
Technical Specifications and Other Terms and Conditions

Annexure A

Indian Institute of Technology (IITH) Hyderabad

Scope of Work for “Design, Development, Fabrication, Testing and Supply of BMS- PCBs”

1. Introduction

BMS-PCB is the processing hardware for the Battery Management System being developed by the IIT, Hyderabad. It is based on the Xilinx Kintex-7 70T industrial grade FPGA (XC7K70T1FBG484I). It provides external interfaces over RS-232 and RS-422 and has external DDR3 memory for storing the program and data. It gets unregulated 28V from external power supply and all the necessary power supplies are generated on the PCB itself.

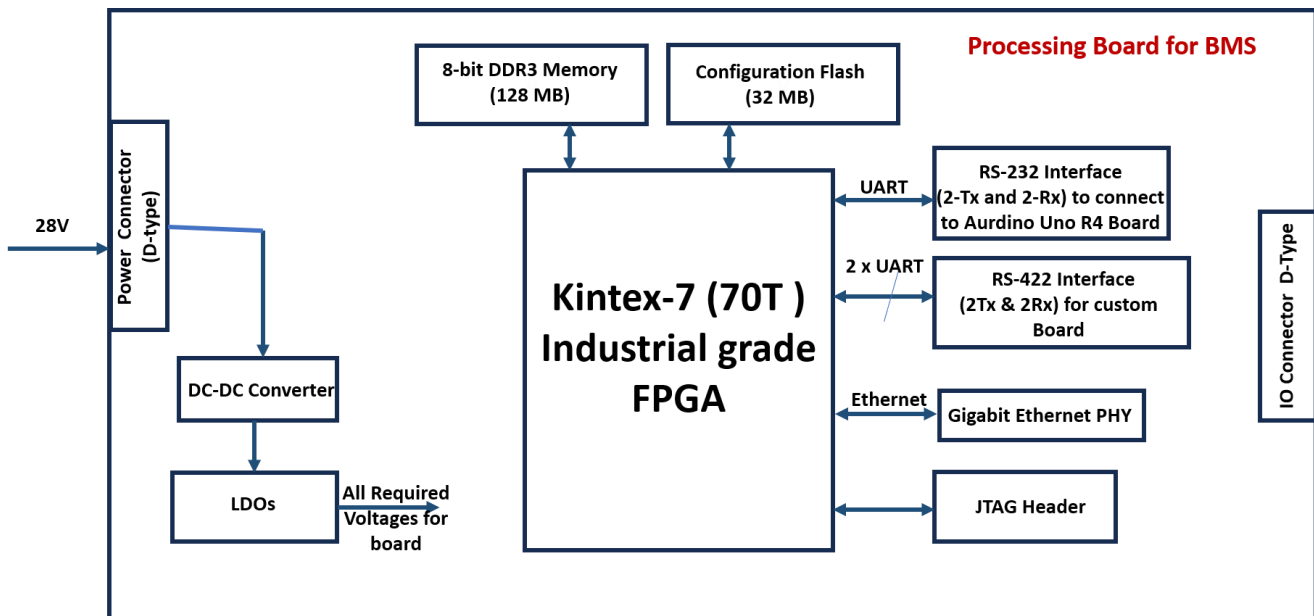


Fig 1: Block Diagram of Processing Board for BMS

Overall scope of this tender is to design, develop, fabricate, test and supply of 3 units of the BMS-PCBs as per the above-mentioned block diagram. Vendor needs to choose all industrial or automotive or mil grade components for this design.

Vendor must develop the functional testing software, FPGA RTL for carrying out the testing of the units. Final software and FPGA RTL files to be provided to IITH for review before delivery. Most of the functional tests will be done in loop back mode, All the test-jigs for the testing of the BMS-PCBs units to be procured by the vendor. Vendor must develop the custom RTL for the BMS board, the logic details will be provided by IITH, for this activity, the vendor needs to place the RTL engineer at IITH for 2 months duration during the execution of the project.

