

**INDIAN INSTITUTE OF SCIENCE
BANGALORE-560 012**



TENDER DOCUMENT

**Construction of Lab Space at III Floor for Centre for
Biosystems Science and Engineering (BSSE) at IISc**

TENDER NO. 12/CCMD/2016-17 DATED 17th March 2017

Address :

Center for Campus Management and Development
Indian Institute of Science,
Bangalore – 560 012.

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CONTENTS

Sl. No.	Description of contents	Page Number
1.	Tender Notification	3-4
2.	General rules and directions to contractors	5-8
3.	Articles of Agreement	9-14
4.	Memorandum of work	15-16
5.	Appendix	17
6.	Generals Rules and Directions to Contractors	18-20
7.	Conditions of Contract	21-39
8.	General Specifications for civil & Electrical works	40-71
9.	Accepted make of materials	72-76
10.	Note	77
11.	Bill of Quantity	78-109
12.	Abstract - Cost	110

INDIAN INSTITUTE OF SCIENCE BANGALORE 12

Tender Notification No. **12/CCMD/2016-17**

Dated **17-03-2017**

Sealed item rate tenders in Two cover system (Technical & Financial Bids) accompanied by E.M.D. by way of Crossed Demand Draft drawn in favour of the Registrar, Indian Institute of Science are invited in duplicate from the eligible Registered CLASS I CIVIL Contractors of CPWD/KPWD/MES/Railways for the following works:

The Technical Bid & Financial Bid shall be submitted in two separate sealed covers duly superscribed as TECHNICAL & FINANCIAL BID. These two covers shall be submitted in a single cover duly superscribing the name of the work with name and address of the tenderer addressed to the Project Engineer cum Estate Officer, CCMD on or before **03.05.2017** up to 3.00 p.m

Tender documents may be downloaded from the website www.iisc.ac.in/opportunities/tenders/ from **03.04.2017 to 02.05.2017**, for a non-refundable fee (for two sets) as indicated in the Table below towards the cost of Tender Documents in the form of Demand Draft on any Nationalized/ Scheduled bank payable at Bangalore in favour of "Registrar, Indian Institute of Science". Interested renderers may obtain further information at Office of CCMD, Indian Institute of Science, Bangalore during office working hours.

Sl. No.	Name of the Work	Estimated Cost (Rs. in Lakhs)	E.M.D. Rs.	Cost of Tender Documents Rs.	Time for Completion of Work
1.	Renovation of Finance and Accounts Building to Accommodate DIGITS Office at IISc	65.40	1,31,000/-	10,000/-	5 (Five Months)
2.	Renovation of Bio-chemistry Building at IISc	43.65	88,000/-	5,000/-	4 (Four Months)
3.	Construction of Lab Space at III Floor for Centre for Biosystems Science and Engineering (BSSE) at IISc	38.70	77,500/-	5,000/-	4 (Four Months)
4.	Construction of Toilet for drivers and Renovation of East wing Toilet Block at J N Tata Auditorium at IISc	34.00	68,000/-	5,000/-	4 (Four Months)

1. Schedule of dates

- Commencement of downloading the tender documents from : **03/04/2017**

- b. Last date for downloading the tender document : **02/05/2017**
- c. Last date for Receipt of duly filled tenders along with cost of Tender documents and EMD to be enclosed in Technical Bid is up to **03.05.2017** up to **3.00 P.M** and the technical bid will be opened on the same day at 3.30 P.M at the Office of CCMD or otherwise the next convenient working day during office hours.

2. Eligibility criteria :

- a. The agency should have executed a single work of similar nature work in Government/Semi-Government costing not less than 80% of the estimated cost of these tender works in any of the financial year during the preceding five years from 2011-12 to 2015-16
 - b. The agency should have given a financial turnover with a minimum of **Rs. 131.00 lakhs** for SIno.1, **Rs. 87.5 lakhs** for SIno.2, **Rs. 77.5 lakhs** for SIno.3 and **Rs. 68.00 lakhs** for SIno.4, in **any two consecutive years** in the preceding five years from 2011-12 to 2015-16.
 - c. The agencies who have executed similar nature of work are eligible to download the tender documents and other related documents including specification and schedule of quantities from the website www.iisc.ac.in/opportunities/tenders/
3. The agency who are successful in work for Sl.No. 1 will not be considered for work Sl.No. 2,3 and 4. Similarly the agency who are successful in work for Sl.No.2 will be not consider for work Sl.No. 3 and 4. Similarly the agency who are successful in work for Sl.No.3 will be not consider for work Sl.No. 4.
4. The tender will be opened as per the descending order of the estimated cost.
5. The Work done Certificate and other certificates enclosed by the agencies are subject to physical verification and document verification for authenticity.
6. Conditional tenders ARE LIABLE TO BE REJECTED
7. Financial bid of technically qualified agencies only will be opened. The date and time of opening the financial bids of successful agencies will be intimated separately.
8. The institute reserves the right to accept or reject any or all tenders without assigning any reasons thereof.

REGISTRAR

GENERAL RULES AND DIRECTIONS TO CONTRACTORS

1. A Schedule of Quantities (Bill of Quantities) is attached herewith. It should however, be clearly understood that these quantities are liable to alterations by omission, addition or variation, at the discretion of the Architects/Project Engineer Cum Estate Officer..
2. The tenderer shall insert all rates and amounts and the totals in the schedule of quantities. Rate for alternative items, when asked for, shall be entered in red ink and shall not be included in the total.
3. The drawings together with specifications and conditions of contract are enclosed. These should be studied carefully by the intending tenderers. In the absence of specifications for any item of work, material or ingredient in the specifications, PWD specifications shall be followed and in the absence of specification for any item, materials are ingredient shall be fixed in all respects in accordance with the instructions and requirements of the Project Engineer Cum Estate Officer, the work will be the best of the kind.
4. The tenderer is expected to inspect the site and acquaint himself with the local conditions and will be deemed to have so done before submitting the tender.
5. The successful tenderer is required to sign an agreement for the due fulfillment of the contract and start the work immediately on of the acceptance of his tender. A draft of the Articles of the Agreement is enclosed. The Earnest Money referred to in item No.3 of Memorandum contained in the "Item Rate Tender for Works", will be forfeited and at the absolute disposal of the Employer if the Contractor defaults from signing the Agreement of in starting the work.
6. The rates quoted shall be for finished work and shall include for all necessary incidental work. Sales or any other tax on materials in respect of this contract will be payable by the Contractor. The Contractors cannot presume any details regarding the contract.
7. Water supply: The Contractor has to make his own arrangement for water supply. However,, if water supply to the site at one convenient point is made available by the Institute, the charges for the consumption of water will be borne by the Contractor at 1.50% of the value of the work.
8. Supply of Electricity-electricity required for construction shall be arranged by the contractor itself. Electricity if supplied to the contractor by the institute will be metered and amounted will be recovered in the bills as per actual at rate

fixed by the Institute. Supply of electricity from the institute is not mandatory. Non supply of electricity by the institute cannot be held as reason for short fall in progress.

9. The duration of the work is **4 (FOUR) MONTHS.**
10. Institute reserves the right to accept or reject any tender without assigning reasons thereof. He further reserves the right of deleting any item of work in this contract at his discretion.
11. The tenders are valid for a period of 3 (three) months from the date of opening.
12. This “General Rules and Directions to Contractors” shall also form part of the tender document.
 - 12.1 Cement to be procured by contractor only, adhering to the following conditions.
 1. Only 53 grade OPC cement is to be used for the projects.
 2. The cement shall conform to IS 8119-1976.
 3. ACC, L&T, Coromandel, Birla brands only to be used.
 4. Test certificate is to be produced for every procurement made for.
 - 12.2 The provisions for the foregoing sub-clause shall apply in the use of steel reinforcements (Fe 500 N/mm²) of structural steel sections, except that the theoretical quantity of steel shall be taken as the quantity required as per design or as authorised by the Project Engineer cum Estate Officer, Hostels, including authorized lappages plus 5% wastage due to cutting into pieces. Over this theoretical quantity, + 4% shall be allowed as variation due to wastage being more or less.
13. This contract comprises:
 - a)General Builders work (Civil works).
 - b)Water supply and Sanitary installations.
 - c)Electrical Installations.
 - d)Sump and overhead tanks.
14. **The General** Builder should get the water supply and sanitary installations and the Electrical installations executed through licensed sub-contractor having

good experience and qualified and competent tradesmen in the respective fields and approved by the Project Engineer Cum Estate Officer.

15. It is entirely the responsibility of the Contractor to arrange for and provide all materials required for successful completion of the work except such special materials that may be supplied if any.
16. The Brand, size and colour of vitrified/ceramic/glazed tiles shall be got approved

from the Competent authority before procurement of materials.

Brands recommended are Johnson, Naveen, Kazaria.

17. Water supply/Sanitary fixtures like Bibcocks, pillarcocks, Health-faucet, anglecock, bottle traps, EWC, IWC, urinal basins shall be as per approval from competent authority.
18. Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows
 - a) Where there is discrepancy between the rates in figures and in words, the lower of the two will be governed and
 - b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will be governed.
 - c) Where there is a discrepancy in entries of unit rate between the Original and Duplicate, the lower will govern.
19. Tol tax, Octrai, Royalty for collecting earth, gravel, sand stone etc., Excise duty, Sales tax or any other tax payable on account of this contract will have to be met from contractors account.
20. The Contractor should make his own arrangements to cover the all-round construction area, by providing polyester net/polythene sheet/barricading to avoid inconvenience to other surrounding departments, as directed by the Engineer-in-charge of the work.

21. The debris arise during the period of construction will have to be cleared then and there to keep the surroundings clean and tidy. Such debris shall, if not cleared, be cleared at his risk and cost.
22. Work done as a sub- contractor under a prime contractor will not be considered for qualification.
23. “Prime Contractor” means a firm that performs a construction work itself and that the work is directly entrusted to the firm by the owner/ government/ local body/ quasi government/ Government undertaking bodies.
24. The contractor shall vacate the campus premises with all his men/ materials immediately after completion of the project.

THE ARTICLES OF AGREEMENT

Articles of Agreement made at Bangalore, this between the INDIAN INSTITUTE OF SCIENCE, BANGALORE 560 012, (hereinafter referred to as the OWNER or EMPLOYER which expression shall include its successors and assigns and all the persons for the time being in the Management of the Institute) represented by its REGISTRAR of the ONE PART, andhereinafter referred to as the "CONTRACTOR", (which expression shall include their partners, their respective heirs, executors, administrators and assigns) on the OTHER PART.

CONTRACTOR

REGISTRAR

WHEREAS the Employer is desirous of getting the work of “**Construction of Lab space at III Floor for Centre for Biosystems Science and Engineering (BSSE) at Iisc.,,**” (hereinafter called the work) executed by the Contractor at the rates quoted by him amounting to **Rs.38,70,000 (Rupees Thirty Eight Lakh Seventy Thousand Only)** which is the estimated amount put to tender.

AND WHEREAS the Contractor has agreed to execute the aforesaid work on terms and conditions mentioned herein and subject to Tender Conditions of Contract and in accordance with the particular specifications, general notes and the schedule of quantities, schedule of rates, payment and penalty condition.

AND WHEREAS the contractor has deposited a sum of **Rs.77,500/- (Rupees Eighty Eight Thousand Only)** with Employer as security for the due performance of this Contract.

NOW it is hereby agreed and declared by and between the parties hereto as follows;

1. In consideration of the payment to be made to them as hereinafter provided, the contractor shall, subject to the terms, conditions, specifications, schedule of quantities, drawings, etc., more particularly stated in the Schedules aforesaid, execute and complete the work within **4 (Four) Months** starting after 10 days of issuance of work order or from the date of handing over of site, whichever is later.
2. The Employer shall pay to the contractor such sums as shall become payable hereunder at the time and in the manner specified in the conditions contained in the schedule aforesaid.
3. The time allowed for carrying out the work as entered in the tender Agreement shall be strictly observed by the contractor and shall be deemed to be the essence of the contract on the part of the contractor and shall be reckoned from 10 days after the date on which the order to commence the work is issued to the Contractor or the date of handing over of site, whichever is later. The work shall throughout the stipulated period of the contract be proceeded with all due diligence and the Contractor shall pay as compensation an amount equal to one percent, or such smaller amount, as the Director, Indian Institute of Science (whose decision in writing shall be final) may decide on the amount of estimated cost of the whole work as shown in the tender for every day that the work remains un commenced or unfinished, after proper dates. And further to ensure good progress during the execution of the work the contractor shall be bound in all cases in which the time allowed for any work exceeds one month (save for special jobs) to complete one-eighth of the whole work before, one-fourth of the whole time allowed under the contract has elapsed, three-eighths, of the work before one-half of such time has elapsed, and three-fourths of the work before three-fourths of such time has elapsed.

CONTRACTOR

REGISTRAR

However for special jobs if a time schedule has been submitted by the contractor and the same has been accepted by the Architects/ Project Engineer-cum-Estate Officer, CCMD the contractor shall comply with the said schedule. In the event of the Contractor failing to comply with the conditions he shall be liable to pay as compensation an amount equal to one percent or such smallest amount, as the Director, Indian Institute of Science (Whose decision in writing shall be final), may decide on the said estimated cost of the whole work for every day that the due quantity of work remains incomplete; provided always that the entire amount of compensation to be paid under the provisions of this clause shall not exceed seven and a half (7 ½) percent of the estimated cost of the work as shown in the tender, provided further that in the event of contractor making up the short fall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the Contractor.

The Director of the Indian Institute of Science, without prejudice to his rights under the contract in any respect of any delay or inferior workmanship or otherwise, or to any claim for damages in respect of any breaches of the Contract and without prejudice to any rights of remedies under any of the provisions of this contract or otherwise and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:-

- (i) If the contractor having been given by the Architects/Project Engineer-cum-Estate Officer, CCMD a notice in writing to rectify reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un workmanlike manner, shall omit to comply with the requirements of such notice for a period of seven days of such notice thereafter or if the contractor shall delay or suspend the execution of the work so that in the judgment of the Project Engineer-cum-Estate Officer, CCMD (which shall be final and binding) either he will be unable to secure completion of the work by the date for completion of the work or he has already failed to complete the work by that date.
- (ii) If the Contractor being a company passes a resolution or if the Court passes an order to wind up the company or if a receiver or a manager is appointed on behalf of the creditors of the company or under circumstances which entitles the Court or the creditors to appoint a receiver or manager which would entitle the Court to make a winding up order.
- (iii) If the Contractor commits breach of any of the terms or conditions of this contract;

CONTRACTOR

REGISTRAR

- (iv) If the contractor assigns or sublets without written approval of the Project Engineer-cum-Estate Officer, CCMD or becomes insolvent.

When the Contractor has made himself liable for action under any of the cases aforesaid, the Project Engineer-cum-Estate Officer, CCMD on behalf of the Director of the Institute shall have powers: -

- (a) To determine or rescind the Contract as aforesaid (in which termination or recession notice in writing to the Contractor under hand of the Project Engineer-cum-Estate Officer, CCMD shall be conclusive evidence) Upon such determination or recession the security deposit of the Contractor shall be liable to be forfeited and shall absolutely be at the disposal of Institute.
- (b) To employ labor paid by the Institute and supply materials to carry out the work or any part of the debiting the Contractor with the cost of the labor and the price of the materials (of the amount of which cost and price certified by the Project Engineer-cum-Estate Officer, CCMD shall be final and conclusive against the Contractor) and crediting him with the value of the work done in all respect on the same manner and at the same rates as if it has been carried out by the contractor under the term of his contract. The certificate of the Project Engineer-cum-Estate Officer, CCMD as to the value of the work done shall be final and conclusive against the contractor, provided always that action under the sub-section shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the Institute are less than the amount payable to the contractor at his agreement rates, the difference shall not be paid to the Contractor.
- (c) After giving notice to the contractor to measure up the work of the contractor and to take such part thereof as shall be un-executed out of his hands and to give it to another contractor to complete in which case any expenses which may be incurred in excess a sum of which would have been paid to the original contractor if the whole work had been executed by him (of the amount of which excess the certificate in writing of the Project Engineer-cum-Estate Officer, CCMD shall be final and conclusive) shall be borne and paid by the original contractor and may be deducted from any monies due to him from the Institute under this contract or any other account whatsoever, of from his security deposit or the proceeds of sales thereof, or a sufficient part thereof as the case may be.

CONTRACTOR

REGISTRAR

In the event of any one or more of the above courses being adopted by the Project Engineer-cum-Estate Officer, CCMD, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provisions, aforesaid, this contractor shall not be entitled for recover or be paid any sum for work thereto/for actually performed under this contract unless the Architect/ Project Engineer-cum-Estate Officer, CCMD has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

4. The schedules above mentioned including the General Rules and Directions to Contractors and the following documents, viz.,

- i) Letter of Indent
- ii) Letter of Acceptance
- iii) Conditions of Contract – Volume I
- iv) Contractor's Bid – Bill of Quantities – Volume II
- v) Technical Specifications – Volume III
- vi) Drawings
- vii) The pre-Bid meeting proceedings and corrigendum
- viii) Any other document listed in the Contract Data as forming part of the contract

shall form an integral part of agreement and the decision of the Project Engineer-cum-Estate Officer, CCMD in reference to all matters of dispute as to material and workmanship shall be final and binding on both the parties.

5. The employer reserves to himself the right of altering the drawings of the works and of adding to or omitting any item of work from or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall not vitiate this agreement.

6. This agreement comprises the work aforesaid and all subsidiary works connected therewith even though such works may not be shown on the schedule appended hereto.

7. Notwithstanding anything contained in the tender submitted by the contractor, all the clauses of this agreement shall be binding on both the parties.

CONTRACTOR

REGISTRAR

8. In case of dispute other than as at Clause 4 above the decision on the Director, Indian Institute of Science, shall be final and binding.

IN WITNESS WHEREOF the parties hereto have set their respective hands the day and the year here in above written.

In the presence of:

Signed by for and on behalf of the said Contractor.

In the presence of:

Signed by for and on behalf of the said Employer.

REGISTRAR
INDIAN INSTITUTE OF SCIENCE
BANGALORE-12

Indian Institute of Science, Bangalore-12

ITEM RATE TENDER FOR WORK

I/We, hereby tender for the execution for the Indian Institute of Science, Bangalore-12 of the works specified in the under mentioned memorandum within the time specified in such memorandum at the rates specified therein and in accordance, in all respects, with the specifications, designs, drawings and instructions in writing which have been read by me/read and explained to me and with such materials as provided for by and in all other respects in accordance with such conditions as for as possible.

MEMORANDUM OF WORK

1.	GENERAL DESCRIPTION	Construction of Lab space at III Floor for Centre for Biosystems Science and Engineering (BSSE) at Iisc.,,
2.	ESTIMATED COST	Rs.38,70,000
3.	EARNEST MONEY	Rs.77,500.00
4.	FURTHER SECURITY DEPOSIT	5.5% on the running account bills and final bill in addition to Earnest Money Deposit. When the F.S.D. deducted from the RA bills of the Contractor @ 5.5% of the bill amount exceeds Rs.1.00 lakhs, the amount in excess of Rs.1.00 lakh may, at the request of the Contractor, be released to him against the production of a bank guarantee issued by a Nationalised Bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the period mentioned in page 2 of Sl.No.1.
5.	TIME ALLOWED FOR THE COMPLETION OF WORK IN ALL RESPECTS FROM THE DATE OF COMMENCEMENT OF WORK	4 (FOUR) Months
6	BILLS OF QUANTITIES.	Enclosed.
7.	SPECIFICATIONS.	The work shall be carried out strictly in accordance with the enclosed specifications and wherever items are not covered by those specifications in accordance with specifications/drawings/designs/requirements and directions of the Project Engineer-cum-Estate Officer, CCMD or his representatives.

Contractor

Registrar

I/We hereby agree to abide by and fulfill all the terms and provisions of the conditions contained in the articles of agreement, which have been read by me/us or in default thereof to forfeit and pay to the Registrar, Indian Institute of Science or his successors the sums of monies mentioned in the said conditions.

The sum of **Rs.77,500/- (Rupees Seventy Seven Thousand Five Hundred Only)** has been deposited in cash/Bank draft as Earnest Money the full value which is to be absolutely forfeited to the Registrar or his successors in Office should I/We fail to commence the work specified in the above memorandum and complete the same.

Dated this

Signature of the Contractor/s

Witness to Contractor/s Signature:

NAME

ADDRESS

OCCUPATION

The above tender is hereby accepted by me on behalf of the Indian Institute of Science, Bangalore-12.

**REGISTRAR
INDIAN INSTITUTE OF SCIENCE
BANGALORE.**

Indian Institute of Science, Bangalore-12

A P P E N D I X

1.Name of the work	Construction of Lab space at III Floor for Centre for Biosystems Science and Engineering (BSSE) at Iisc.,,”
2.Date of commencement of work	Within Ten days from the date of issue of work order or the date of handing over the site whichever is later
3.Time of Completion	4 (FOUR) Months
4.Frequency of interim Certificate and payment	Once every month.
5.Further Security deposit	5.5% on the running bills and final bill in addition to earnest money deposit. When the F.S.D. deducted from the R.A. Bills of the contractor @ 5.5% of the bill amount exceeds Rs.1.00 Lakhs, the amount in excess of Ra.1.00 Lakh may, at the request of the contractor, be released to him against the production of bank guarantee issued from a Nationalised Bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the period i.e., 90 days.
6. Defects liability period / retention amount from the final bill/release of balance of deposit.	The security deposit lodged/paid by a contractor shall be refunded to him after the final bill is paid or after twelve months from the date of completion of the work, during which period the work so executed should be maintained by the contractor in good order, whichever is later.
7. Penalty for delay	In respect of the shortfall in progress, assessed as due to the delay on the part of contractor as per clause 2(b) and 2(c), the contractor shall be liable to pay as penalty an amount equal to one percent of the estimated cost of the balance work assessed according to the programme, for every day that the due quantity of work remains incomplete, provided always that the total amount of penalty to be paid under the provisions of this clause shall not exceed 7 ½ percent of the estimated cost of the entire work as shown in the tender, provided further that in the event of the contractor making up the shortfall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the contractor.
8. Period for payment of Running Bill.	Three weeks from the date of submission of each Running account bills by the Contractor.
9. Period for submitting the final Bill.	One month from the date of virtual completion of the work by the Contractor.

CONTRACTOR.

REGISTRAR

GENERAL RULES AND DIRECTIONS TO CONTRACTORS

1. A Schedule of Quantities (Bill of Quantities) is attached herewith. It should however, be clearly understood that these quantities are liable to alterations by omission, addition or variation, at the discretion of the Architects/Project Engineer-cum-Estate Officer, CCMD.
2. The tenderer shall insert all rates and amounts and the totals in the schedule of quantities. Rate for alternative items, when asked for, shall be entered in red ink and shall not be included in the total.
3. The drawings together with specifications and conditions of contract are enclosed. These should be studied carefully by the intending tenderers. In the absence of specifications for any item of work, material or ingredient in the specifications, PWD specifications shall be followed and in the absence of specification for any item, materials are ingredient shall be fixed in all respects in accordance with the instructions and requirements of the Project Engineer-cum-Estate Officer, CCMD, the work will be the best of the kind.
4. The tenderer is expected to inspect the site and acquaint himself with the local conditions and will be deemed to have so done before submitting the tender.
5. The successful tenderer is required to sign an agreement for the due fulfillment of the contract and start the work immediately on of the acceptance of his tender. A draft of the Articles of the Agreement is enclosed. The Earnest Money referred to in item No.3 of Memorandum contained in the "Item Rate Tender for Works", will be forfeited and at the absolute disposal of the Employer if the Contractor defaults from signing the Agreement of in starting the work.
6. The rates quoted shall be for finished work in –situ and shall include for all necessary incidental work. Sales or any other tax on materials in respect of this contract will be payable by the Contractor. The Contractors cannot presume any details regarding the contract.
7. The water supply to the site at one convenient point if made available by the owner, the charges for the consumption of water will be borne by the Contractor at 1.5% of the value of work requiring water.

Contractor

Registrar

8. Time allowed for completion of work is within **4 (FOUR) Months**. No time extension will be granted.
9. Registrar reserves the right to accept or reject any tender without assigning reasons thereof. He further reserves the right of deleting any item of work in this contract at his discretion.
10. The tenders are valid for a period of 3 (Three) months from the date of opening.
11. This "General Rules and Directions to Contractors" shall also form part of the tender document.
12. It is entirely the responsibility of the Contractor to arrange for and provide all materials required for successful completion of the work except such special materials that may be supplied if any.

12.1 Cement to be procured by contractor only, adhering to the following conditions.

1. Only 43/53 grade OPC cement is to be used for the projects.
2. The cement shall conform to IS 8119-1976.
3. ACC, L&T, Coromandel, Birla and Rajashree brands only to be used.
4. Test certificate is to be produced for every procurement made for.

12.2 The provisions for the foregoing sub-clause shall apply in the use of steel reinforcements of structural steel sections, except that the theoretical quantity of steel shall be taken as the quantity required as per design or as authorised by the Project Engineer-cum-Estate Officer, Hostels, including authorized lappages plus 5% wastage due to cutting into pieces. Over this theoretical quantity, + 4% shall be allowed as variation due to wastage being more or less.

13. This contract comprises:

- a) General Builders work (Civil works).
- b) Water supply and Sanitary installations.
- c) Electrical Installations.
- d) Sump and overhead tanks.

Contractor

Registrar

14. The General Builder should get the water supply and sanitary installations and the Electrical installations executed through licensed sub-contractor having good experience and qualified and competent tradesmen in the respective fields and approved by the Project Engineer-cum-Estate Officer, CCMD.
15. The tender is liable to be rejected if it contains any freak rates for any of the items namely, low rates of 25% below or high rate 25% above than the reasonable market rates based on the cost of materials and labour at the time of tendering.(Estimates rates).
16. Tol tax, Octrai, Royalty for collecting earth, gravel, sand stone etc., Excise duty, Sales tax or any other tax payable on account of this contract will have to be met from contractors account.
17. The Contractor should make his own arrangements to cover the all round construction area, by providing polyester net/polythene sheet/barricading to avoid inconvenience to other surrounding departments, as directed by the Engineer-in-charge of the work.
18. The debris accumulated during the period of construction will have to be cleared then and there to keep the surroundings clean and tidy. Such debris if not cleared, shall be cleared at his own risk and cost.
19. All questions relating to the performance of the obligations under this agreement and all the dispute and differences which shall arise either during or after the agreement period or other matters arising out of or relating to this agreement or payments to be made in pursuance thereof shall be decided by the Director of IISc whose decision shall be final and binding on the contractor. The contractor hereby agrees to be bound by the decision of the director.

Contractor

Registrar

CONDITIONS OF CONTRACT

Clause 1. Security Deposit

- (a) The person/persons whose tender may be accepted (hereinafter called the contractor which expression shall unless the context otherwise requires, include his heirs, executors, administrators and assigns) shall pay Earnest Money Deposit indicated in Column (ii) of the table given below and shall permit Institute (a) to deduct FSD at the percentage mentioned in Column (iii) of the table given below of all moneys payable for work done under the Contract, at the time of making such payments to him/them and (b) to hold such deductions as Further Security Deposit (FSD).

Estimated cost of the work	E.M.D Percentage	F.S.D Percentage
(i)	(ii)	(iii)
Upto Rs.20,00,000/-	2 ½%	5%
Rs.20,00,000/- upto Rs.1.00 Crore	2%	5 ½%
Rs.1.00 crore upto Rs.10 crores	1 ½%	6%
10 crores and above	1%	6 ½%

(b) **Addition or Reduction in Security Deposit.**

The EMD for the tendered work and additional amount of Security Deposit at the rates mentioned in **Sub-clause 1(a)** above should be, paid by the contractor. If a portion of the work is withdrawn from the Contractor under the provisions of Clause 12(a), the Project Engineer cum Estate Officer(CCMD), Indian Institute of Science(hereinafter referred to as the Project Engineer cum Estate Officer) may allow a proportionate reduction in the amount of the Security Deposit.

(c) **Dues to Institute, to be set off against Security Deposit.**

All compensation or other sums of money payable by the Contractor to Institute under the terms of this contract may be realized or deducted from any Security Deposit payable to him or from any sums which may be due or may become due by Institute to the Contractor on any account whatsoever and in the event of his security deposit being reduced by reason of any such realization or deduction as aforesaid, the Contractor shall, within ten days thereafter, make good in cash any sum or sums which have been deducted from, or raised by sale of his security deposit or any part thereof.

(d) Refund of Security Deposit (EMD & FSD):

The Security Deposit lodged/paid by a Contractor shall be refunded to him after the final bill is paid or after twelve months from the date of completion of the work, during which period the work should be maintained by the Contractor in good order, whichever is later.

Clause 2. PENALTY FOR DELAY

(a) Written Order to Commence Work

After acceptance of the tender, The Project Engineer cum Estate Officer, CCMD shall issue a written order to the successful tenderer to commence the work. The Contractor shall enter upon or commence any portion of work only with the written authority and instructions of The Project Engineer cum Estate Officer, CCMD. Without such instructions the Contractor shall have no claim to demand for measurements of or payment for, work done by him.

(b) Programme of work

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor. It shall be reckoned from the date of handing over the site to the Contractor not less than 75 percent of work site area comprising a continuous block. The work shall throughout the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the essence of the contract on the part of the Contractor). To ensure good progress during the execution of the work, the contractor shall be bound (in all cases in which the time allowed for any work exceeds one month) to comply with the time schedule according to the programme of execution of the work as agreed upon and enclosed to the agreement.

(c) Review of progress and responsibility for delay etc.,

The Project Engineer cum Estate Officer, CCMD shall review the progress of all works with the contractor during the first fortnight of every month. Such a review shall take into account the programme fixed for the previous month, obligations on the part of the Contractor.

(d) Apportioning of responsibility for delay between Contractor and Institute.

In case the progress achieved falls short by more than 25 percent of the cumulative programme, the reasons for such shortfall shall be examined and a record made thereof apportioning the responsibilities for the delay between the contractor and the Institute. This record should be signed in full and dated both by The Project Engineer cum Estate Officer, CCMD and the Contractor.

(e) Shortfall in progress made up subsequently.

To the extent the shortfall is assessed, as due to the delay on the part of the contractor, a notice shall be issued to him by The Project Engineer cum Estate Officer, CCMD to make up the shortfall . If the shortfall is not made up before the progress of the work is reviewed during the second month succeeding the month in which the shortfall was observed, the Contractor shall be liable to pay penalty as indicated in **Clause 2(h)** below.

(f) Settlement of dispute regarding shortfall in progress.

In case of dispute between The Project Engineer cum Estate Officer, CCMD and Contractor regarding the responsibility for the shortfall in progress, the matter shall be referred to the Director, IISc., who shall thereupon give a decision within fifteen days from the date of receipt of reference. The decision of the Director shall be final and binding on the contractor and The Project Engineer cum Estate Officer, CCMD.

(g) Penalty for delay

In respect of the shortfall in progress, assessed as due to the delay on the part of contractor as per **Clause 2(b)** and **2 (c)**, the contractor shall be liable to pay as penalty an amount equal to one percent of the estimated value of the balance work assessed according to the programme, for every week that the due quantity of work remains incomplete; provided always that the total amount of penalty to be paid under the provisions of this clause shall not exceed 7 ½ percent of the estimated cost of the entire work as shown in the tender, provided further that in the event of the contractor making up the shortfall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the contractor.

Note: *If The Project Engineer cum Estate Officer, CCMD considers it necessary he shall be entitled to take action as indicated in **Clause 3 (d)** also.*

(h) Adjustment of excess/over payments.

Excess/over payments as soon as they are discovered should be adjusted in the next running account bill of the contractor and in case the final bill has already been paid, the excess/over payment made shall be recovered from the Security Deposit of the contractor together with interest at such percentages as Institute may decide from time to time, from the date of such excess or over payment to the date of recovery.

Clause 3 ACTION WHEN WHOLE OF SECURITY DEPOSIT IS FORFEITED

In any case in which under any clause or clauses of this contract the contractor shall have rendered himself liable to pay compensation and/or penalty amounting to the whole of his security deposit including the amount deducted in installment from his bills as Further Security Deposit, The Project Engineer cum Estate Officer, CCMD on behalf of the Director, IISc., shall have power to adopt any of the following courses as he may deem best suited in the interest of Institute.

(a) Forfeiture of Security Deposit

Without prejudice to Institute's right to recover any loss from the Contractor under **sub-clauses (b) and (c) of Clause 3** of the Contract, to rescind the contract (of which rescission notice in writing to the contractor under the hand of The Project Engineer cum Estate Officer, CCMD shall be conclusive evidence). And in that case, the security deposit of the contractor including whole or part of the lump sum deposited by him and also the amount deducted from his bills as Further Security Deposit, shall stand forfeited and be absolutely at the disposal of the Institute.

(b) Debiting cost of labour and materials supplied.

To employ labour paid by the Institute and to supply materials to carry out the work or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (as to the correctness of which cost and price the certificate of the The Project Engineer cum Estate Officer, CCMD shall be final and conclusive against the contractor) and crediting him with the value of the work done; in all respects in the same manner and at the same rates as if it had been carried out by the contractor under terms of this contract, and in that case the certificate of the The Project Engineer cum Estate Officer, CCMD as to the value of the work done shall be final and conclusive against the contractor.

(c) Recovery of extra cost on unexecuted work

To measure up the work of the contractor and to take such part thereof as is remaining unexecuted out of his hands and to give it to another contractor to complete it in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (as to the amount of which excess expenses the certificate in writing of the The Project Engineer cum Estate Officer, CCMD shall be final and conclusive) shall be borne and paid by the original contractor and shall be deducted from any money due to him by Institute under this contract.

(d) Action against unsatisfactory progress

If the contractor does not maintain the rate of progress as required under **Clause 2** and if the progress of any particular portion of work is unsatisfactory even after taking action under **Clause 2(c) and 2(d)**, the The Project Engineer cum Estate Officer, CCMD shall be entitled to take action under **Clause 3(b) or 3(c)** at his discretion in order to maintain the rate of progress after giving the contractor 10 days notice in writing whereupon the contractor will have no claim for any loss sustained by him owing to such actions .

(e) No compensation for loss sustained on advance action

In the event of any of the above courses being adopted by the Project Engineer cum Estate Officer,CCMD, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased, or procured any materials, entered into any agreements or made any advances on account of, or with a view to the execution of the work or the performance of the contract. And in case the contract shall be rescinded under the provision aforesaid the contractor shall not be entitled to recover or be paid any sum for any work thereof actually performed by him under his contract, unless and until the Project Engineer cum Estate Officer,CCMD shall have certified in writing the performance of such work and the amount payable in respect thereof, and he shall only be entitled to be paid the amount so certified.

Clause 4. CONTRACTOR TO REMAIN LIABLE TO PAY COMPENSATION IF ACTION IS NOT TAKEN UNDER CLAUSE-3.

(a) In any case in which any of the powers conferred upon the the Project Engineer cum Estate Officer, CCMD by **Clause 3** thereof shall have become exercisable and the same shall not have been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor for which under any clause hereof he is declared liable to pay compensation or penalty amounting to the whole of his security deposit and the liability of the contractor for past and future compensation or penalty shall remain unaffected.

(b) Power to take possession of or require removal of or sell contractor's properties.

In the event of the The Project Engineer cum Estate Officer, CCMD taking action under **sub-clause (a) or (c) of Clause 3**, he may, if he so desires, take possession of all or any tools, plant, materials and stores, in or upon works or the site thereof or belonging to the contractor, or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account at the contract rates; or in the case of contract rates not being applicable, at current market rates, to be certified by the The Project Engineer cum Estate Officer, CCMD whose certificate thereof shall be final. In the alternative, the Project Engineer cum Estate Officer, CCMD may after giving notice in writing to the contractor or his clerk of the works, foreman or other authorised agent, require him to remove such tools, plant, materials or stores from the premises within a time to be specified in such notice; and in the event of the contractor, failing to comply with any such requisition, the Project Engineer cum Estate Officer, CCMD may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and at his risk in all respect, and the certificate of the The Project Engineer cum Estate Officer, CCMD as to the expense of any such removal; and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

Clause 5. GRANT OF EXTENSION OF TIME

- (a) If the contractor shall desire an extension of the time for completion of the work, on the ground of his having been unavoidably hindered in its execution or on any other ground, he shall apply in writing to the Project Engineer cum Estate Officer, CCMD before the expiry of the period stipulated in the tender or before the expiry of 30 days from the date on which he was hindered as aforesaid or on which the cause for asking for extension occurred, whichever is earlier and the Project Engineer cum Estate Officer, CCMD or other competent authority may if in his opinion, there are reasonable grounds for granting an extension, grant such extension as he thinks necessary or proper. The decision of such competent authority in this matter shall be final.
- (b) The time limit for completion of the work shall be extended commensurate with its increase in cost occasioned by alterations or additions and the certificate of the Project Engineer cum Estate Officer, CCMD or other competent authority as to such proportion shall be conclusive.

Clause 6. ISSUE OF FINAL CERTIFICATE – CONDITIONS REGARDING

(a) On completion of the work the contractor shall report in writing to the Project Engineer cum Estate Officer, CCMD the completion of the work. Then he shall be furnished with a certificate by the Project Engineer cum Estate Officer, CCMD of such completion, but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall have been executed, all scaffolding, surplus materials and rubbish, and shall have cleaned thoroughly all wood work, doors, windows, wall, floor or other parts of any building, in or upon which the work has been executed, or of which he may have had possession for the purpose of executing the work, nor until the works shall have been measured by the Project Engineer cum Estate Officer, CCMD or other competent authority, or where the measurements have been taken by his Engineer-in-charge until they have received the approval of the Project Engineer cum Estate Officer, CCMD or other competent authority, the said measurements being binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials and rubbish, and cleaning on or before the date fixed for the completion of the work the Project Engineer cum Estate Officer, CCMD or other competent authority may, at the expense of the contractor, remove such scaffolding, surplus materials and rubbish, and dispose of the same as he think fit and clean off such dirt etc., as aforesaid and contractor shall be liable to pay the amount of all expenses incurred but shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

(b) CLOSURE OF CONTRACT PENDING COMPLETION OF MINOR ITEMS.

In cases where it is not desirable to keep the building contract open for minor items, such as flooring in the bath rooms, etc., which can be carried out only after installation of sanitary work the main contract may be finalized after getting a supplementary agreement executed in the prescribed form by the same contractor for doing the residual work.

Clause 7. Contractor to submit bills monthly in printed form

- (a)** A bill shall be submitted by the contractor on or before 15th of each month for all items of work executed in the previous month as required by IISc.
- (b)** All bills shall be prepared in the prescribed printed or electronic form in PDF format in quadruplicate and handed over to the Engineer-in-charge in charge of the work/ the Project Engineer cum Estate Officer, CCMD's Office and acknowledgment obtained.
- (c)** The charges to be made in the bills shall always be entered at the rates specified in the tender in full or in part as the case may be, in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, the charges in the bills shall be entered at the rates hereinafter provided for such work.
- (d) Scrutiny of Bills and measurement of work**

The details furnished by the Contractor in the bill should be completely scrutinized and the said work should be measured by the Engineer-in-charge in the presence of the Contractor or his duly authorised agent. The countersignature of the contractor or the said agent in the measurement book shall be sufficient proof to the correctness of the

measurements, which shall be binding on the contractor in all respects. If the contractor does not submit the bills within the prescribed time, the Project Engineer cum Estate Officer, CCMD may depute within seven days of the prescribed date, an Engineer-in-charge to measure up the said work. The countersignature of the contractor shall be obtained in the Measurement Book concerned with reference to which the Institute may prepare the bill.

(e) Filing of objections to measurement by contractor

Before taking any measurement of any work as has been referred to in **Clause 7(d)** above the Project Engineer cum Estate Officer, CCMD or a Engineer-in-charge deputed by him shall give reasonable notice to the contractor. If the Contractor fails to attend at the measurements after such notice or fails to countersign or to the difference, within a week from the date of measurement in the manner required by the Project Engineer cum Estate Officer, CCMD, then in any such event, the measurements taken by the the Project Engineer cum Estate Officer, CCMD or by the Engineer-in-charge deputed by him as the case may be, shall be final and binding on the contractor and the contractor shall have no right to dispute the same.

(f) One copy of the passed bill shall be given to the Contractor without any charge.

Clause 8. PAYMENT PROPORTIONATE TO WORK APPROVED AND PASSED.