List of functional tests to be carried out on the PCBs are provided in the Appendix - 'A'. This is the minimum set of functional tests that need be performed during board bring-up. However, the detailed electrical tests which are to be performed on the units will be provided by IITH during the execution of the project. Detailed responsibilities of IITH and the vendor, acceptance criteria, deliverables and schedules are provided in the sections below.

2. Responsibility of IITH

- i. Provide the block diagram and interfaces of the BMS-PCB. ii. Provide mechanical dimensions and connector details. iii. Provide the details of the heatsink if any required.
- iv. Provide the final testcases that are required to be developed for ATP testing before delivering the boards at IITH.
- v. Provide technical clarifications whenever required.
- vi. Review the following documents submitted by the vendor and provide approvals.
 1. PCB Schematics
 2. Signal Integrity analysis report
 3. Bill of Material
 4. Acceptance Test Procedure Document
- vii. Provide the necessary details in terms of the required resources to be tested for the Software and RTL development for carrying out the functional testing.
- viii. Support the vendor for review of all the technical documentation and testing results of the BMS-PCB.
- ix. Conduct Design Review before release of the design for fabrication.

3. Responsibility of Vendor

- i. The Vendor should take responsibility from PCB Schematics design stage to delivery of 03 numbers of tested BMS-PCBs to IITH.
- ii. The vendor needs to understand the block diagram provided by IITH and select suitable components in the industrial / automotive / mil grade and develop the schematics.
- iii. The vendor needs to carryout final PCB layout design, Signal Integrity analysis, Component procurement, PCB fabrication, PCB assembly, unit level assembly, functional testing.

- iv. The vendor must develop all the necessary software and FPGA RTL code for board bring up and functional acceptance testing.
- v. Vendor must develop the custom RTL for the BMS board, the logic details will be provided by IITH, for this activity, the vendor needs to place the RTL engineer at IITH for 2 months duration during the execution of the project.
- vi. The vendor needs to prepare all the documents required for approval by IITH as per the specified formats.
- vii. Vendor must carry out the functional tests based on the approved ATP document only.
- viii. The Vendor must prepare the detailed project plan document and submit along with the quotation.
- ix. Design the boards taking design constraints for high-speed signals of DDR3 and generate the design document and seek IITH approval. Any change incorporated in the design by vendor should be ratified by IITH.
- x. The Vendor should use the approved schematic for PCB layout design taking care of thermal requirements of PCB and EMI/EMC related issues.
- xi. All the development tools, test-jigs required for the testing of the units to be procured by the vendor.
- xii. The vendor should follow the High-Speed PCB design guidelines as per industry standard / IC Manufacturers' specifications (Design kits) for all ICs on board.
- xiii. Vendor should procure the Bill of Materials (BOM) for all the 3 boards.
- xiv. The Vendor should carry out Simulation for PCB layout design for impedance matching, signal path delays, cross talk, radiated signal strength, isolation between two adjacent signals, frequency / time domain analysis, Signal Integrity analysis, EMI/EMC and Thermal analysis. Next stage to be initiated only after satisfactory simulation results and obtaining clearance from IITH. If need arises, PCB layout to be redesigned and simulation to be carried out till satisfactory results are obtained.
- xv. The Vendor should generate final Gerber file, required database for PCB fabrication. xvi. The Vendor must provide the final gerber file to IITH for review before fabrication.
- xvii. The Vendor should take responsibility for fabrication of the PCBs with IPC Class-2 or Class-3 and provide Certification to IITH.