- a) No payment shall be made for any work estimated to cost rupees five thousand or less until after the whole of the work shall have been completed and certificates of completion given. But in the case of works estimated to cost more than Rs. 5,000 the contractor shall on submitting the bill and after due verification by the Engineer-in-charge as per **Clause 7(d)** entitled to necessary payment proportionate to the part of the work then approved and passed by The Project Engineer cum Estate Officer, CCMD or other competent authority whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor.

b) Payment at reduced rates

The rates for several items of works agreed to within shall be valid only when the items concerned are accepted as having been completed fully in accordance with the stipulated specifications. In cases where the items of work are not accepted as so completed, the Project Engineer cum Estate Officer, CCMD or other competent authority may make payment on account of such items at such reduced rates as he may consider reasonable in the preparation of final or on account bills.

c) Payment or intermediate certificates be regarded as advances:

All such intermediate payments shall be regarded as payments by way of advance against the final payments only and not as payments for work actually done and completed, and shall not preclude the Project Engineer cum Estate Officer, CCMD or other competent authority from requiring any bad, unsound imperfect or unskillful work to be removed or taken away and reconstructed or re-erected nor shall any such payment be considered as an admission for the due performance of the Contract or any part thereof in any respect or the accruing of any claim, nor shall it conclude determine or affect in any other way the powers of the Project Engineer cum Estate Officer,

CCMD or other competent authority as to the final settlement and adjustment of the accounts, or otherwise or in any other way vary or affect the contract.

d) Submission of Final bill and its settlement

The contractor shall submit the final bill within one month of the date of actual completion of the work in all respects. His claims shall be settled (except those under dispute) within two months thereafter in respect of works costing up to Rs. 1 lakh and within five months thereafter in respect of works costing more than Rs. 2 lakhs.

e) Disputed items

Note: The contractor shall submit a list of the disputed items within 30 days from the disallowance thereof and if he fails to do this, his claim shall be deemed to have been fully waived and absolutely extinguished.

Clause 9. Definition of Work :

- (a)** The expression 'Work' or 'Works' where used in these conditions, shall unless there be something in the subject or context repugnant to such construction, be construed to mean the work or works contracted to be executed under or in virtue of the contract, whether temporary or permanent and whether original, altered, substituted or additional.

(b) Work to be executed in accordance with specifications, drawings, orders etc.

The contractor shall execute the whole and every part of the work in the most sound and substantial and workmanlike manner, and in strict accordance with the specifications both as regards materials and workmanship. The contractor shall also conform exactly, fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Project Engineer cum Estate Officer, CCMD or other competent authority and lodged in his office and to which the contractor shall be entitled to have access at such office, or on the site of the work for the purpose of inspection during office hours. The contractor shall also be responsible for the delivery of structure in sound conditions and the execution of the work strictly in accordance with the specifications of the work.

(c) Action where there is no specification

In the case of any class of work for which there is no such specification, then in such a case of the work shall be carried out in all respects in accordance with the instructions and requirements of the Project Engineer cum Estate Officer, CCMD or other competent authority.

(d) Work as per Specifications and IS Codes.

The detailed specification, which forms a part of contract, accompanies the tender document. In carrying out the various items of work as described in Schedule B of the tender documents and the additional, substituted, altered items of work these detailed specification shall be strictly adhered to, supplemented by relevant provisions of the Indian standard specifications, the code of practice; etc., The Indian standard specification and the code of practice to be followed shall be the latest versions of those listed in the detailed technical specifications. Any class of work, not covered by the detailed technical specifications, shall be executed in accordance with the instructions

and requirements of the engineer and the relevant provisions of the Indian standard specifications.

Clause 10. Alteration in quantity of work, specifications and designs, Additional work, deletion of work

- (a) The Project Engineer cum Estate Officer, CCMD shall have power to make any alternations in, omissions from additions to or substitutions for the original specification, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work. For that purpose or if for any other reason it shall in his opinion be desirable, he shall have power to order the Contractor to do and the contractor shall do any or all the following: -
- (b) Increase or decrease the quantity of any work included in the contract.
- (c) Omit any such work.
- (d) Change the character or quality or kind of any such work,
- (e) Change the levels, lines, positions and dimensions of any part of the work,
- (f) Execute additional work of any kind necessary for the completion of the works and
- (g) change in any specified sequence, methods or timing of construction of any part of the work.

10.a) Contractor bound by Project Engineer cum Estate Officer, CCMD's instructions

The Contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Project Engineer cum Estate Officer, CCMD or other competent authority and such alteration shall not in any way vitiate or invalidate the contract.

Orders for variations to be in writing

- (i) No such variations shall be made by the Contractor without an order in writing of the Project Engineer cum Estate Officer provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is the result of the quantities exceeding or being less than those stated in the 'Schedule B' provided also that if for any reason the Project Engineer cum Estate Officer, CCMD shall consider it desirable to give any such order verbally, the Contractor shall comply with such order without any confirmation in writing of such verbal order given by the Project Engineer cum Estate Officer, CCMD, whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of the clause; provided further that if the Contractor shall within seven days confirm in writing to the Project Engineer cum Estate Officer, CCMD and if such confirmation is not contradicted in writing within fourteen days by the Project Engineer cum Estate Officer, CCMD, it shall be deemed to be an order in writing by the Project Engineer cum Estate Officer, CCMD.
- (ii) Any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on same conditions in all respects on which he agreed to do the main work and same rates as are specified in the tender for the main work. However, change in the unit rates tendered and accepted shall be considered in respect of items under which the quantity of work performed exceeds tendered quantity by more than 25 percent and this actual change in rate will be restricted only to such excess quantity (i.e. beyond 125 percent of the tendered quantity).

(b) Rates for additional, substituted, altered items of work

If the additional, substituted or altered work includes any class of work for which no rate is specified in the contract, then such work shall be carried out at the rates specified for or derived from similar item of work in the agreement. In the absence of similar items in agreement, rate shall be as specified for or derived from similar items in the schedule of rates of KPWD prevalent at the time of execution of such additional substituted or altered items of works, plus or minus the overall percentage of original tendered rates over the current schedule of rates of (KPWD) the year in which tender is accepted as mentioned in sub clause (b) above. With regard to the question whether the additional, substituted or altered item/items of work/works is / are similar or not, to that/those in the agreement / in the Schedule of Rates of KPWD and the decision of the Director shall be final and binding on the contractor.

(c) Determination of rates for items not found in Estimate or Schedule of Rates

If the rates for additional, substituted or altered work cannot be determined in the manner specified in sub **clauses (b) and (c)** above, then the contractor shall within 7 days of the date of receipt by him of the order to carry out the work, inform The Project Engineer cum Estate Officer,CCMD of the rates which it is his intention to charge for such class or work, supported by analysis of the rate or rates claimed. Thereupon the Project Engineer cum Estate Officer,CCMD shall determine the rate or rates on the basis of observed data and failing this, on the basis of prevailing market rates. Under no circumstances the contractor shall suspend the work on the plea of non-settlement of rates for items falling under this clause. In the event of any dispute regarding the rates for such items the decision of the Director, IISC shall be final.

Clause 11. TIME LIMITS UNFORSEEN CLAIMS

Under no circumstances whatever shall the contractor be entitled to any compensation from Institute on any account unless the contractor shall have submitted claim in writing to the Project Engineer cum Estate Officer, CCMD or other competent authority

Clause 12. NO CLAIM TO ANY PAYMENT OR COMPENSATION FOR DELETION OF WHOLE OR PART OF WORK

- a)** If at any time after the execution of the contract documents, the Project Engineer cum Estate Officer, CCMD or other competent authority shall, for any reason whatsoever, require the whole or any part of the work as specified in the tender, to be stopped for any period or require the whole or part of the work (i) not to be carried out at all or (ii) not to be carried out by the tendered contractor, he shall give notice in writing of the fact to the contractor who will thereupon suspend or stop the work totally or partially as the case may be. In any such case, except as provided hereunder, the contractor shall have no claim to any payment of compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not so derive in consequence of the full amount of the work not having been carried out, or on account of any loss that he may be put on account of materials purchased or agreed to be purchased, or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs

and instructions, which may involve any curtailment of the work, as originally contemplated.

(b) Payment for materials already purchased or ordered by contractor.

Where, however, materials have already been purchased or agreed to be purchased by the contractor before receipt by him the said notice the contractor shall be paid for such materials, at the rates determined by the Project Engineer cum Estate Officer, CCMD or other competent authority provided they are not in excess of requirements and are of approved quality, and/or shall be compensated for the loss, if any, that he may be put to, in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the Project Engineer cum Estate Officer, CCMD or other competent authority whose decision shall be final.

(c) Labour charges during stoppage of work

If the contractor suffers any loss on account of his having to pay labour charges during the period during which the stoppage of work has been ordered under this clause, the contractor shall on application, be entitled to such compensation on account of labour charges as the Project Engineer cum Estate Officer, CCMD or other competent authority, whose decision shall be final, may consider reasonable. Provided that the contractor shall not be entitled to any compensation on account of labour charges if in the opinion of the Project Engineer cum Estate Officer, CCMD or other competent authority, the labour could have been employed in the same locality by the contractor for the whole or part of the period during which the stoppage of the work has been ordered as aforesaid.

(d) Time limit for stoppage of work

The period of stoppage ordered by the Project Engineer cum Estate Officer, CCMD or other competent authority should not ordinarily exceed six months. Thereafter the portion of works stopped may be treated as deleted from this agreement if a notice in writing to that effect is given to the Project Engineer cum Estate Officer, CCMD or other competent authority by the contractor within seven days after the expiry of the above period.

(e) Execution of work deleted

The portion of work thus deleted may be got executed from the same contractor on supplemental agreement on mutually agreed rates, which shall not exceed current Schedule of Rates (KPWD) plus or minus tender percentage,

Clause 13. ACTION AND PENALTY IN CASE OF BAD WORK

If at any time before the security deposit is refunded to the contractor, it shall appear to the Project Engineer cum Estate Officer, CCMD or other competent authority that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of inferior quality, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for, or are otherwise not in accordance with the contract, it shall be lawful for the Project Engineer cum Estate Officer, CCMD or other competent authority to intimate this fact in writing to the contractor and then notwithstanding the fact that the work, materials

or articles complained of may have been paid for, the contractor shall be bound forthwith to rectify, or remove and reconstruct the work so specified on whole or in part as the case may require, or if, so required shall remove the materials or articles at his own charge and cost and in the event of his failing to do so within a period to be specified by the Project Engineer cum Estate Officer, CCMD or the competent authority in the written intimation aforesaid, the contractor shall be liable to pay a penalty not exceeding one percent on the amount of the estimate for every day not exceeding ten days during which the failure, so continues and in the case of any such failure the Project Engineer cum Estate Officer, CCMD or other competent authority may rectify or remove, and re-execute the work or remove and replace the materials or articles complained of, as the case may be at the risk and expense in all respects of the contractor should the Project Engineer cum Estate Officer, CCMD or other competent authority for any valid reasons consider that any such inferior work or materials as described above is to be accepted or made use of, it shall be within his discretion to accept the same at such reduced rates he may fix thereof.

Clause 14. WORK TO BE OPEN TO INSPECTION - CONTRACTOR OR RESPONSIBLE AGENT TO BE PRESENT

- (a) All works under or in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the The Project Engineer cum Estate Officer, CCMD or other competent authority and his Engineer-in-charge, and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Project Engineer cum Estate Officer, CCMD or other competent authority Engineer-in-charge to visit the work shall have been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing present for the purpose. Orders given to the contractor duly authorised agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

(b) Employment of technical staff

The Contractor shall employ the following technical staff during execution of this work:

- (i) One Graduate Engineer when the cost of the work to be executed is 'Rs. 5 lakhs or more',
- (ii) One qualified Engineering Diploma Holder when the cost of work to be executed is more than Rs. 2 lakhs but less than Rs. 5 lakhs;
- (iii) In addition to (i) and (ii) above, the contractor shall employ different types of such technical personnel as may be required and sufficient for execution of work and directed by the Project Engineer cum Estate Officer, CCMD to ensure efficient execution of work.

The technical staff so employed, should be available at site whenever required by Engineer in-charge to take instructions.

- (c) If the contractor fails to employ the technical staff as aforesaid, he shall be liable to pay a sum of Rs. 10000 (Rupees TEN thousand only) for each month of default in the case of Graduate Engineers and Rs. 5000 (Rupees Five thousand only) for each month of default in case of Diploma Holders.

- (d) If the Contractor himself possesses the required qualification and is available at the site for receiving instructions from the The Project Engineer cum Estate Officer, CCMD and other competent authority vide **sub-clause (a)** above it will not be necessary for the technical staff to be available at site for receiving instructions.

Clause 15. NOTICE TO BE GIVEN BEFORE WORK IS COVERED UP

The contractor shall give not less than five days notice in writing to the Project Engineer cum Estate Officer, CCMD or his Engineer-in-charge in charge of the work before covering up or otherwise placing beyond the reach of the measurement any work in order that the same may be measured; and correct dimensions thereof taken before the same is so covered up or placed beyond the reach of measurement, and shall not cover up or place beyond the reach of measurement, and work without the consent in writing of the Project Engineer cum Estate Officer, CCMD or other competent authority or his Engineer-in-charge in charge of work; and if any work shall be covered up or placed beyond the reach of measurement, without such notice having been given or consent obtained, the same shall be uncovered at the contractor's expense, and in default thereof no payment or allowance shall be made for such work or for the materials with which the same was executed.

Clause 16. CONTRACTOR LIABLE FOR DAMAGE DONE, AND FOR IMPERFECTIONS FOR TWELVE MONTHS AFTER CERTIFICATE OF COMPLETION

If the Contractor or his workmen or servants shall break, deface, injure or destroy any part of a building in which they may be working, or any building, road fence, enclosure or grassland or cultivated ground contiguous to the premises on which the work or any part thereof is being executed, or if any damage shall be done to the work, while it is in progress from any cause whatever or if any imperfections become apparent in it within Twelve months of the grant of a certificate of completion, final or otherwise, by the Project Engineer cum Estate Officer, CCMD or other competent authority the contractor shall make good the same at his own expenses, or in default the Project Engineer cum Estate Officer, CCMD or other competent authority may cause the same to be made good by other workmen, and deduct the expenses (of which the certificate of the Project Engineer cum Estate Officer, CCMD or other competent authority shall be final) from any sums that may be due or may thereafter become due to the contractor, or from his Security Deposit or the proceeds of sale thereof, or of a sufficient portion thereof.

Clause 17. CONTRACTOR TO SUPPLY PLANT, LADDERS, SCAFFOLDINGS, ETC., AND IS LIABLE FOR DAMAGES ARISING FROM NON-PROVISION OF LIGHT, FENCING ETC

The contractor shall supply at his own cost all materials, plant, tools, appliance, implements, ladders, scaffolding, and temporary works required for the proper execution of the work whether in the original, altered or substituted form and whether included in the specification, or other documents forming part of the contract or referred to in these conditions or not, and which may be necessary for the purpose of satisfying or complying with the requirements of the Project Engineer cum Estate Officer, CCMD or other competent authority as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore, to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or the materials. Failing

this, the same may be provided by the Project Engineer cum Estate Officer, CCMD or other competent authority at the expense of the contractor and expense may be deducted from any money due to the contractor under the contract or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof. The contractor shall provide necessary fencing and lights required to protect the public from accident, and shall also be bound to bear the expense of defense of every suit, action or other legal proceedings, that maybe brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any suit, action or proceedings to any person, or which may with the consent of the contractor be paid for compromising any claim by any such person.

Clause 18. Measures for prevention of fire

The contractor shall not set fire to any standing jungle, trees, brushwood or grass without a written permit from the Project Engineer cum Estate Officer, CCMD. When such permission is given, and also in all cases when destroying cut or dug up trees, brushwood grass, etc., by fire the contractor shall take necessary measures to prevent such fire spreading to or otherwise damaging surrounding property.

Clause 19. Liability of contractor for any damages done in or outside Work Area.

Compensation for all damages done by contractor or his men whether in or beyond the limits of Institute property including any damage caused by spreading of fire mentioned in Clause 18 shall be estimated by the Project Engineer cum Estate Officer, CCMD and the estimate of the Project Engineer cum Estate Officer, CCMD, subject to the decision of the Director, IISc on appeal shall be final and the contractor shall be bound to pay the amount of the assessed compensation on demand failing which the same will be recovered from the contractor as the damages in the manner prescribed in clause 1(c) or deducted by the Project Engineer cum Estate Officer, CCMD or other competent authority from any sums that may be due or become due from Institute to the contractor under this contract or otherwise.

The contractor shall bear the expenses of defending any action or other legal proceedings that may be brought by any person for injury sustained by him owing to neglect of precautions to prevent the spread of fire and shall pay any damages and cost that may be awarded by the court in consequence.

Clause 20. EMPLOYMENT OF FEMALE LABOUR

The employment of female labourers on works in the neighbourhood of soldier barracks should be avoided as far as possible.

Clause 21. Work on Notified Holiday

No work shall be done on any notified holiday without the sanction in writing of the Project Engineer cum Estate Officer, CCMD or other competent authority

Clause 22. WORK NOT TO BE SUBLET

- (a) The contract shall not be assigned or sublet by the contractor,. However, any specific portion of the work which is of a specialised nature and normally not executable by a general contractor could be got done by the specialised agencies which are executing such works, after obtaining the specific approval of the Project Engineer cum Estate Officer, CCMD in writing in each case. Such consent to sublet the work, if given, shall

not relieve the contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor or his agents, servants or workmate as fully as if they were the acts, defaults or neglects of the contractor, his agents, servants or workmen.

(b) Consequences of subletting work without approval, becoming insolvent, bribing etc., by contractor and action against the contractor.

If the contractor shall assign or sublet his contract or any portion thereof without the specific approval of the Project Engineer cum Estate Officer, CCMD or attempts to do so or become insolvent or commence any proceedings to get himself adjudicated as insolvent or make any composition with his creditors or attempts so to do or if any bribe, gratuity, or indirectly be given, promised or offered by the contractor or any of his servants or agents to any officer or person in the employ of Institute in any way relating to his office or employment or if any such officer or person in the employment or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Project Engineer cum Estate Officer, CCMD or other competent authority may thereupon by notice in writing rescind the contract and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Institute and the same consequences shall ensure as if the contract had been rescinded under Clause 3 here of and in addition, the contractor shall not be entitled to recover or be paid for any work actually performed under contract.

(c) Recovery of excess payments based on excess measurements and action against contractor.

Whenever it is noticed that excess payments have been made to the contractor based on excess measurements recorded by the Engineer-in-charge in the measurement book and countersigned by the contractor or his duly authorised agent, action shall be taken to recover the excess payments together with interest immediately. Action may also be taken to remove the name of the contractor from the approved list of contractors and also to black-list him.

(d) Criminal proceedings against IISc Officers and Contractor for the lapses.

Institute also reserve the right to initiate criminal proceedings against the concerned Institute Officers who are directly responsible for the lapse and the contractors who have colluded with the officers of the Institute in the lapse and fraudulently received amounts not due to them legitimately.

**Clause 23. SUM PAYABLE BY WAY OF COMPENSATION TO BE
CONSIDERED AS REASONABLE COMPENSATION WITHOUT
REFERENCE TO ACTUAL LOSS.**

All sums payable by a contractor by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied for the use of Institute without reference to the actual loss or damage sustained and whether any damage has or has not been sustained.

Clause 24. SETTLEMENT OF DISPUTES -TIME LIMIT FOR DECISION

(a) If any dispute or difference of any kind whatsoever were to arise between the Project Engineer cum Estate Officer, CCMD and the contractor regarding the following matters namely,

- (i) The meaning of the specifications designs, drawing and instructions herein before mentioned,
- (ii) The quality of workmanship or materials used on the work and
- (iii) Any other question, claim right, matter, thing whatsoever, in any way arising out of or relating to the contract, designs, drawings, specification, estimates, instructions, or orders, or those conditions, or failure to execute the same whether arising during the progress of the work, or after the completion, termination or abandonment thereof, the dispute shall, in the first place, be referred to the Director, IISc. The Director, IISc shall within a period of fifteen days from the date of being requested by the Contractor to do so give written notice of its decision to the Contractor.

(b) Director's decision final.

Subject to other form of settlement hereafter provided, the Director's decision in respect of every dispute or difference so referred shall be final binding upon the contractor. The said decision shall forthwith be given effect to and contractor shall proceed with the execution of the work with all due diligence.

(c) Remedy when Director's decision is not acceptable to contractor

In case the decision of the Director is not acceptable to the contractor, he may approach the Law Court at Bangalore for settlement of dispute after giving due written notice in this regard to the Director within a period of ninety days from the date of receipt of the written notice of the decision of the Director.

(d) Time limit for notice to approach Court of law by contractor

If the Director has given written notice of his decision to the contractor and no written notice to approach the law court has been communicated to him by the contractor within a period of ninety days from receipt of such notice, the said decision of Director shall be final and binding upon the contractor.

(e) Time limit for notice to approach law court by contractor when decision is not given by Director, IISc as at (b).

If the Director fails to give notice of his decision within a period of ninety days from the receipt of the contractor's request in writing for settlement of any dispute or difference as aforesaid, the Contractor may within ninety days after the expiry of the first named period of ninety days approach the Law Courts at Bangalore giving due notice to the Director.

(f) Contractor to execute and complete work pending settlement of dispute.

Whether the claim is referred to the Director or to the Law Courts, as the case may be, the contractor shall proceed to execute and complete the works with all due diligence pending settlement of the said dispute or differences.

(g) Obligations of The Project Engineer cum Estate Officer,CCMD and contractor shall remain unsettled during considerations of dispute.

The reference of any dispute or difference to the Director or the Law Court may proceed notwithstanding that the works shall then be or be alleged to be complete, provided

always that the obligations of the Project Engineer cum Estate Officer, CCMD and the contractor shall not be altered by reason of the said dispute or difference being referred to the Director or the Law Court during the progress of the works.

Clause 25. CONTRACTOR TO PAY COMPENSATION UNDER WORKMEN'S COMPENSATION ACT.

- (a) The contractor shall be responsible for and shall pay any compensation to his own workmen payable under the relevant Workmen's Compensation Act for injuries caused to the workmen. If Institute pays such compensation on behalf of the contractor it shall be recoverable by Institute from the contractor under as per relevant clauses.

(b) Contractor to pay expenses of providing medical aid to workmen.

The contractor shall be responsible for and shall pay the expenses of providing medical aid to any workman who may suffer a bodily injury as a result of an accident. If Institute incurs such expenses, the same shall be recoverable from the contractor forthwith and be deducted without prejudice to any other remedy of Institute, from any amount due or that may become due to the contractor.

Clause 26. CONTRACTOR TO PROVIDE PERSONAL SAFETY EQUIPMENT FIRST AID APPARATUS, TREATMENT Etc

The contractor shall provide all necessary personal safety equipment and first aid apparatus for the use of the persons employed on the site and shall maintain the same in good condition suitable for immediate use, at any time and shall comply with the following regulations in connection therewith: -

- (i) The worker will be required to use the equipment so provided by the contractor and the contractor shall take adequate steps to ensure proper use of the equipment by those concerned.
- (ii) When work is carried on in proximity to any place where there is a risk of drowning; all necessary steps shall be taken for the prompt rescue of any person in danger.
- (iii) Adequate provision shall be made for prompt first - aid treatment of all injuries likely to be sustained during the course of the work.

Clause 27. Minimum age of persons employed by contractor

- (a): No contractor shall employ any person
 - (i) who is under age of 18 years.
 - (ii) Who does not produce a valid certificate of vaccination against smallpox in respect of himself/ herself as well as all the members of his/her family.
- (b) The contractor shall provide potable water facilities to the workers. Similar amenities shall be provided to the workers engaged on large works in urban area.
- (c) Removal of persons not satisfying conditions (a) (i) & (ii)

The Project Engineer cum Estate Officer, CCMD or other authority is authorised to direct the removal or to remove through - his own agency, from the work any person referred to in sub-clauses (a) above not satisfying these conditions and no responsibility shall be accepted by the Institute for any delay caused in the completion of the work by such directions for removal.

- (d) Payment of fair and reasonable wages by contractor.

The contractor shall pay fair and reasonable wages, which shall not be less than the minimum wages fixed by Govt. of Karnataka from time to time to the workmen employed by him in the contract undertaken by him. In the event of any dispute arising between the contractor, and his workmen on the ground that the wages paid are not fair and reasonable the dispute shall be referred without delay to The Project Engineer cum Estate Officer, CCMD or other competent authority, who shall decide the same. The decision shall not in any way affect the conditions in the contract regarding the payment to be made by Institute at the agreed tender rates.

Clause 28. METHOD OF PAYMENT OF BILLS

Payment to contractors shall be made by cheques drawn by the Institute

Clause 29. SET OFF AGAINST ANY CLAIM OF INSTITUTE

Any sum of money due and payable to the contractor (including the security deposit refundable to him) under this contract may be appropriated by the Institute and set off against any claim of Institute in respect of a payment of a sum of money arising out of or under any other contract made by the contract with the Institute.

Clause 30. RATES INCLUSIVE OF ALL TAXES.

- (a) The rates to be quoted by the contractor shall be inclusive of all taxes like sales tax, VAT, Service Tax etc., No extra payment on this account will be made to the contractor.
- (b) All quarry fees, octroi dues levied by the state or any local body or authority and ground rent, if any, charged by the The Project Engineer cum Estate Officer, CCMD for stacking materials should be paid by the contractor.

Clause 31 Refund of Security Deposit (EMD & FSD):

The Security Deposit lodged/paid by a Contractor shall be refunded to him after the final bill is paid or after **TWENTYFOUR** months from the date of completion of the work, during which period the work should be maintained by the Contractor in good order, whichever is later.

Clause 32. PENALTY FOR DELAY

(a) Written Order to Commence Work

After acceptance of the tender, The Project Engineer cum Estate Officer, CCMD shall issue a written order to the successful tenderer to commence the work. The Contractor shall enter upon or commence any portion of work only with the written authority and instructions of The Project Engineer cum Estate Officer, CCMD. Without such instructions the Contractor shall have no claim to demand for measurements of or payment for, work done by him.

(b) Programme of work

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor. It shall be reckoned from the date of handing over the site to the Contractor not less than 75 percent of work site area comprising a continuous

block. The work shall throughout the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the essence of the contract on the part of the Contractor). To ensure good progress during the execution of the work, the contractor shall be bound (in all cases in which the time allowed for any work exceeds one month) to comply with the time schedule according to the programme of execution of the work as agreed upon and enclosed to the agreement.

(c) Review of progress and responsibility for delay etc.,

The Project Engineer cum Estate Officer, CCMD shall review the progress of all works with the contractor during the first fortnight of every month. Such a review shall take into account the programme fixed for the previous month, obligations on the part of the Contractor.

(d) Apportioning of responsibility for delay between Contractor and Institute.

In case the progress achieved falls short by more than 25 percent of the cumulative programme, the reasons for such shortfall shall be examined and a record made thereof apportioning the responsibilities for the delay between the contractor and the Institute. This record should be signed in full and dated both by The Project Engineer cum Estate Officer, CCMD and the Contractor.

Clause 33 BAR CHART / PERT CHART:

BAR chart /PERT chart shall be produced during agreement by the contractor . According to the bar chart work is to be executed otherwise penalty will be levied for the delay of work

GENERAL SPECIFICATIONS

PART -1 Specifications for Civil Works

1.0 EXCAVATION

- 1.1 The places where excavation is directed to be done shall be cleared of all shrubs, weeds, grass and vegetation including roots, where necessary and if so directed, the excavated earth must be deposited in layers of 15 cms and the clods broken. During excavations, if so directed, 'dead-man' (of volume not more 5% of the excavation volume shall be left at the places directed for verification of the dimensions of excavation). These 'dead-man' shall be removed and earth deposited at places shown before full rate is paid, Alternatively or in addition to 'dead-man', block level at intervals as directed will be jointly taken and recorded by the contractors representative and employer's representative before starting of excavation and after completion. Recording of – block levels or leaving of 'dead-man' may be avoided in the case of narrow foundations and trenches, if so directed.
- 1.2 The rate quoted shall include bailing or otherwise removing all water which may accumulate in the excavation from all causes and removing of swish, trimming of all sides plumb or otherwise as directed, dismantling removing and stacking as directed any existing water pipes and or soil pipes etc., encountered within the excavation.

2.0 CONCRETE WORKS

- 2.1 Proportion of ordinary cement concrete will be expressed as 1:4:8, 1:3:6, 1:2:4 etc., The first figure will be quantity of ordinary Portland cement by volume, the second figure will be dry coarse sand (fine aggregate) by volume and the third figure will be the quantity of coarse aggregate by volume. Cement shall be measured by weight. The weight is to be derived on the basis that one cubic meter will weigh 1440 kg or one full bag of 50kg will be assumed to be 35 lts. When the sand is wet or moist suitable corrections for bulking is to be given while proportioning. The clerk of works may allow measuring cement by volume.
- 2.2 Unless otherwise specified, the rates for all RCC will be exclusive of reinforcements but including from work, Reinforcements will be measured and paid separately.
- 2.2.1 Unless otherwise stated for all RCC work the size of coarse aggregate will be 20MM and down size.
- 2.2.2 Concrete proposed for roof slab and roof beams is ready mixed concrete. The contractor should quote, his rate keeping in view that the rate should include for ready mixed concrete all as per specifications and directions of Engineer-in-charge.

2.3 READY MIXED CONCRETE (RMC) IS: 4926-1976

- a. The RMC from suppliers of ACC/L & T/Fletcher challenge should only be used.
- b. The rates are inclusive of all lead and lift. Additional lead and lift charges.
- c. The rate is inclusive of all necessary form work, centering and scaffolding capable of withstanding pumping of concrete.
- d. The rates are applicable to the materials with a maximum radius of 25 km from the city center.
- e. Test results of concrete for 28 days strength be obtained from the concerned RMC supplying firm.

2.4 MATERIALS.

2.4.1 Cement:-

2.4.1.1 Cement shall comply in every respect with the requirements of the latest publication of IS: 269 and unless otherwise specified, ordinary Portland cement shall be used. No other make of cement but that approved by the Architects/ Employers will be allowed on works and the source of supply shall not be changed without approval of the Architects/Employer in writing test certificates to show that the cement used fully complies with the relevant IS specifications shall be submitted to the Architects/ Employer and notwithstanding this the architects may at their discretion order that the cement brought to site and which they may consider damaged or of doubtful quality for any reasons whatsoever shall be retested in an approved testing laboratory and fresh certificate of its soundness shall be produced, Cement ordered for retesting shall not be for any work pending results of retest.

2.4.1.2 Cement shall be stored neatly packed in piles not exceeding 10 bags high in weather-proof sheds with raised wooden plank flooring to prevent deterioration by dampness or intrusion of foreign matter. It shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt, i.e., the first received being first used. Cement deteriorated and/or clotted shall not be used on work but shall be removed at once from the site daily record of cement received and consumed shall be maintained by the contractor in an approved form and a copy submitted to the employer once a month.

2.4.2 Fine Aggregates:

2.4.2.1 Sand shall conform to IS: 383 it shall pass through IS sieve 4.75mm (3/ from a 16" B S) test sieve, leaving a residue not more than 5%. It shall be from a natural source or crushed stone screenings it shall be washed, if directed, to reduce the percentage of deleterious substances to acceptable limits. Sand

shall not contain any trace of salt and sand containing any trace of salt shall be rejected.

- 2.4.2.2 The fine aggregate for concrete shall be graded within limits as specified in IS: 383 and the fineness modules shall range between 2.60 to 3.20 the fine aggregates shall be stacked. Carefully, on a clear hard dry surface so that will not get mixed up with deleterious foreign materials. If such a surface is not available, a platform of planks or corrugated sheets or brick floor or concrete floor shall be prepared. Sand shall be added in the desired proportion as required for the strength specified, with suitable correction for “bulking”.
- 2.4.2.3 Coarse aggregates: Coarse aggregate shall conform to IS:383. It shall consist of crushed or broken stone, 95% of which shall be retained on 4.75 mm IS test sieve. It shall be obtained from crushed granite, trap, basalt or similar approved stones from approved quarry. Coarse aggregate shall be chemically inert when mixed with cement and shall be angular in shape and free from soft friable thin porous laminated or flaky pieces. It shall be free dust and other foreign matter. – Gravel/shingle of desired grading may be permitted as a substitute in part or full in plain cement concrete if the Architect/Employer is otherwise satisfied about the quality of aggregate.

2.5 MIXING OF CONCRETE:

- 2.5.1 Machine mixing:- Aggregates shall be accurately measured out in boxes and mixed dry along with required cement. Water shall then be added in measured quantity and mixing shall be continued until there is uniform distribution of the materials and the mass is uniform in colour and consistency but in no case shall the mixing be done less than two minutes. Only hopper loading mixer shall be used.
- 2.5.2 Hand mixing: when hand mixing is permitted with the approval of the Project-Engineer – Cum – Estate Officer, CCMD, it shall be carried out in water tight, mixing platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. If required by, the architect/consultant 10% extra cement has to be used at the contractor's cost if hand mixing is done.

2.5.3 Consistency:

- 2.5.3.1 Only sufficient water giving due allowance for the moisture content of aggregate shall be added to the cement and aggregate during mixing to produce a mixture of sufficient workability to enable it to be well consolidated to be worked in to corners of the shuttering and around the reinforcements (where there is reinforcements) to give the specified finish and to have the specified strength.

2.5.3.2 Normally for every 50 kg of cement in the concrete in the mix, total water including moisture content of aggregate should not be more than 34 lts for 1:3:6 mix, 32 lts for 1:2:4 mix 30 lts for 1:1 ½ :3 and 27 ltrs for 1:1:2 mix

2.5.3.3 If difficulty be experienced in placing concrete of specified mix and approved consistency between and below reinforcement bars, in the bottom of beams and similar situations, the concrete shall have improved workability by increasing the proportion of water with corresponding additional quantity of cement using aggregates of smaller size than specified as directed by the Architect/ Employer for which extra will be paid.

2.5.3.4 The consistency shall be determined by making trial mixtures with dried aggregates, or. When so instructed by test laboratory made test cubes under the direction of Architect/ Employer by slump – Test using a standard cone or the Architect/Employer may direct the use of any other means of testing the consistency.

2.5.3.5 If the apparatus used for the slump test is a standard cone, the cone when filled, shall be raised vertically – clear of the concrete: The ‘slump’ shall be 300mm minus the height of the slumped cone of concrete. Care shall be taken to prevent vibration of the samples being tested. The following slumps shall be adopted for different kinds of works:

		With Vibrator	Without Vibrator
A	Mass concrete in RCC foundations, footings and retaining walls	10 to 25mm	80 mm
B	RCC beam, slabs and columns	25 to 40 mm	100 to 125 mm
C	Thin RCC section or section with congested steel	40 to 50mm	125 to 150mm

2.5.4 Placing and Compacting

2.5.4.1 Method of placing concrete shall be such as to preclude segregation and as far as practicable the placing shall be continues.

2.5.4.2 Special care shall be taken in accordance with 18:456 while laying concrete under extreme weather. Concrete, during the operation of placing shall be thoroughly worked around the reinforcements, embedded fixtures, spaded against comers of the form work by punning, rodding or by any other approved means and thoroughly compacted by mechanical vibrators. The number and type of vibrator to be used, and in general immersion type vibrators shall be used.

2.5.4.3 Consolidation by using immersion vibrator will be in accordance with Is: 3558 sufficient number of reserve vibrators in good working condition shall be kept

on hand at all times, so as to ensure that there is no slacking or interruption in compacting.

2.6 ADMIXTURE

The use of admixtures may be allowed only if approved by the Architect/Consultant their decision in this regard shall be final.

2.7 TRANSPORTING

Concrete shall be conveyed from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of any of ingredients? If segregation does occur during transport the concrete shall be remixed before being placed, normally not more than 30 minutes shall lapse between mixing and consolidation in position.

2.8 CURING:

All cement concrete after laying shall be protected from damages, till it sets and shall be cured thereafter for not less than ten days. The work shall be protected from direct wind and direct sun, rays. Water used for curing shall be free from sediments of any kind and generally fit for drinking.

2.9 STRENGTH OF ORDINARY CONCRETE:

2.9.1 The Contractor has to ensure that proper- materials in specified proportion are used and the correct water cement ratio, just sufficient for the workability is maintained to see that the minimum strength of concrete as provided under paragraph 3.9.2 (below) are obtained. To verify this, test cubes from the concrete pours should be made and tested. The frequency of testing and the acceptability criteria will be according to IS: 456.

2.9.2 Compressive strength of 15 cm cubes at 28 days after mixing shall be as follows: same as para 3.13.2

2.9.3 Six cubes shall be taken from any mix selected at random as directed by Engineer-in-charge three of these should be tested after 7 days and three after 28 days. The strength at 7 days must be 2/3 of the strength at 28 days. The criteria for acceptance are only the strength at 28 days.

2.10 FORMWORK AND CENTERING

2.10.1 The form: work shall conform to the shape, lines and dimensions of the faces of concrete shown on the drawings and be so constructed as to remain sufficiently rigid the placing and compacting of the concrete and shall be sufficiently water tight to prevent loss of cement slurry from the concrete. Form work shall be constructed of steel or timber or marine plywood and adequately designed to support the full weight of wet concrete (deflection

limited to 3mm) and retain its form during laying, consolidation and setting of concrete. Timber used shall be properly seasoned so as to prevent deformation when wetted.

- 2.10.2 Props shall be straight and of full height and no joints shall be allowed. Props shall be braced with bamboo's or wooden battens or other means in both directions at intervals of 1500mm and where additional staging is necessary, extra care shall be taken to use bigger size props with bracing at necessary levels. All the props shall be supported on sole plates double wedged. At the time of removing props these wedges shall be gently eased and not knocked out.
- 2.10.3 All rubbish, chipping, shavings, sawdust etc., shall be removed from the interior of the forms before concrete is placed. The form work in contact with the concrete shall be cleaned and thoroughly wetted and treated with non staining mineral oil or any other approved material. Care shall be taken that "oil or such similar material is kept out of contact with the reinforcement.
- 2.10.4 Officer, GGMD at convenient places for washing down all the rubbish. These are to be closed before concreting.
- 2.10.5 All form work shall be removed without shock or vibration and shall be eased off carefully in order to allow the structure to take up its load gradually. Forms shall not be disturbed until concrete has adequately hardened to take up its own weight and superimposed load coming on it and in no circumstances shall forms be struck until the concrete reaches its strength of at least twice the stress to which the concrete may be subjected to at the time of striking. The said forms shall be so fixed that while removing them the supporting forms and props are not disturbed.
- 2.10.6 In the case of folded plates and shell roofs the contractor should take prior approval of the pattern of centering and shuttering along with programme for deshuttering.
- 2.10.7 The tolerance of shuttering and stripping time will be as set forth in IS : 456 if directed, forms shall be given an upward camber to ensure that the beams do not have any sag. No honey combing will be permitted, however any honey combing of minor nature as specifically allowed by the clerks of works shall be repaired neatly with cement mortar 1:2
- 2.10.8 Any work showing signs of damage through premature or careless removal of centering or shuttering, shall be reconstructed by the contractor at his own cost. Surface that has to remain exposed after removal of forms shall be carefully examined and any fins, burrs, projections etc., that are detected shall be removed.
- 2.10.9 Centering and shuttering is specified to be paid for separately, measurement of such centering and shuttering will be taken according to IS: 1200

2.11 Steel Reinforcement

- 2.11.1 Reinforcement for such works shall be steel bars, fabrics etc., as specified in the drawings. Mild steel bars shall be of tested quality conforming to grade I of IS : 432 and high yield strength (of 500 N/sqmm) deformed bars shall be of IS:1786 or 1139 as appropriate. Fabric reinforcement where called for shall be kept clean and free from pitting, loose rust millseale- oilrrgrease- earth paint or any material which may impair the bond between concrete and reinforcement or which may cause high corrosion of the reinforcement or deterioration of the concrete.
- 2.11.2 Reinforcement shall be accurately done to the dimensions, spacing and minimum cover as per structural drawings. The contractor shall submit to the clerk of work bar bending schedules, prior to the commencement of fabrication. All joints in mild reinforcement upto and including 16mm dia shall be overlapped. The length overlap for tension and compression joints in mild steel reinforcement above 16mm dia may be welded subject to the approval of the project Engineer- cum estate officer.
- 2.11.3 Wherever specified and / or approved, welded laps shall be provided subject to the following.
- 2.11.3.1 Random samples of typical – welded joints shall be made and got tested in an approved laboratory at the contractor's expenses.
- 2.11.3.2 If the cold twisted deformed bar has an untwisted end at lapping joint, such portion – shall be cut off prior to welding.
- 2.11.3.3 bars shall be free from rust at the joints to be welded.
- 2.11.3.4 Bars can be aligned and kept in proper axis in order to minimize crookedness in bar welding.
- 2.11.3.5 Nothing extra shall be payable towards lap welding of joint unless specifically mentioned or agreed otherwise.
- 2.11.4 Reinforcement shall be rigidly held in place inside the form work using chairs (bent from steel bars) spacer bars and cement concrete blocks each block shall be secured to the reinforcement with wire or clip embedded in the center of block so that it shall not be in contact with form work. Insterctions of reinforcement shall be bound together with 18 guage annealed soft iron binding wire.
- 2.11.5 Before proceeding to place reinforcements the contractor shall ensure that appropriate cover between the bars and or the form work is available. Should any difficult arise during the placing of steel in obtaining the required cover the contractor shall immediately draw the attention of the architect/

consultant to the difficulty and shall carryout such corrective measures as the architect/ consultant may instruct.

2.11.6 Reinforcement left projecting from newly placed concrete shall be supported in a way there is no risk of disturbance, which would cause damage to newly placed concrete.

2.11.7 The contractor shall ensure that movement of men and material subsequent to fixing in position of the reinforcement is organized such that displacement of the reinforcement will not occur.

2.11.8 The measurements recorded for reinforcements shall be including all laps and wastages as approved by the project Engineer- cum Estate officer's representative.

2.12 INSERTS IN CONCRETE

The contractor shall fix all necessary inserts such as steel – plates, pipes, sleeves, bolts etc., and shall make provisions in the form work for holes, pockets dowels, etc., at no extra cost (unless otherwise specified) to enable, subsequent fixing of supports, brackets or similar items. He shall also ensure that all conduits, inserts etc., are in position before placing concrete.

2.13 CONTROLLED CONCRETE

2.13.1 Controlled concrete shall be taken to mean that there shall be full field control of(a) predetermined grading of all aggregates that go into concrete and (b) Predetermined proportion of coarse aggregate, fine aggregate, cement and water for the required strength.

2.13.2 Strength shall mean the acceptable field strength after 28 days of curing on the tests conducted on 15 cm cubes from concrete taken during concreting in the manner set if forth in IS 456. A statement to acceptable minimum field strength is noted below.

Compressive Strength		
Grade	Preliminary test (Kg/ Sq Cm)	Work Test (Kg/Sq Cm)
M10	135	100
M15	200	150
M20	260	200
M25	320	250
M30	380	300
M35	440	350
M40	500	400

- 2.13.3 Arrive at the proportion to be adopted to obtain the grade of concrete, the mix should be based on laboratory tests conducted using the aggregate actually available at site which would be used for making/ concrete. The design mix should give suitable workability to enable it to be well consolidated to be worked into the corners of the shuttering and around the reinforcement.
- 2.13.4 Where difficulty is likely to be encountered in placing and compacting concrete and where there is crowding of reinforcements a separate mix is to be designed for required strength and used without extra cost, the mix design along with the workability obtainable with the designed mix should be furnished to the architect/employer before hand approval obtained. A laboratory is to be established at site to assess the moisture content of aggregate as frequently as necessary and as instructed by the Architect/employer based on which corrections is to be applied to the quantity of water to be used for mixing.
- 2.13.5 All aggregates are to confirm strictly to IS: 383. The aggregates will be tested as frequently as directed by the Architect/Employer to see that their specifications is the same as adopted in the mix design they must be stored on clean plat form made for the purpose.
- 2.13.6 Concrete shall be weigh batched, Dials of weigh batching unit to be used shall be checked with standard weights periodically. The conversions of weights volume will be allowed by Project Engineer cum Estate Officer, under special circumstances. Despite the design for several, mixes the following quantities of cement are the minimum to be used per cubic meter of the different grades of concrete.

Sl No	Grade of Concrete	Cement/ Cum (Bags)
1	M5	3.20
2	M7.5	3.60
3	M10	4.40
4	M15	4.80
5	M20	6.40
6	M25	6.80
7	M30	7.20

3.0 SIZE STONE MASONRY

- 3.1 Size stone shall be hard granite, basalt or trap stone obtainable from approved quarry, the stones shall be clean and wetted before they are used
- 3.2 Height of each course shall not be less than 15cm and all courses shall be of uniform height.
- 3.3 No face stone shall be less in depth than in height or shall tail into the work to a length less than the height stone shall break joints at least half the height of course faces of stones shall be hammers dressed such that the buildings are not more than 25mm thickness of joints shall not be more than 20mm. Edges of face stones of exposed faces shall be chiseled true to both longitudinal and vertical lines exposed faces of corner stones are to be two lines dressed 50mm wide.
- 3.4 Bond or through stones shall be provided not exceeding 2.0m apart in each course and shall be staggered bond stone shall be from the front to back of the walls fro walls upto 60cms thick; they shall either be in one piece (if available locally) or be in the series of headers; each header overlapping the adjoining one by not less than 150mm bond or through stones shall be marked as directed to enable easy detection even after having been built in position. The interior (or filling) shall be with flat bedded stones laid in mortar joints and shall not exceed 10% of the quantity of stone masonry. Care is to be taken that no dry work or hollow spaces shall be left anywhere in the masonry.
- 3.5 The work shall include.
 - 3.5.1 All scaffolding – platforms, staging etc.,
 - 3.5.2 Hacking and roughening of concrete or other surfaces for binding of the masonry.
 - 3.5.3 Raking out joints for plastering and / or pointing.
 - 3.5.4 Levelling up and preparing and pointing.
 - 3.5.5 Building in holdfasts or similar inserts.
 - 3.5.6 Keeping (the work) in damp condition for two weeks
 - 3.5.7 Construction watery situation.

4.0 BRICK MASONRY:

4.1 GENERAL

- 4.1.1 All brick work should be carried out as shown on the drawings with set backs, projections, cuttings, toothings etc., wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in the proportion of 1:6 shall be used. Flat brick arches shall be provided, wherever required, without any extra cost. Brickwork shall be kept wet while in progress till mortar has properly set. On holidays or when the work is stopped top of all unfinished masonry shall be kept wet, should the mortar be dry, white or powdery, due to lack of curing work shall be pulled down and rebuilt at the contractors expense.
- 4.1.2 Table moulded bricks shall be locally available or brought from outside first quality having a minimum crushing strength of 40kg per sqcm and water absorption not more than 20% by weight. Bricks shall be thoroughly cleaned and well wetted. Table moulded bricks shall be soaked for atleast 12 hours in fresh water before being used on the work.
- 4.1.3 Unless otherwise specified, brickwork shall be done in English bond with frog upwards. The bricks shall be bedded and joined with mortar in such a manner as not to leave voids. Each brick shall be correctly into position by tapping with the handle of trowel. Grouting of mortar slurry will not be allowed except where necessary for special reasons and in such cases, prior permission of the Architect/ Employer shall be obtained.
- 4.1.4 A care shall be taken that each course of brick work is truly horizontal and perfect in bond and the face of the wall is straight, plumb and even. The mortar joints shall be 10mm in thickness, except where extra thickness is required for the purpose of bringing the work to the required height or level. Halfbricks or bats shall not be used except for obtaining the bond and where absolutely necessary.
- 4.1.5 Brickwork in 239 mm wall: If bricks are of size such that the width of the header course does not come equal to the width of the stretcher course, the difference shall be made up during construction of brickwork itself by same mortar as used for construction of masonry to provide a plane vertical surface. The surface should also be scarified to receive plaster.
- 4.1.6 All junctions of wall shall be carefully bonded into the main walls. The rate of laying masonry will be upto a height of 100cm per day if cement mortar is used greater heights may be built only if permitted by the Project Engineer-Cum Estate Officer.
- 4.1.7 During rains, the work shall be carefully covered to prevent mortar from being washed away. Should any mortar or cement be washed away the work shall be removed and rebuilt at the contractors expense.

4.2 HALF BRICK WORK:

This shall be set in cement mortar as specified. Unless otherwise specified, the walls be reinforced with 2 nos of 6mm mild steel bars with tie bars at 1m interval on the top of the first course and at every fifth course thereafter. The cost of the half brick work shall include the cost of reinforcement where reinforcement of half brick walls is specified.

5.0 Wood Works:

5.1 GRP Door shutters as per the Engineer-in-charge/ Architects approval

5.2 GLAZING WORKS

All glass shall be specified in the drawings and schedule of quantities and free from air bubbles, specks and scratches or other defects. All glass shall be cut to fit the sashes or other members as required. All glass, shall be properly bedded, securely fixed and finished as indicated on the drawings. T.W beading moulded as specified shall be provided for fixing the glass. No glazing shall be complete until all the stains and marks have been removed from the surface of glass.

6.0 ALLUMINIUM DOOR, WINDOWS ETC.,

6.1 GENERAL

6.1.1 These shall be custom-built units of approved established manufacturer using standard aluminum alloy extruded sections generally conforming to the relevant basic concept drawings of the Architects and Schedule of quantities including necessary glazings, fittings, fastenings, locking arrangements polysulphide sealants etc., to ensure water tightness.

6.1.2 Based on the Architects concept drawings, the contractor shall submit detailed fabrication/ assembly/ erection drawings for the approval of the Engineer-in-charge. Samples of each unit, based on the approved fabrication and assembly drawings shall be made by the contractor and got approved by the Engineer-in-charge before bulk fabrication and assembly of each unit.

6.2 STORAGE AND HANDLING:

The contractor shall take particular care to stack the fabricated frames etc., on the site under cover. These shall be handled with care and stacked on edge of level bearers and supported evenly.

6.3 Before erecting- the frames coming in contact with concrete, masonry, plaster or dissimilar metals, shall be treated with a coat of zinc chromate. The contractor shall cover the work with transparent lacquer based or methacrylates or cellulose butyrate, tithe surface from wet cement during installation. This coating shall be removed on completion. Before handing over,

the aluminium work shall be washed with mild solution of non-alkali soap and water.

- 6.4 The colour of anodizing shall be uniform mat natural finish otherwise stated and its sample shall be submitted for the Engineer-in-charge, approval before work commences. The section shall be anodized to a minimum thickness of 20 microns. The contractor must submit necessary evidence to the satisfaction of the Engineer-in-charge that the thickness of the anodisation is not less than 20 microns. In case of doubt the Engineer-in-charge may reject the materials.

6.5 TOLERANCE ON SIZE.

Frames should be made to fit the actual openings with not more than 5mm clearance all round. Discrepancies in overall width or height exceeding 5mm will not be allowed and frames will be rejected in such cases. Minor discrepancies acceptable to the Architect/ Employer shall have the gaps suitably filled. The sizes of frames, if noted in the drawings/ schedule of quantities, may vary up to plus or minus 50mm beyond which the rate payable will be increased or decreased proportionate to the changes, where the rate quoted is for one unit number, if the rate quoted is for superficial area, such area will be net finished size of the opening.

7.0 STEEL WORK:

The fabrication, supply and erection of the steel (Fe 500 N/mm²) work consists of accomplishing all related jobs like providing all labour, tools and plant, all materials and consumables such as welding electrodes, bolts and nuts, oxygen and acetylene gases, oils for cleaning etc., All of approved quality, the work shall be executed. In an expeditious and workmanlike manner, as contemplated in the drawings and to the complete satisfaction of the project Engineer-cum – Estate Officer, CCMD, representative. The work shall also include providing shop primer coat of paint and grouting of hold down bolts.

8.0 PLASTERING- WORKS:

8.1 EXTENT AND INTENT

The contractor shall furnish all materials, labour, scaffolding, equipment, tools, plant and incidentals necessary as required for the completion of all plaster and wall finishes, subject to approval by the Project Engineer-cum- Estate Officer, CCMD.

8.2 GENERAL

- 8.2.1 Plaster as here in specified shall be applied to all internal and external surfaces where called for. Flazed tile dado, terrazzo dado and wall finishes other than plaster shall be provided where indicated on drawings and schedule of finishes. Areas called for on drawings and typical shall be considered to apply to appropriate adjoining area whether shown on same drawings or not whether indicated or not.

- 8.2.2 All plaster works and other wall finishes shall be executed by skilled workmen in a workman like manner and shall be of the best workmanship and in strict accordance with the dimensions on drawings subject to the approval of the project Engineer-Cum-Estate Officer, CCMD.
- 8.2.3 The primary requirement of plaster work shall be to provide absolutely water tight enclosure, dense, smooth, and hard and devoid of any cracks on the interior and / or exterior. The contractor shall do all that is necessary to ensure that this objective is achieved. All plastering shall be finished to the true plane, without any imperfections and shall be square with adjoining work and form proper foundation for finishing materials such as paints etc.,
- 8.2.4 Masonry and concrete surfaces, which call for applications of plaster, shall be clean, free from efflorescence, damp and sufficiently rough and keyed to ensure proper bond, subject to the approval of the Project Engineer-Cum- Estate Officer.
- 8.2.5 Wherever directed by the Project Engineer-cum-Estate Officer, CCMD, or other representative, all joints between concrete frames and masonry infilling shall be expressed by a groove cut in the plaster. The said groove shall coincide with the joints beneath as directed. Where grooves are not called for the joints between concrete members and masonry infilling shall be 24 guage galvanized chicken mesh strip 400mm wide or as called for on drawings/documents which shall be in position before plastering.

8.3 CHASING AND CUTTING:

All chasings, installations of conduits, insert boxes etc., shall be completed before any plastering or other wall finish is commenced on a surface. No chasing or cutting of plaster or other finish on a surface shall be permitted. Broken corners shall be cut back not less than 150mm on both sides and patched with plaster of paris as directed. All corners shall be rounded to a radius of 8mm or as directed by the Project Engineer-Cum-Estate Officer, CCMD.

8.4 SAMPLES:

Samples of each, type of plaster and other wall finish shall be prepared well in advance of undertaking the work for approval by the Project Engineer-Cum-Estate Officer, CCMD.

8.5 PROPORTIONS:

The materials used for plastering shall be proportioned by volume by means of gauge boxes.

8.6 PREPARATIONS OF SURFACES.

The joints in all walls, both existing and freshly built shall be raked to a depth of 15 cleaned with wire brushes, dusted and thoroughly wetted before starting plastering work. Concrete surfaces to receive plaster shall be roughened by hacking over the

entire surface so that the skin of the concrete is completely removed, as approved by the Architect/ Employer to ensure proper key for the plaster.

8.7 PLASTER TO WALLS:

Unless otherwise specified, all works shall be plastered and finished as follows:

Internal faces : 20mm thick with cement mortar 1:6 (one part of cement and six parts of fine river sand) finished smooth with lime rendering.

External faces: 12mm thick base coat with cement Mortar 1:4 (one part of cement and four part of fine river sand) finished rough to receive the final coat and 6mm thick final coat with cement mortar 1:3 (one part of cement and three parts of coarse river sand) sponge finished.

8.8 MORTAR MIXING

Mortar shall be prepared as specified in small quantities as required and applied within fifteen minutes of mixing.

8.9 Plaster application shall be commenced only after the preparatory work is approved by the Project Engineer- Cum- Estate Officer, CCMD. Correct thickness of plaster shall be obtained by laying plaster screeds (gauges) at intervals of 1.5 m as directed. Mortar shall be firmly applied, well pressed, into the joints, rubbed and finished to give a smooth and even surface to the satisfaction of the Project Engineer-Cum-Estate.

8.10 CURING

Finishing Plaster shall be kept wet for at least ten days after completion in hot weather, walls exposed to such shall be screened with matting kept constantly wet or by other approved means.

8.11 CLEANING PLASTERING:

Plaster to ceiling, so fits of stairs flight slabs and similar locations, where called for, shall be 12 mm thick comprising of one part cement and three parts of clean fine sand unless otherwise specified. The surface shall be brushed, swept clean and thoroughly wetted before plastering. Mortar shall be applied firmly pressed to the surface, rubbed and finished smooth evenly subject to the approval of the Project Engineer-Cum-Estate Officer, CCMD.

8.12 CEMENT MORTAR:

8.12.1 Cement mortar shall be of proportion specified for each type of work. It shall be composed of Portland cement and sand. The ingredients shall be accurately gauged and shall be evenly mixed together in a mechanical mixer. Care should be taken not to add more water than necessary. If hand mix is allowed, it shall be done on pucca waterproof platform. The gauged materials shall be put on platform and thoroughly mixed dry. Water shall then be added and the whole

mixed thoroughly until the mix is homogeneous and of uniform colour. Quantity of mortar mixed should not be more than what can be consumed within half an hour of mixing.

8.12.2 Cement mortar mix are specified in 1:2, 1:3, 1:4, 1:5 etc., the first figure will mean one part of Portland cement by volume and the second will mean so many parts of sand by volume. For example cement mortar 1:4 would mean

One part of cement and four parts of sand.

8.12.3 Cement and sand must conform to relevant I.S specification.

8.13 LIME RENDERING:

This will be prepared out of best quality fat lime slaked at site with fresh water not less than one week or not more than two weeks before use. All impurities, ashes and improperly burnt stuff shall be screened and picked out before slackening. Slaked lime shall be screened through to remove all unslaked materials, stones etc., so that only a fine creamy paste is available for rendering. Slaked lime is to be diluted with just sufficient water to give a thick consistent pulp suitable for effective covering of base surface. Before the base coat sets, the lime rendering is applied and finished smooth and the entire plastered surface is made truly plane.

9.0 FLOORING:

9.1 GRANOLITHIC FLOORING

9.1.1 General: The flooring shall be of specified thickness and shall consist of 1:2:4 concrete base or as specified and 12mm thick granolithic wearing coat. The granolithic flooring shall be laid in alternate panels. The size of panels shall be as decided by the Project Engineer-Cum-Estate Officer, CCMD

9.1.2 Laying of 1:2:4 concrete base:

9.1.2.1 The 1:2:4 concrete shall be of graded coarse aggregate of maximum size 10mm, coarse sand and cement. The ingredients shall be thoroughly mixed with sufficient water to obtain the required plasticity.

9.1.2.2 The free water on the surface of the base shall be removed and a coat of cement slurry of the consistency of thick cream shall be brushed on the surface.

9.1.2.3 The prepared 1:2:4 concrete shall be laid immediately after mixing on the fresh grouted base. The concrete shall be spread evenly and leveled carefully. Low places shall be filled, humps removed and the whole surface again leveled. The layer shall be compacted by ramming trowel led and allowed to set.

9.1.2.4 Mixing and laying of wearing coat: one part of cement in dry state shall be mixed with 1.5 parts by volume of well graded/crushed granite chips of

6mm maximum size. The ingredients shall be then mixed with sufficient water so for ordinary concrete. The wearing coat shall be laid 12mm thick over the base concrete immediately after it has set, compacted and leveled with a steel trowel. Just sufficient trowel ling shall be made to give a level surface. The surface should not be over trowelled as excessive trowelling will bring the cement to the surface which shall be strictly avoided. When the initial set takes place, further compaction by steel trowelling shall be done and final brushing shall be made before the topping becomes too hard.

9.1.3 Curing as soon as the surface is hard enough, it shall be covered with sacking or sand and kept continuously wet for a period of at least one week.

9.2 A bed of cement mortar 1:4 shall be laid and properly leveled to average thickness of 20mm and the surface kept slightly rough to form a satisfactory key for the tiles, neat cement paste of honey like consistency shall be spread over mortar bed, over such an area so that the paste will not harden before laying tiles. Slabs shall be soaked in water for 15 minutes and allowed to dry. The slab shall be then fixed as per approved pattern with thin coat of cement paste applied on back of each slab and tapped with a wooden mallet till it is properly bedded in level with adjoining slabs. Joints shall be not more than 1:5 mm wide. The surplus cement grout that may have come out of the joints has to be wiped off gently and joints cleaned. The joints shall, be filled up with grey or white cement with an admixture pigment to match the shade of the slab. The flooring shall be cured for 14 days. Then it shall be polished according to IS: 1443, and pointed with cement mortar: 1:1 (1 part of cement and 1 part of fine screened sand) mixed with matching colour pigment.

9.3 GRANITE SLAB WORK:

9.3.1 General: The slab must be of uniform thickness as specified, the variation in the thickness not exceeding 12 mm and must be from the same source. They shall be of uniform texture and colour free of any veins and streaks. All the edge shall be chiseled true to line, square and shape. The surface should be rough dressed/ one line dressed. Three line dressed pulman dressed/mirror polish as specified.

9.3.2 Rough Dressing: The stone surface to be chisel dressed to one plane by removing all bushings so that the maximum depression is not more than 6 mm.

9.3.3 One Line Dressing: This is done after the rough dressing is completed by point chiseling so that the variations are not more than 4mm. Work includes rough dressing also.

9.3.4 Two Line Dressing: This is done after, one line dressing is done by chiseling so that variations are not more than 2.5mm work includes rough and one line dressing also.

- 9.3.5 Three Line Dressing: This is done after two lines dressing is over by chiseling so that variations are not more than 1.5mm work includes rough, one line dressing also.
- 9.3.6 Pulmane Dressing: After the three line-dressing is over, the surface is smoothened by using a special pulmane tool to further even out three line dressed surface so that the maximum variation in surface evenness is not more than 1.0mm work includes rough, one line, two line and three line dressing also unless otherwise stated.
- 9.3.7 Mirror polishing: The surfaces are to be polished by grinding using manual or mechanical process to give a smooth even perfect plane surface or as may be directed. The polished surface should reflect light like a mirror and must be free from scratches and depressions.

9.4 GLAZED TILING

- 9.4.1 Glazed tiles shall be from an approved manufacture conforming to IS.777 of specified size, thickness and colour, All specials viz coves, internal and external angels, corners beads etc., shall be used wherever directed. Under layer of 12mm average thickness of cement mortar 1:3 proportion shall be laid tiles shall be well soaked in water washed clean and set in cement grout each tile being gently tapped with wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints should be kept as thin as possible and in straight lines or to suit the required pattern after tiles have been laid surplus cement grout shall be cleaned off the depth of % mm and all dust and loose mortar removed joints shall then be flush pointed with white cement if necessary mixed with pigment to match the colour of the tile. The floor / dado shall be kept wet for 14 days, after curing the surface shall be washed with mild hydrochloric acid and clean water, the finished floor/ dado shall not sound hollow when tapped with wooden mallet, the rate will include the cost of under layer of cement mortar.

10.0 PAINTING

- 10.1 The specifications covers the various types of all surfaces thought the interior and exterior of the building the number of coats required in various situations and also the type of finish required for the several items of work such as cement based paint, plastic emulsion point, oil bound distemper etc., are specified in the schedule of quantities and specifications.
- 10.2 Before commencement of the work, the contractor shall provide sample panels of painting at this own cost for the approval of the Project Engineer-Cum-Estate Officer-CCMD, to enable him to keep an accurate check on the materials supplied and final shade to be painted. It is however, the responsibility of the contractor to provide any deviations and defects shall have to be Rectified by the contractor at his own cost.
- 10.3 Contractor shall protect not only his own work at all times but also all the adjacent work and materials by suitable covering, protection or other methods

acceptable to the Project Engineer-Cum-Estate Officer, CCMD during progress of painting, it is of painting work to remove all paint and varnish spots from floors, walls, glass panes and other surfaces and restore them to original conditions. The work generally touched up shall be attended to after all workmen have left. Accumulated – material, rubbish etc., have to be cleared and the premises left in clean, orderly and acceptable conditions.

- 10.4 Contractor shall provide scaffolding wherever necessary erected on double supports tied together by horizontals. No ballies, bamboos or planks shall rest on or touch the surface, which is being painted. Contractor is demand to have considered the following while tendering and no extra claim on account of these will be entertained.
- 10.4.1 Supplying the paint and other materials required of approved colour and brand.
- 10.4.2 Preparing the surfaces to be painted.
- 10.4.3 Providing and erecting scaffolding and removing the same after completion of the
- 10.4.4 Lifting of materials to any height and painting at all levels.
- 10.4.5 Applications of painting as per the specification and to manufactures instruction.
- 10.4.6 Curing, protecting the painted surfaces and adjacent work and thoroughly cleaning of premises.
- 10.5 The paint shall generally conform to the chemical composition and other characteristics laid down in the relevant Indian standard specification. The entire materials required for painting work shall be obtained direct from approved manufactures or their authorized agents and brought to site in original manufactures containers with seals unbroken.
- 10.6 Paint shall be ready mixed of quality of the approved brand and manufacture. Mixing of paint by the contractor at site will not be allowed, except preparation and their quality shall be strictly maintained as per manufacture's instruction and all as directed by the Project Engineer-cum-Estate Officer, CCMD. All the materials shall be kept properly protected when not actually in use. Lids of containers shall be kept closed. Materials which have become stale or flat (in opinion of the project Engineer-Cum-Estate Officer, CCMD) shall not be permitted to be used on the works and shall be removed from site forthwith. Any materials found not conforming to the relevant specifications shall have to be removed by the contractor from the site at his own expenses.
- 10.7 Providing two coats of synthetic enamel paint of approved make colour over one coat of primer on plastered surfaces, wooden surfaces and steel surfaces: A fully putty coating has to be given after primer coat in the case of wooden

surfaces. The putty shall be made from pure whiting mixed to the proper consistency with new linseed oil, a little white lead being mixed to help hardening of putty. On no account putty is to be used before primary coat. Primers to be used shall be according to the manufacture specifications.

10.8 The manner of taking measurements will be in accordance with ISI: 1200.

11.0 WHITE WASHING

White wash shall be prepared from fat lime or shell lime slaked on site mixed with just enough water to make a thick paste and allowed to remain for atleast 7 days before use. At the time of using the paste shall be diluted with just sufficient water and strained through cloth. 4 kg of gun dissolved in hot water shall be added to each cubic meter of cream (115 GMS per cft). Ultra marine blue or other approved locally available colour pigment shall be added to give required whiteness. The number of coats as specified in the bill of quantities shall be added to give required whiteness. The number of coats as specified in the bill of quantities shall be applied by using flat brushes or spray pimps, on surface prepared. Each coat shall be allowed to dry before next coat is applied.

12 TREATMENT FOR SUNKEN FLOOR SLAB:

- A. Brick bat aggregate shall be from well burnt bricks. The proprietary water proofing compound and the quantity to be used shall be as per para 15.1
- B. The surface shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and dusted off. The surface (bottom as well as sides) shall be treated with cement slurry admixed with proprietary water proofing compound to penetrate interstices and fill the pores in the surface.
- C. After the slurry coat is laid, a layer of well burnt brick bats/ aggregates of about 40mm size shall be laid in cement mortar of mix as specified by the specialist firm but not leaner than 1:5 (a cement : 5 coarse sand) admixed with proprietary water proofing compound the mortar being filled to half the depth of the aggregate. The brick bat/aggregate layer shall be rounded off at junctions with the beam all etc., and tapered towards top to a height of 100mm long beams/ wall, etc., curing of this layer shall be done for 3 days.
- D. After curing the surface shall be applied with a coat of cement slurry admixed with proprietary water proofing compound.
- E. Joints of brick bat/ aggregate shall be filled fully with cement mortar of mix as specified by the specialist firm but not leaner than 1:4 (1 cement. 4 coarse sand) admixed with proprietary water proofing compound and top finished with average 20mm thick layer of some water. This layer of mortar shall be continued to the sides of beam. Wall etc., the height upto which this treatment is to be extended on the sides shall be as directed by the Engineer-in-charge.

The surface shall be finished smooth with cement slurry admixed with proprietary water proofing compound.

- F. While the water proofing treatment is 3qrie it shall be ensured that the outlet pipes are properly fixed arid the gap between the wall and pipes are properly filled with brick/stone aggregate and cement mortar admixed with proprietary water proofing compound and grouted with cement slurry admixed with proprietary water proofing compound by injection process.
- G. Water proofing treatment shall be cured for 10 days
- H. Measurements: measurements for the floor treatment shall be taken on plain area of floor treated nothing extra shall be paid for rounding off at junctions and taking the treatment along sides of beams and walls for about 100mm sides of beam/wall etc., where the treatment is only with mortar shall be measured and paid separately , length and breadth shall be measured correct to once centimeter and area calculated correct to 0.01 sqm
- I. Rates: The rates shall include the cost of all labour and material involved in all the operations described above. Base treatment and sides treatment will be paid separately under respective items.

PART II: SPECIFICATIONS FOR WATER SUPPLY AND SANITARY WORKS

1.0 GENERAL

1.0 SCOPE OF WORK:

The general character and the scope of work to be carried out is illustrated in the drawings and specifications. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the rules and regulations of the local authority. The contractor shall furnish all labour, supply and install all materials, appliances, tools, equipments etc., necessary for the complete provision and testing of the whole plumbing services installation as specified here as per the relevant ISI codes as shown on the drawings. This also includes any material, appliances, equipment not specifically mentioned herein or noted on the drawings as being furnished or installed but which are necessary and customary to make a complete installation as shown on the drawings or described herein, properly connected and in working order.

In general, the work to be performed under this contract shall comprise of the following:

- 1.1 All incidental jobs connected with water supply services installation, such as excavation in trenches and back filling, cutting chases in concrete, brick etc., and making good cutting drilling holes through walls, floors and grouting for embedding of fixtures, equipment and fixing of valves, pumps etc.,
- 1.2 Furnish and install a complete workable, service installation as shown on the drawings and as per the latest ISI specifications including all that which is reasonably inferred.
- 1.3 Complete installation of internal water supply system.
- 1.4 Complete installation of the sewerage and sewerage appurtenances internally and around the building.
- 1.5 Complete installation of all sanitary and plumbing fixtures.
- 1.6 Co-operation with other crafts in putting the installation in places. Any work without regard or consultation with other trades, shall be removed by the contractor without any traditional cost to the employer, to permit the proper installation of all other work, as prescribed by the architects.
- 1.7 Repair all damages done to the premises as a result of this installation and remove all debris arising there from to the satisfaction of Project- Engineer – cum- Estate Officer.

- 1.8 Cleaning of all plumbing “fixtures, testing and showing satisfactory performance all the fixtures at the time of handing over to the Project Engineer-cum-Estate Officer.
- 1.9 It is the responsibility of the contractor to safe guard and takes care of all the fixtures fitted until the time handing over to the Project Engineer-cum-Estate Officer.
- 1.10 Painting of all concealed and exposed pipes as specified.
- 1.11 Assume full responsibility of all statutory requirements.
- 1.12 At the completion of the work, furnish necessary information like invert levels and layout of pipeline etc., and prepare final completion drawings to the Project-Engineer-cum-Estate Officer.

2.0 REGULATIONS AND STANDARDS:

2.1 The installations shall conform in all respects to the following board list of standards in general:

- | | | |
|----------------|---|---|
| IS 3114 – 1965 | : | Code of practice for laying of CI pipes. |
| IS 1230-1968 | : | Specifications for mild steel tube, tubular and other steel |
| | | pipe fittings part I |
| IS 1536 – 1980 | : | Centrifugally cast (spun) cast iron pressure pipes for water, gas and sewerage. |
| IS 780 – 1980 | : | Sluice valve for water works purposes. |
| IS 1520 – 1980 | : | Horizontal centrifugal – pumps. |

2.2.1 The installation shall also be in conformity with the byelaws and requirement of the local authority in so far as these become applicable to the installation wherever this “specification calls for a higher standard of materials and / or workmanship than those required by any of the above regulations and standards then this specification shall take precedence over the said regulations and standards. Wherever the specification require something which will violate the regulations, the regulations shall govern.

3.0 PERMITS AND TESTS:

On completion of the work, the Contractor shall obtain and deliver to the Project Engineer-cum-Estate Officer, CCMD certificates of final inspection and approval by the local authority as may be applicable. The Project Engineer-cum-Estate Officer, CCMD shall have full power to require the materials or work to be tested by any independent agency at the contractors expenses in order to prove their soundness and adequacy.

4.0 DRAWINGS AND SPECIFICATION

The drawings and specification shall be considered as part of this and any work or materials shown on the drawings and not called for in the specifications or vice versa shall be executed as if specifically called for in both. The contract drawings shall indicate the extent of general, arrangement of the fixtures, drainage system etc., and essentially diagrammatic. The drawings indicate the points of supply and termination of pipe runs and broadly suggest the routes to be followed. The work shall be installed as indicated on the drawings, however, any changes found essential to coordinate, this work with other trades shall be made without any additional cost. The data given herein and on the drawings is as exact as could be secured but its complete accuracy is not guaranteed. The drawings and specifications are of the assistance and guidance to the contractor and exact location distance and levels will be governed by the individual building and site condition, therefore approval of the Project Engineer-cum – Estate Officer, CCMD on tracing cloth.

5.0 MANUFACTURERS INSTRUCTIONS:

Where manufacturers have furnished specific instructions, relating to the materials used in this job, covering points not specifically mentioned in job, covering points not specifically mentioned in these documents. These instructions shall be followed in all cases.

6.0 CHANGE IN DIMENSION

If the size of the fixture mentioned is not available, then the nearest available size shall be fixed with due consent of the Engineer-in-chief, CCMD.

7.0 MATERIALS:

- 7.1 Materials shall be of the best quality obtainable and unless otherwise specified they shall conform to the respective Indian Standards Specification.
- 7.2 Samples of all materials shall be as per the list of approved branch manufacture. The samples shall be got approved before placing order and the approved samples shall be deposited with the Engineer-in-chief, CCMD.
- 7.3 In case of non availability of materials in merits, sizes, the nearest size of EPS units shall be provided with prior approval of the Engineer-in-chief Project Engineer-Cum-Estate Officer, CCMD, for which no extra will be paid.

8.0 TRENCHES FOR PIPE DRAINS:

- 8.1 Opening out trenches: In excavating the trenches etc., the road metalling pavement curbing etc., are to be placed on one side and preserved for reinstatement when the trench or other excavation shall be filled up at no extra cost.

Before any road metal is replaced, it shall be carefully shifted, the surface of all trenches and holes shall be restored and maintained to the satisfaction of the Architects. The contractor shall not cut or break down any live fence of trees in the one of proposed works but shall tunnel under them unless the Architects shall order to the contrary. The contractor shall scrub up and clear the surface over the trenches and other excavations of all stumps, roots and all other encumbrances affecting execution of the work and shall remove them from site to the approval of the Project Engineer-Cum-Estate Officer, CCMD.

- 8.2 Cutting of roads: All works across the roads, shall be carried out as per the directions of the Project Engineer-Cum Estate Officer, CCMD.
- 8.3 Excavation to be taken to proper depth: The trenches shall be excavated in all conditions of soil and to such a depth that the pipelines shall rest as described in the several clauses relating there to and so that the inverts may be at the levels given the drawings. In loose soil, the Project Engineer-cum-Estate Officer, CCMD. May order the contractor to excavate to a great depth than shown on the drawings to fill up the extra excavation with concrete, sand, gravel or other materials. For such authorized filling of materials the contractor shall be paid extra at the rates laid down under clause 20.0 of the general conditions of contract, if the extra work was ordered by the Project Engineer-Cum-Estate Officer, CCMD. If the contractor should excavate the trench to a greater depth than is required without a specific order to that effect in writing, the extra depth shall have to be filled up with concrete at the contractor's own cost to the requirements and satisfaction of the Project Engineer-Cum- Estate Officer, CCMD.
- 8.4 Refilling: After the pipes or other fittings has been laid and proved to be water tight, the trench or other excavation shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the pipes and other permanent works. Filling in the trenches and upto 50cm above the pipes shall consist of the finest selected materials placed carefully and consolidated. After this has been laid, the trench and other excavation shall be refilled carefully in 15cm layers with materials taken from the excavation each layer being watered and consolidated.
- 8.5 Settlement and Damages : The contractor shall, at his own cost make good promptly, during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, beams, footpaths, gardens, open spaces, etc., whether public or private caused by his trenches or by his other excavations and he shall be liable for any accidents caused thereby. He also shall at his own expenses and charge, repair and make good any damage to the buildings and other properties.
- 8.6 Disposal of surplus soil: The contractor shall at his own cost and charge, dispose within the site all surplus excavated material not required to be used on the works to within a distance of 50cm.
- 8.7 Timbering of pipe line and trenches: The contractor shall at all times support efficiently and effectively the sides of the pipe trenches and other excavations by suitable timbering, piling, sheering etc., without any extra cost. All timbering, sheeting and piling with their wallings and supports shall be of adequate dimensions and strength and fully braced and strutted so that there is no risk of collapse or subsidence of the walls of the trench. The contractor shall be held accountable and responsible for the sufficiency of all timbering, bracing, sheeting and piling used and for all damages to persons and property

resulting from the improper quality, strength, placing, maintenance or removing of the same.

- 8.8 Removal of water from pipeline, trenches etc., : The contractor shall at all times during the progress of work keep the trenches and excavations free from water which shall be disposed of by him in a manner as will neither cause injury to the public health nor to the work completed or in progress nor to the surface of any roads or streets nor cause any interference with the use of the same.
- 8.9 The width of the excavated trench shall be as per the table given below width at bottom

Excavation upto 90cms depth	33cm	33cm
90 to 150cm depth	60cm	60cm
150 to 300cm depth	75cm	75cm
300 to 500cm depth	90cm	100cm

- 8.10 Protection of existing services : All pipes, water mains, cables etc., met in the course of excavation shall be carefully protected and supported.
- 8.11 Concreting: All pipes at shallow road crossings and made up ground shall be laid on a bed of 15cm concrete with one part of cement, 4 parts of sand and 8 parts of 40mm gauge stone metal property consolidated. Concrete shall be laid to the full width of the trench and also in haunches.

8.12 CAST IRON PIPES AND FITTINGS

- 8.12.1 Cast – iron soil, waste and vent pipes and fittings shall be of heavy quality conforming to IS 1536-1967 and fittings to IS 1537-1960
- 8.12.2 Claying and Jointing: The pipes shall be laid, underground, under the floors, or on walls either buried or exposed as the case may be as shown on the drawings.
- 8.12.3 Cast Iron, Pipes: Cast iron pipes shall be laid and jointed in conformity with the code of practice for laying of cast iron pipes. Cast iron pipes shall be jointed by best quality caulking lead free from all impurities in wet trenches, joints shall be made with lead wool. The spigot shall be centered in the adjoining socket by tightly caulking in sufficient turns of tarred gaskin to leave unfilled the required depth of socket for lead. Where the gaskin has been caulking tightly home, a jointing ring shall be placed round and barrel and against the face of the socket. Molten lead shall then be poured into fill the remainder of the socket in one with suitable tools by hammering right-round the joint, to make up for the shrinkage of the molten metal on cooling and shall preferably finish 3mm behind the socket face. Lead for caulking shall conform to IS 782-1966. The quantity of lead to be filled per joint in various sizes of cast iron pipes. Shall be as follows:

Water main pipes: Lead /joint (Kg)

80mm (3") pipe	1.8
100mm (4") pipe	2.2
125mm (5") pipe	2.6
150mm (6") pipe	3.4
200mm (8") pipe	5.0

8.12.4 The joints and pipes laid for water supply systems shall be tested to a pressure of 12kg.sqcm for two hours without developing leaks/fall in pressure. The drainage pipelines and joints shall be tested to a head of 150cm for two hours without developing leaks/fall in pressure. In case of leaks the piping shall be redone in such portion and the test repeated till achieving satisfactory results.

8.12.5 Under ground piping shall be of CI tyton type confirming to IS class A 1536 the piping shall be laid not less than 1Mt below the ground level. Suitable masonry/ PCC support anchor blocks shall be provided at change in direction with soil conditions are unsatisfactory.

8.12.6 All fittings shall be CI flanged confirming to IS 1538. The flanges shall be drilled as per relevant Indian Standards Flanges shall be faced and cleaned and shall have jointing of rubber insertion or asbestos compound. In case of tytron pipes the joint shall be made by using rubber gaskets as per manufactures specification. The joint shall be capable of withstanding a pressure of 10.5 Kg/Sqcm.

9.0 SLUICE VALVES

Sluice valves shall conform to IS: 780 valves shall be of right hand type. Only flanged valves shall be used . Valve wheel shall have an arrow engraved or cast thereon showing the direction of turning open or close operation.

10.0 NON-RETURN VALVES

Non return valve shall be of cast iron with gun metal seat. Non return of valves shall be of flanged type. Spring loaded valves shall not be used. The valves shall be suitable for a test pressure of 21 kgs/Sqcm.

11.0 MODE OF MEASUREMENT

11.1 Excavation (General): the width of excavation shall be limited to as said earlier.

11.2 Cast iron pipes: Cast iron pipes shall be measured along the center line of the pipe including all specials in Rmt. The quoted rate for respective item shall be Rmt, and shall include the following:

- A. Cost of respective pipes and specials and jointing materials etc.,
- B. Laying fixing and jointing with necessary clamps, brackets, bolts, nuts and washers.
- C. Making good all damages to the parts of the building to suit the surroundings and making good the defects if any.
- D. Testing and making good the defects if any

Valves: Valves shall be per number only and shall include the following:

- A. Cost of valve and jointing materials
- B. Fixing and jointing with necessary bolts, nuts, rubber insertion etc.,
- C. Testing and making good the defects if any:

11.4 GI Pipes and Fittings:

The pipes shall be of the medium quality (class B) unless otherwise specified and shall be of galvanized iron, screwed socketed and shall conform to IS: 1239. They shall be manufactured by a firm of repute. All fittings shall be malleable iron galvanized fittings of approved best Indian make.

11.4.1 LAYING AND FIXING

11.4.1 Where pipes have to be cut or re-threaded, ends shall be carefully cut so that no obstruction to bore is offered. For internal work all pipes and fittings shall be fixed truly vertical and horizontal either by means of standard pattern holder bat clamps keeping the pipes (12mm) clear of the wall everywhere or concealed as re-directed.

11.4.1.2 For external work, G.I pipes and fittings shall be laid in trenches. The width of the trench shall be the minimum width required for working. The pipes laid underground shall not be less than 60cms. From the finished ground level. The work of excavation and refilling shall be done as specified elsewhere or concealed as directed.

11.4.2 Painting : The burred pipes shall be painted with two coats of bit mastic paint.

11.4.3 Testing: Before any pieces are painted or covered, they shall be tested to a hydrostatic pressure of 7 kg/sqcm pressure shall be maintained for atleast eight hours without appreciate drop in pressure, in addition to the sectional testing of water supply pipes, the contractor shall test the whole installation to the entire satisfaction of the Project Engineer-Cum – Estate Officer, CCMD. He shall rectify any leakages, failure of fittings or valves.

11.4.4 Mode of measurements: G.I pipes above and below ground shall be measured along the center line of the pipes and fittings the quoted rate for respective item shall be per Rmt and shall include the following:

- a) Cost of respective pipes and specials
- b) Laying, fixing and jointing with necessary clamps
- c) Cutting hole and chases in walls floors, etc., and making good the same
- d) Testing and making good the defects if any.

PART III: SPECIFICATIONS FOR ELECTRICAL INSTALLATION

1.0 LEGEND:

- 1.1 Internal electrification (general lighting and power) is for general lighting for fans, lugs, lights etc.

2.0 GENERAL

- 2.1 The electrical installation shall comply in all respects with the requirements of the Indian electricity act, 1916 as amended from time to time and the Indian Electricity rules and Regulations currently in force.
- 2.2 Materials, fittings and appliances shall be of the best quality and of approved make/ manufacture; conforming to the relevant Indian Standard Specifications. Samples must be attached to Project Engineer-Cum-Estate Officer, CCMD for their approval well in advance, atleast prior to execution of work, (tenderers tenders may specify the name of makers/manufactures of the materials, fittings and appliances which they propose to use, while tendering)
- 2.3 Workmanship shall be I Class, conforming to the requirements of the I.E Rules and regulations currently in force. 2.4 it shall be the contractors responsibility to prepare the necessary drawings/ chart, and submit the same through proper channel to the concerned authorities for approval of the installations:

3.0 GENERAL LIGHTING:

- 3.1 The wiring is to be done in concealed conduit for full unless otherwise specified. The distribution of circuit distribution boards and main board are as indicated in the layout.
- 3.2 The circuit distribution boards are all to be completely embedded in walls to make them flush to the surface.
- 3.3 The main control board to be fixed in position as indicated in the layout and in the manner indicated by the Project Engineer-Cum-Estate Officer, CCMD, the power supply is so be drawn from the existing overhead line through an underground cable system, using necessary size G.I pipe at the wall entry. The cable jointing work should be done by an experience person specially trained for such jobs. The scope of this work includes laying cables in trenches (the trenches to be prepared by the contractor himself) and the cable jointing using necessary compounds.
- 3.4 The scope of this work covers the supply and installation of fittings like lighting fixtures, ceiling fans, exhaust fans, complete in all respects like mounting accessories lamps, wiring etc.,

- 3.5 The wiring for lights, plugs, fans etc., shall be of “looping-in-system” and in each and every switch box a neutral point shall be made available for testing purpose.
- 3.6 Not more than two power socket outlets should be connected in the same circuit and the power plugs be wired with PVC insulated conductor wires drawn in conduit.

4.0 POWER:

- 4.1 Power wiring in conduits shall unless otherwise specified, also be of concealed type run on walls independent of general lighting wiring based on the principle of overhead bus bar systems.
- 4.2 The mains will be terminated and connected through immediate junction boxes as shown in the layout and type of termination shall be as detailed in the layout: The tapping connections to load circuit boards shall be from the individual intermediate junction boxes, which will be at suitable capacity fuse units. The neutral connection shall be direct without fuse.
- 4.3 The tapping connections to load circuit boards shall be from the individual intermediate junction boxes, which will be at suitable capacity fuse units. The neutral connection shall be direct without fuse.
- 4.4 The control boards for the load outlets shall be fixed at a height of not more than 5 ft from the floor level and shall be in such a position as will be indicated by the Project Engineer-cum-Estate Officer at the time of execution.
- 4.5 All the intermediate junction boxes and the load control boards shall be suitable for flush mounting on the walls.
- 4.6 A portion of the power main pipes shall be possible to run the same on walls.

5.0 EARTHING:

- 5.1 Earthing in the case of power wiring shall be with soft drawn bars copper wire of size not less than 10 SWG, in double run suitably fixed on to the surface of the conduit by means of copper earth clips to ensure perfect electrical contact and the earthing wire shall run throughout the length of the conduit. At the main board level of individual earth wire runs shall be suitably interconnected firmly by means of earth clips to ensure proper continuity of earth connections, as well as full electrical contacts with the conduit pipes of the intermediate junction box and the load control boards and any other metal works in the wiring system shall all be suitably connected for perfect earth connections with insulated copper wire of size not less than 22G interconnections to the main earth loads. All the above works shall be in conformity with IS 732-1963

Code of practice for electrical wiring installation (system voltage not exceeding 650v)

6.0 GENERAL LIGHTING:

- 6.1 Insulated copper wire of not less than 22 G shall be used for the running of continues earth wire all along with conduits and shall be firmly bounded by means of suitable size earth clips, externally in order to have good electrical contact Bare copper wire sizes not less than 4 SWG shall be used for the main earthing connections.
- 6.2 These two earthing point outside the building shall be according to the I.S specifications for pipe earthing (IS 732-1963) provision shall be made at the light and fan outlets for earthing connections, so that they can be used wherever found necessary instruction from the Project Engineer-Cum-Estate Officer, CCMD.

7.0 Materials:

- 7.1 The conduit pipes to be used shall be heavy guage not less than 2mm thick of PVC conduit and good quality. The minimum size of conduit to be used shall be $\frac{3}{4}$ " dia. The conduit fittings like bends, junction boxes etc., should be of standard quality and shall be with good deep matching threads to suit the conduit pipes and shall be free from burs etc.,
- 7.2 The switch boxes etc., shall be metal clad out of M.S Sheets not less than 16SWG either square or oblong in shape and in suitable sizes as per requirements and shall be provided with earthing terminal screws for body earthing connections. The depth of the boxes shall be such that they should fully be embedded in the wall, flush with the finished wall surfaces.
- 7.3 The top covers of these boxes be of either laminated sheets of thickness between 1/8" to 1/4" as required for perpex sheets.
- 7.4 The control switches for lights shall be hush type as specified 7.5 the 5 amps plugs and socket shall be 3 pin flush type
- 7.5 The 15 amps 3 pin power plugs shall be preferably flush mounting type with a combined switch and shall be controlled by a fuse or a miniature circuit breaker single pole type.

8.0 PARTICULAR SPECIFICATIONS:

- 8.1 Type/system of wiring : only loop in system of wiring with PVC in conduit (surface as per details in schedule) and junction boxes where absolutely necessary and only at the places approved by the Engineer-in-Chief, CCMD.
- 8.2 Wires: Single core multistrand copper PVC of approved make and conforming to ISI only should be used.

- 8.3 Conduit: Heavy gauge of 2mm thick PVC conduit pipe. Conduit drops must be laid to plumb. PVC bushings should be provided at all ends of conduits.
- 8.4 Workmen: All work must be executed by licensed electrical wiremen possessing valid licences.
- 8.5 Switches: All 5 amps switches and 3 pin wall plugs must be of good quality or equivalent approved make.
- 8.6 Florescent Fittings: Light fittings should be complete in all respects including clamps reflectors, tubes, chokes, condensers, starters and internal wiring, extras on this account not admissible. The rate quoted must include these elements as well. Any damage to these fittings during erection/ installation should either be made good or fitting replaced totally.
- 8.7 Cables: Cables shall be with aluminium conductor, PVC insulated conforming to IS specification.
- 8.8 The contractor should enclose the pamphlets, catalogues of various materials offered while submitting the tender. The tenderers are required to submit along with their tender the list of makes of all equipments, fittings, fans, lamps, switches, gear, fuse gear, conduits and accessories, wiring materials and accessories. Non compliance to this will subject to their tender for disqualification or rejection.
- 8.9 Earthing: All machine parts, metal covers, switches, panels, fittings should be I/P earthed as given in the schedule and this has to be approved by the electrical inspector. The procedure should be strictly from L.E.E Regulations and Indian Electricity Act. Earthing in continuity for conduit pipes throughout and at junction boxes should be maintained by check nuts on either side and earthing clamps where necessary.
- 8.10 Boards: The main board and the sub distribution boards should be metal clad. The M.S sheet used for the box should be 3 mm thick and holes of the required diameter for incoming and outgoing pipes should be drilled in it.
- 8.11 Wiring diagrams: The contractor shall, on completion of electrical works executed in the budding furnish in duplicate the wiring diagrams indicating the light, power, fan points/outlets etc., indicating the colour code also so as to enable easy identification of circuits.

I.S SPECIFICATIONS

A general list of IS Specifications applicable to this contract is appended here with

IS CODE NO

SP 7-1970	National Building Code
1885	Symbols
4648	Guide for electrical layouts
5578	Marketing of insulated conductors
5216	Guide for safety in installations
374	Ceiling fans
5077	Decorative light fitting
1913	Safety requirement of fittings
1536 & 6616	Ballasts
3323	Bi-pin lamp holders
2215	Starters for fittings
2418	Flourescent lamps
1569	Discharge lamps
3324	Holders
5513	Boxes for enclosures for Ele Accessories
Sp-7-2675	Fuse distribution boards
371	Ceiling roses
2667 & 3387	Metal conduits – fittings and accessories
1653	Rigid metal conduits
3854	Switches for lighting circuit control
1293	Three pin plugs
2351	Danger Board
3106	Instalation and selection of fuses
3043	Earthing
2147	Degree of protection by switch and control gear
4237	Requirement for switch and control gear
40437	Heavy duty air break switch and Sf units
2208	HRG fuses
375	Switch gear bus bars
2607	Air break isolators
1951	PVC sleeveings
1255	Code of practice for laying cables.
1694	PVC insulated cables.
1554	PVC cables.
3961	Current rating of cables.

LIST OF APPROVED MAKES FOR CIVIL WORKS

	Item	Make
1	WINDOWS	
2	ALUMINIUM	JINDAL/INDAL/HINDAL CO
3	STEEL	TATA/ SAIL
4	DOORS	SAL WOOD DOOR WITH FLUSH SHUTTER, GRP LAMINATED DOORS
5	GLAZING	JOHNSON, KAJARIA
6	GLAZED TILES	JOHNSON, KAJARIA, NAVEEN
7	CERAMIC TILES	JOHNSON, KAJARIA, NAVEEN
8	PAINTS AND DISTEMPER	ASIAN BRAND, APEX BRAND
9	SYNTHETIC ENAMEL	ASIAN BRAND
10	WATER PROOFING COMPOUND	FOSROC, DR.FIXIT
11	VITRIFIED FLOORING	JOHNSON, KAJARIA
IF THE ABOVE BRAND IS NOT AVAILABLE THE EQUIVALENT MATERIAL TO BE APPROVED BY THE ENGINEER-IN-CHARGE BEFORE FIXING		
ALL MATERIAL SHALL HAVE TO BE GOT APPROVED FROM THE ENGINEER-IN- CHARGE BEFORE BEING USED.		

<u>List of approved makes – Plumbing and sanitary Works</u>		
1	VITREOUS CHINA SANITARY WARE	HINDUSTAN SANITARY WARE/ PARRY WARE
2	C.P FITTINGS	JAQUAR CONTINENTAL
3	PVC PIPES (SWR QUALITY)	ORIPLAST
4	G.I FITTINGS	R BRAND
5	G.I PIPES	TATA B CLASS A GRADE
6	BALL VALVE (15MM TO 150MM DIA)	ZOLOTO/AM
7	GUN METAL GATE VALVE	ZOLOTO/LEADER
8	STONE WARE PIPES AND GULLY	NECO/TSL/ANDHRA
9	MAN HOLE COVERS	NECO
10	EWV SEAT COVER TO LID	COMMANDER/PRINCE
11	FLOAT GLASS MERCURY COATED	MODI/KONICA
12	PVC CONNECTION PIPE	KOHINOOR
13	PVC SWR PIPE	SUPREME
14	FLUSHING CISTERN	SLIMLINE
15	CP BOTTLE TRAP	JAQUAR
16	MIRROR	ATUL/MODIGUARD
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

List of approved makes – Electrical works		
A	PVC CONDUITS	UNIVERSAL/UNI PLAST
B	UG CABLES	UNIVESAL /CCI/ANCHOR/GLOSER/FINO LEX
C	COPPER WIRES	WINCAP/FINOLEX/ANCHOR
D	DP SWITCHES, SP SWITCHES AND SOCKETS	ANCHOR/ROMA
E	MCB/ELCB	MDS/L&T HAGER
F	SWITCH FUSE UNITS/FISE LINK	GEC/EE/L&T/SCHNIEDER
G	FLOURESENT /CFL TUBE FITTING	PHILIPS/CROMPTON
H	LAMPS	PHILIPS/CROMPTON
I	EXHUST FANS	GEC/CROMPTON
J	TELEPHONE CABLES	DOORAVANI/DELTON
K	MAIN MCB-DB (MDB)	L&T HAGER/ABB/SCHNIEDER
L	DB-KIOSK	L&T HAGER/MDR/ABB/SCHNIED ER
M	CT	L&T HAGER/ABB/SCHNIEDER
N	VOLT METER – ANALOGUE METER	L&T HAGER/ABB/SCHNIEDER
O	AMMETER-ANALOGUE METER	L&T HAGER/ABB/SCHNIEDER
P	INDICATING LAMPS	L&T HAGER
Q	GRIMMING LUNGS	DOWELS MAKE ONLY
R	CEILING FAN	CROMPTON GREAVES
S	GEYSER	RACOLD/BAJAJ
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

List of approved makes – Electrical works		
S1	DESCRIPTION	MAKE
1	GI PIPES	TATA/JINDAL
2	PUMPS	KIRLOSKAR
3	PRESURE GAUGE	H GURU
4	PRESSURE SWITCH	INDFOSS
5	MOTOR CONTROL PANEL	MICRO POWER SYSTEM/ SUBRAMANYAM INDUSTRY
6	CABLES	TOSHIBA/HAVELLS/UNIVERSAL
7	BUTTERFLY VALVE	INTERVALVE/ADVANCE
8	NON RETURN VALVE	INTERVALVE/ADVANCE
9	Y-STRAINER	ANIL/LEADER/SAMSUNG
10	HYDRANT VALVE	ISI MARKED
11	HOSE BOX	GURAD FIRE/ SUBRAMANYA INDUSTRIES
12	CP HOSE	ISI MARKED
13	BRANCH PIPE	ISI MARKED
14	BALL VALVE	ITAP/R BRAND
15	FIRE HOSE REEL DRUM	OMEX
16	FIRE EXTINGUISHERS	ISI MARKED
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

Note:

- 1) The rate quoted shall be inclusive of ALL LEAD AND LIFTS INCLUDING SCAFFOLDING AND STAGING wherever required. No extra will be payable on this account.
- 2) All the unserviceable materials obtained from dismantling should be disposed out of the campus and serviceable materials should be stacked at the central stores/place shown within the campus.
- 3) Necessary charges for testing the materials should be done by the agency.

SCHEDULE - B						
Construction of New Air Conditioned lab spaces at III rd Floor for BSSE , IISc						
BILL OF QUANTITIES - CIVIL						
Sl. No	Description	Qty	Unit	Rates quoted in (Rs Ps)		Amount (Rs Ps)
				In figures	In words	
1	Dismantling weather proof course and removing and conveying the debris to a distance upto 200 m. with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., completeThe rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	75.00	cum			
2	Dismantling cement concrete flooring or plain cement concrete work including removing and conveying the debris (within average thickness of 15 cms). with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete as per specification The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	55.00	sqm			
3	Dismantling plastering and removing the debris . with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., completeThe rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	50.00	sqm			

4	KSRB 6-1.3 : Providing and constructing burnt brick masonry for basement and superstructure with approved quality of non-modular bricks of standard size of class designation 35 with cement mortar 1:6 including cost of materials, labour charges, scaffolding, curing complete as per specifications. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	20.00	cum			
5	KSRB 5-15 : Providing and constructing non-load bearing wall with cement concrete solid blocks with compressive strength not less than 35 Kg/sqm with cement mortar 1:4 (Jamb, closer blocks) with blocks of size 40x15x20cms. (lxbxh) conforming to I.S : 2185/1965 in superstructure including cost of materials, labour charges, scaffolding, curing complete as per specifications. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	160.00	sqm			
6	KSRB 6-7.1 :Construction of partition wall 11.2 cms thick with non modular ground moulded burnt bricks of class designation 35 with cement mortar 1:4 including providing and fixing plaster mesh manufactured out of hot dipped galvanised iron of nominal thickness 0.35 mm. 100 mm. wide as per I.S. 2212/1991 at 7.5 m. c to c including cost of materials, labour charges, scaffolding, curing complete as per specifications. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	50.00	sqm			

7	KSRB15-3.5 : Providing 15mm thick cement plaster in single coat with cement mortar 1:4, to brick masonry including rounding off corners wherever required smooth rendering, : Providing and removing scaffolding, including cost of materials, labour, curing complete as per specifications The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	400.00	sqm			
8	KSRB15-3.8 : Providing 18mm thick cement plaster in single coat with cement mortar 1:4, to brick masonry including rounding off corners wherever required smooth rendering, : Providing and removing scaffolding, including cost of materials, labour, curing complete as per specifications The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	275.00	sqm			
9	Providing and applying 2 coats of wall putty to inside plastered walls using white cement putty of approved brand and shade including scraping and levelling the surface using steel blade and preparing the surface even and smooth by using different grade sand papers, cost of materials, labour, scaffolding etc with all lead and lift at all levels etc., complete as directed by the Engineer-in-charge The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	400.00	sqm			

10	KSRB15-7 : Providing lime rendering for plastering to wall , including cost of materials, labour, curing complete as per specifications with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete as per specification The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	400.00	sqm			
11	Providing and applying 2 coats with Plastic Emulsion paint of approved brand and shade on wall surface including priming coat with primer after thoroughly brooming the surface free from mortar drops and other foreign matters including preparing the surface even and sand paper smooth, cost of materials, labour, The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	400.00	sqm			
12	Providing and finishing external wall in two coats over one coat of primer with antifungal paint (APEX)of approved brand and shade to give an even shade after thoroughly brooming the surface to remove all dirt and loose powered materials, free from mortar drops and other foreign matters cost of materials, labour, complete as per specification with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	275.00	sqm			

13	<p>KSRB 4-1.1: Providing and laying in position Reinforced cement concrete of design mix m20 with opc cement @320kgs with 20mm and down size graded granite metal coarse aggregates @0.69 cum and fine aggregates @ 0.46 cum with super plastisiser @3lts confirming to IS 9103-1999 reaffirmed -2008, machine mixed, concrete laid in layers not exceeding 15 cms. thick,vibrated for R C C.beams ,coloums of all sizes in foundation plinth and super structurew ground floor level for roof slabs ,stair case,lintles, columns including cost of all materials, labour, HOM of machinery, curing complete as per specifications. with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete as per specification The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.</p>	3.00	cum			

14	<p>KSRRB 7.10 : Providing and fixing in position anodized aluminium windows and ventilators as per approved drawings with sliding shutters using double track window frame section of size 61.85x31.75mm. with 1.2mm thick, bottom section weight 0.695 kg/m, sides and top sections 1.3 mm. thick weight 0.659 kg/m; and shutter comprising top and bottom section of size 40mmx18mm, 1.25mm thick 0.417 kg./m; shutter outer side 40mmx18mm, 1.25mm.thick weight 0.417 kg/m, shutter interlock section 40mmx26.7mm, 1.1mm thick, weight 0.469 kg/m. the shutters mounted on nylon rollers with approved quality of fixtures such as aluminium handles tower bolts etc.; and providing and fixing 5.5mm. thick plain glass for shutters fitted with rubber beading aluminium sections anodised 12 to 15 microns, including cutting to required length, join mitred subdividing the frame tenoned and rivetted in the assembled frame stiffened with end clips at corners angles etc., and fixed to the walls, lintels, floor beams/cills as the case may be with necessary steel screws, raul plugs, or teak wood gatties including cutting masonry or concrete and making good the original surface using cement mortar, aluminium sections pretreated for removal of any</p>	50.00	sqm			
	<p>do using aluminium section powder coated to a minimum of 60-70 microns with exterior durable pure polyester grade powder of approved quality with all lead and lift, loading and unloading, transportation charges and all other incidental charges etc., complete as per specification The rate inclusive of all taxes lead, lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.</p>					

15	Providing and fixing Double shutter Glass door of 12mm thick plain toughned glass of approved make (Saint Gobin, Modi float). The door is fixed by using any approved make hardware fitting like patch fitting, pivot, floor machine, locking arrangements and suitable SS door rails with floral glassetching for 1/3rd portion of door area etc complete including cost of all materials, labour, hire of tools and machineries as per specificationsThe rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	6.00	sqm			
16	: Providing and fixing laboratory sink (Ceramic sink) of approved size with M.S / C.I brackets, C.P brass chain with rubber plug, 32 mm C.P. brass waste, tap with union, brass stop cock complete, painting of fittings and brackets, cutting and making good the wall and floor wherever required, including cost of materials, labour complete as per specifications. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	2.00	No			
17	Providing and fixing Chemical laboratory Tap with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete as per specification The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	2.00	No			

18	Providing and laying flooring using 60 X 60 cms of approved make, shade and size for flooring laid on bed of 12mm thick cement mortar 1:3 mix flush pointing with white cement using colour pigment including cost of all materials, labour, curing complete as per specifications The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	280.00	sqm			
19	KSRB 15-18.2 : Providing and applying enamel metal paint two coats (including priming coat) over new steel or other metal surface brushing to give an even shade after cleaning oil, grease, dirt and other foreign matter,including cost of materials, labour, complete as per specifications The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	200.00	sqm			
20	Providing and fixing Chlorinated poly Venyle chloride (CPVC) pipes conforming to IS 15778, having thermal stability for hot and cold water supply including all CPVC plain and brass threaded fittings including , fixing the pipes with clamp at 1.00mtr spacing and making good the walls. This includes jointing of pipes and fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints with all lead and lift etc., complte as directed by the engineer in-charge (Concealed work including cutting chases and making good the walls The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	30.00	m			
	25 mm					

21	Providing and fixing Chlorinated poly Venyle chloride (CPVC) pipes conforming to IS 15778, having thermal stability for hot and cold water supply including all CPVC plain and brass threaded fittings including , fixing the pipes with clamp at 1.00mtr spacing and making good the walls. This includes jointing of pipes and fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints with all lead and lift etc., complte as directed by the engineer in-charge (Concealed work including cutting chases and making good the walls) The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	25.00	m			
	32 mm					
22	Providing and fixing to wall, ceiling and floor unplasticized PVC pipes 10 kg/sqcm. working pressure chemplast/wavin or equivalnet make with pipe fittings, wall clips, making good the wall,, ceiling and floor, including cost of all materials, labour charges, HOM of aequipment and testing complete as per specifications.The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	30.00	m			
	110 mm					

23	Providing and fixing CI Nahani trap of approved make conforming to ISI specifications and construction of Cistern n CC 1:2:4 as per directions (Rate is inclusive of cost of materials and fixtures and conveyance of materials to work spot) 12.5 cms x 7.5 cms with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete as per specification and directions of the engineer - in -charge of the work The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	2.00	each			
24	Providing and fixing high quality pre painted puffed galvanised sheets of 0.38mm thick sheet in bootom and 0.42mm thick sheet on top with the 40mm thick puff insulation in between the sheets etc., complete in roofing over the existing tubular frame works with all self screwing anchor bolts, gutter, edge profiles etc., with all lead and lifts etc, complete as per specifications and directions of Engineer Incharge. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	250.00	Sqm			

25	<p>Fabricating supply and erecting M.S Tubular Truss of all spans as per approved drawings and design with prefabricated steel applications using quality material and are durable, reliable and corrosion and abrasion resistant. welding shall confirm to latest structural welding code. Quality shall be on various parameters like shape, size, design guage and polish.. The entire truss is anchored in RCC coloum by uing 4nos of M.S angle bolts at each support, with 10mm thick base and shoe plate .The work includes cutting,straightening,placing in portion of M.S angle and welding whatever necessary and applying one coat of red oxide primer coat to all the members ,including cost of materials,labourcharges and hire charges of machineries for cutting,welding,griding and erection equipments The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.</p>	2750.00	kgs			

26	Providing and fixing factory made splendor of solid core single leaf rigid composite polymer laminated sal wood, door shutter of required thickness, manufactured out of solid core door conforming to IS 2202 (Part-1) 1991, laminated with 0.8 mm thick polymer, termite, water resistant and fire retardant with superior gluing based on vacuum lamination technology and with various pre moulded design on both faces conforming to IS 6307-1985, using adhesive conforming to IS 4835-1979 and door shutters tested in conformation to IS 4020-1994. The finish of shutters will be TEADK/OAK/CEDAR/ROSE WOOD/WALNUT, plain colours WHITE/IVORY/BEIGE /LIGHT GREY. Excluding cost of fixtures and inclusive of supply of shutters to respective work spot. with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.					
	do with door shutter 30mm thick	9.60	sqm			
	Total Rate					
27	Providing and fixing suspended wavy planks using commercial plywood 12 mm thick with 4 mm thick veneering on both sides by using 450 mm width plywood sheet cut to desired shape by suspending it to the trusses using MS / Aluminium suspenders, with all lead and lifts etc, complete as per specifications and directions of Engineer Incharge. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	120.00	sqm			

29	Providing and laying plat form using prepolished,watercut/gang saw 40mm thick telephonic black granite.laid on exisdtng vertical supports and fixing in Cm1:3 proportion.including cutting to required shape pattern with paper joints,including full rounding for nosing,finished with cemrnt mortor,pointed with pigments to match the colour of slab making through jointing with sealent,making holes 25mmx12mm grooves in joints including curing The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	12.00	Sqm			
30	KSRB 4.9.2 : Providing TMT steel reinforcement for R.C.C work including straightening, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM of machinery complete as per specifications. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	0.16	MT			
31	Lift charges for steel of all diameters for additional floors over ground floor per floor height of 3.5 m or part thereof cost of labour, complete as per specification with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete as per specification and directions of the engineer - in -charge of the work	0.16	MT			

32	KSRB 4.2.12 : Extra for providing throating or drip moulding to R.c.C. chajja with plastering (labour charges only) as per specifrication. with all lead and lift , loading and unloading, transportation charges and all other incidental charges etc., complete The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	50.00	m			
33	KSRB 4-6.10 :Providing and removing centering, shuttering, strutting, propping etc., for chajjas, corbels etc., including edges including cost of all materials, labour complete as per specifcaiton. The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.	16.00	sqm			
34	Removing and shifting and relaying of existing GI pipelines of 100 mm dia The rate inclusive of all taxes lead , lift Transportation etc. complete and the work shall be carried out as per the instructions of Engineer in charge.					
		50.00	m			
35	KSRB 9.4-4 : Providing Sal wood frames of doors, windows, clerestory windows, ventilators and other frames, wrought, framed or assembled including making plaster groves (excluding cost of cement concrete and side clamps), but including cost of materials, labour, HOM of machineries complete as per specifications. Specification No. KBS 9.33 (white sal wood)	0.25	cum			
	Total for Civil Works					

CONSTRUCTION OF LAB SPACE AT III FLOOR FOR CENTRE FOR BIO SYSTEMS SCIENCE AND ENGINEERING (BSSE) AT IISC

BILL OF QUANTITIES - ELECTRICAL

Sl.No.	Item of work	Unit	Qty	Rate in figures	Rate in wods	Amount
1	Supplying of 1.1 KV LT UG cable having aluminum conductor PVC insulated, extruded inner sheathed, galvanized, steel strip (except 2CX10Sq.mm wire armoured) confirming to IS-3975:1990 (No. of Strip indicated in GTP) & extruded PVC outer sheathed armoured cable with specified IS-1554 Part-1:1988 & confirming to GTP of GROUP-A					
	3.5 core 120 sqmm	Mtr	144			
2	Labour charges for laying of 1.1 KV class UG cable in existing trench GI pipe / stoneware pipe / on wall / on pole as required.					
	On wall /Structure					
	95 sqmm to 150Sqmm	Mtr	144			
3	Digging of trench of 0.6m deep x 0.50 mtr wide refilling the trench to the required ground level and consolidating etc., complete.					

	In soil (hard)	Mtr	62			
4	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
	45mm dia	Each	2			
5	Supplying tinned copper lugs and crimping and wiring to terminal point for wire of the following sizes.					
	120 sqmm Long Barre	No	6			
	70 sqmm Long Barrel	no	2			

6	Supplying and fixing miniature circuit breakers on existing MCB distribution boards using necessary fixing materials and 'C' Type curve, indicator ON/OFF, energy cross-3 with Short circuit breaking capacity of 10K and complete wiring as required confirming to IEC 60898.					
	5-32Amps TPN	Each	1			
7	Supplying and fixing Moulded Case Circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete. Protection of Overload and Short circuit with thermal Magnetic/Micro processor release and Earth Fault as per IS-13947. (Icu = Ics)					
	FOUR POLE					
	100Amps 25kA.	Each	3			
	250Amps 35kA	Each	1			

8	Supplying of multi function digital meter with three line back light LCD type display for voltage, Current, frequency, Power, power factor, KVA, KWH,KVAR suitable for 3 phase, 4 wire LT network with IP 54 degree of protection and completely wired as required with communication Port and Class 0.5s accuracy.	Each	1			
9	Supplying and fixing of LED type panel board indicating lamp with required colour suitable for 220v A.C. 50 Hz 12/24v D.C.	Each	3			
10	Fabricating supplying and mounting MS box made out ... SWG suitable for floor / wall mounting, fully weather proof with provision for better heat dissipation, provided with hinged front cover, equipped with tamper proof locking arrangements, with suitable size clamps with necessary cable entry pipe with gland and box should be finished with 2 coats of red oxide primer paint and finally finished with approved colour enameled metal paint etc., complete.					
	16SWG	sq.cms	1,96,236			

11	Supplying fixing and wiring earth electrode for grounding of lifts, transformers, DG sets etc. using 40mm dia 2.9mm thick 2.5 mtr long GI pipe with GI funnel with mesh and suitable size reducer fixed on the top of the earth electrode. The funnel should be enclosed in a CC chamber of 400x400x400mm with a cast iron cover. The earth electrode shall have staggered holes of 12mm dia and the electrode should be covered 150mm all-round with alternate layers of salt and charcoal from the bottom of the CC chamber. The connection from the electrode is to be established through GI strip using GI bolts and nuts	No	2			
12	Supplying and running of GI/Copper strips for grounding connections, using necessary fixing materials as required.					
	GI strip					
	25x3mm	Mtr	94			
13	Supplying and fixing Moulded Case Circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete. Protection of Overload and Short circuit with thermal Magnetic/Micro processor release and Earth Fault as per IS-13947. (Icu = Ics)					
	FOUR POLE					

	Supplying and fixing of Shunt trip suitable for MCCB.CBCT.	Each	1			
14	Supplying, fixing and wiring 50/5 to 400/5Amps 5VA burden Current Transformer. Class 0.5 accuracy with Tape Wound.	Each	3			
15	Supplying and fixing angle iron frame work fabricated out of M.S. angle iron.. and M.S. flat ... with bolts, washers etc., and painted with 2 coats of red oxide and then two coats of approved paint.					
	50x50x6mm	Mtr	11			
16	Supplying amps rated 3phase with neutral bus bar using required capacity electrolytic aluminum strips covered with heat shrinkable coloured PVC sleeve, mounted on phenolic/FRP/DMC insulator which are mounted on powder coated 40x6mm M.S.flat frame work in existing panel board. The bus bar shall have suitable holes for termination of incoming and outgoing cables as per IS specification with necessary bolts, nuts and washers etc., complete.					

	250Amps 4x30x10mm Aluminum Strips	Mtr	4			
	100Amps 4x30x6mm Aluminum Strips	Mtr	3			
17	Supplying and fixing regular MCCB distribution Panel confirming to IS 8828, on wall / wood board / flush mounting using required clamps, bolts, nuts etc., with provision for fixing of suitable type capacity MCCB's as an incomer for 3 phase Double door with necessary bus bar completely wired to use on 440Volts 3phase 4 wire powder coated painting etc., complete with a provision for fixing of single/three phase suitable capacity MCCB/MCB's as outgoings confirming to IS8828.P-46,i-6.15					
	8Way	Each	2			

18	Supplying and fixing regular MCB distribution boards on wall / wood board / flush mounting using required clamps, bolts, nuts etc., with provision for fixing suitable type capacity MCB's single phase / 3 phase / single door with powder coated painting. Made out of 14 SWG MS enclosure.					
	III - Double Door					
	4Way TP &N	Each	1			
19	Supplying and fixing miniature circuit breakers on existing MCB distribution boards using necessary fixing materials and 'C' Type curve, indicator ON/OFF, energy cross-3 with Short circuit breaking capacity of 10K and complete wiring as required confirming to IEC 60898.					
a	5-32Amps TPN	Each	11			
b	5-32Amps SP	Each	33			

20	Supplying and fixing Moulded Case Circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete. Protection of Overload and Short circuit with thermal Magnetic/Micro processor release and Earth Fault as per IS-13947. (Icu = Ics)					
	FOUR POLE					
	100Amps 25kA.	Each	2			
21	Supplying and fixing of modular switch/ Socket/stepped electronic fan regulator/ dimmer/telephone socket etc on existing modular switch plate as per IS 3854 and IS 1293					
	GROUP A					
a	TV/Telephone socket	Each	4			
b	RJ45/ I.O. outlet	Each	7			

22	Supplying and fixing of Metal Socket set of 2pole and earth plugs and socket for incorporating SP and TP MCB (Without MCB). The entire plug and socket shall be mounted in a thermoplastic / powder coated metal box & wired Completely.					
	TP & N					
	30Amps	Each	5			
23	Supplying and fixing surface/flush mounting unbreakable PVC modular box suitable for mounting modular switch plates with due groove cutting in Brick/C.C wall, including necessary rawl plugs, Machine/NF screws etc., complete.					
a	1-3Way	Each	14			
b	6-8Way	Each	31			

24	Supplying and fixing superior quality modular switch mounting polycarbonate plate with necessary supporting back plate with required nos. of machine screws, bolts nuts etc., complete on the existing metal/PVC box.					
a	1 to 3 Module	Each	14			
b	6 Module	Each	30			
c	8 Module	Each	1			
25	Supplying and fixing of modular switch/ Socket/stepped electronic fan regulator/ dimmer/telephone socket etc on existing modular switch plate as per IS 3854 and IS 1293					
	GROUP A					
a	Stepped Fan Regulator.	Each	8			
b	6Amps one way.	Each	31			
c	6Amps 3way socket.	Each	12			

d	16Amps one way switch	Each	44			
e	6/16Amps universal socket	Each	44			
26	Supplying and wiring adopting loop system in existing PVC Conduit / casing capping using 1100V grade, COPPER conductor flexible multistrand FRLS PVC insulated, 2X1.5Sq.mm Cable confirming to the GTP without switch, the other end of the wires shall be terminated with sufficient loose length in a wood/PVC round block complete for each outlet.					
	GROUP A					
28	Long point above 6Mtr upto 10Mtr from tapping point to out let via switch box	Point	19			
29	Supplying exhaust fan of 1440 RPM of 300mm (12") size with bracket blades complete for light duty suitable to operate on 230V 50Hz, AC Supply.	Each	2			

30	Fixing one exhaust fan in the nitch already left in the wall with bolts and nuts and 5 amps. ceiling rose with sufficient length of 23 / 0.0076 inch PVC insulated twin core wire.	Each	2			
PVC CONDUIT & ITS ACCESSORIES						
31	Open Conduit System					
	Supplying heavy gauge PVC conduit pipediamm thick confirming to IS 2509 with suitable size bends, junction boxes, adhesive paste etc., and fixing using inverted wood plugs in case of RCC ceiling and RCC wall / stone structure or rawl plugs in case of brick walls and cement plastering the damaged portion using heavy gauge saddles at an interval of 700mm using NF screws.					
a	32mm dia 2.5mm thick	Mtr	44			
b	25mm dia 2mm thick	Mtr	190			

c	19/20mm dia 2mm thick	Mtr	183			
32	Supplying and fixing of PVC casing and capping on the wall or ceiling using necessary materials like bends, screws at an interval of 300mm etc. as required.					
a	32mm	Mtr	28			
b	50mm	Mtr	17			
c	20mm	Mtr	163			

d	25mm	Mtr	147			
33	Wiring for lighting/power circuit using one of FRLS PVC insulated 1100V grade, multistrand Copper with low conductor resistance single core wire in open or concealed system of wiring with specified IS-694:1990 & confirming to GTP of GROUP -A.					
a	10 sqmm					
	6 sqmm					
	10 sqmm x 4					
	6 sqmm x 1	Mtr	68			
b	6 sqmm					
	4 sqmm					
	6sqm mx4 + 4 sqmm x 1	Mtr	29			
c	4 sqmm					
	2.5 sqmm					

	4 sqmmx4 & 2.5sqmm x 1	Mtr	98			
d	4 sqmm					
	2.5 sqmm					
	4sqmmx2 & 2.5sqmmx1	Mtr	418			
e	2.5 sqmm					
	1.5 sqmm					
	2.5sqmmx2 + 1.5sqmmx1	Mtr	264			
	2 Pair TF wire	Mtr	160			
34						

35	Cat 6 Data Wire	Mtr	364			
36	36W LED Fitting	No.	16			
37	Fixing charges	No.	16			
38	Supplying capacitor type ceiling fan complete with down rod blades, shackle, canopies etc., for operation on 230 volts, 50 cycles. Single phase AC supply conforming to ISS-374-1979 and with double ball bearing system.					
	48" Sweep (1200mm)					
	Regular model	Each	8			

39	Fixing a ceiling / wall mounting fan of all capacities and all types, with necessary clamps and 'S' hook made out of 15mm dia MS rod, with 5 amps. ceiling rose of approved quality with necessary length of 23 / 0.0076 inch PVC insulated twin twisted wire of approved quality, mounted on a suitable size wooden board and wired.	Each	8			
40	Supplying and fixing of modular switch/ Socket/stepped electronic fan regulator/ dimmer/telephone socket etc on existing modular switch plate as per IS 3854 and IS 1293					
	GROUP A					
	1000-1200Watts Dimmer	Each	8			
	TOTAL FOR ELECTRICAL WORKS					

**Construction of Lab Space at III Floor for Centre for
Biosystems Science and Engineering (BSSE) at IISc**

ABSTRACT – COST

SL.No.	Description	Amount
1.	Civil Works	
2.	Electrical Works	
Grand Total		