- xviii. The Board will be evaluated for its functional electrical performance by concerned reps from IITH using vendor's Test and Measurement facility for meeting the Electrical Specifications.
- xix. The Vendor should test & evaluate the units as per the approved documents and generate test report and submit to IITH
- xx. The boards will not be accepted as deliverables if they have any jumpers in it.
- xxi. Vendor should provide x-ray reports of the populated PCBs for all BGA components.
- xxii. Vendor should provide all the necessary inputs including the final schematics, layout, structural, thermal, SI and de-rating analysis reports for conducting PDR before release of the design for fabrication. Any suggestions or modifications as suggested by the PDR committee must be implemented before release of the design for fabrication.
- xxiii. The Vendor should prepare the documents such as Design Document, User Manual, ATP document and these are to be delivered to IITH.
- xxiv. Vendor must procure mating connectors and cables for testing separately.
- xxv. Vendor should provide the final database including the schematics and layout to IITH for review before release for fabrication.
- xxvi. Vendor must provide compliance to entire scope of work along with the techno commercial bid.
- xxvii. Vendor must provide necessary manpower for integration of the IP cores at IITH for a period of 2 months.
- xxviii. Vendor must develop the functional testing software, FPGA RTL for carrying out the testing of the units.
- xxix. All the test-jigs for the testing of the BMS-PCBs units to be procured by the vendor.
- xxx. Vendor must develop the custom RTL for the BMS board, the logic details will be provided by IITH, for this activity, the vendor needs to place the RTL engineer at IITH for 2 months duration during the execution of the project.

4. Intellectual Property (IP) rights

IITH owns the entire Intellectual Property rights for this hardware design. Vendors need to take prior written permission from IITH to use this design elsewhere. All the test software developed for this project will also be owned by IITH.

5. L1 (Lowest Bidder) selection Criteria:

The vendor who quotes the lowest price for the 03 BMS-PCBs and complies to entire scope of work will be selected as the lowest bidder and will be awarded with the tender related supply order.

6. Pattern of Quote

The response to the tender enquiry will be in two parts. Techno-Commercial bid, Price Bid. Vendor must quote as per the following Line Items in techno commercial bid.

A. Techno-Commercial bid

Sl No	Item Description	QTY
1	Design and Development of BMS-PCB (As per the scope of work attached) <ul style="list-style-type: none"> • Source Code, BSP, APIs and Device Drivers, FPGA code used for ATP (Soft Copy) • Test setup and test-jig details and test software details along with documentation (Soft Copy) • Schematics design file and PDF, PCB layout design file and PDF, Net list, Gerber database, Signal Integrity analysis report (Soft Copy) • Design documentation, User Manual, I/O and Connector details (Soft Copy) • Documentation for Acceptance testing (Soft copy) 	01
2	Fabrication and Testing of BMS-PCBs (As per the scope of work attached)	03

B. The price bid should contain the Total cost including the taxes.

7. Acceptance Criteria

The acceptance criteria are to demonstrate the functionality of the boards as per the approved ATP document.

8. List of Deliverables & Schedules

The vendors must deliver the below mentioned deliverables within 5 months from the date of supply order in 1 LOT.

8.1 BMS-PCB Deliverables:

Sl. No	Item Description	Quantity (1 Set)
1.	<ul style="list-style-type: none"> ○ Source Code, BSP, APIs and Device Drivers, FPGA code used for ATP (Soft Copy) ○ Test setup and test-jig details and test software details along with documentation (Soft Copy) ○ Schematics design file and PDF, PCB layout design file and PDF, Net list, Gerber database, Signal Integrity analysis report (Soft Copy) ○ Design documentation, User Manual, I/O and Connector details (Soft Copy) ○ Documentation for Acceptance testing (Soft Copy) 	01
2	BMS-PCB with Mating Connectors	03

9. Performance Warranty (including Maintenance)

Warranty of 1 years is required from the date of receipt and acceptance of items at IITH with onsite repair and free replacement of parts.

Appendix- 'A' Functional Test Cases

This appendix explains the likely Functional Tests to be conducted for the BMS-PCB as part of the ATP. Detailed ATP will be worked out during the execution of the project. The list of tests to be performed are divided into following two sub sections.

- 1) Functional Testing of FPGAs, Memories and IO Interfaces
- 2) System Level Functional Testing

I. Functional Testing of SoCs, FPGAs, Memories and IO Interfaces

1. **FPGA Configuration:** All the FPGA are loaded at power on.
 - i.Kintex-7 FPGA configuration files shall be programmable over JTAG.
 - ii.Kintex-7 FPGA configuration files shall be programmable over Ethernet with microblaze processor running on the FPGA
2. Data transfer on RS-422 / RS-232 Interface connected with PC
3. All pattern memory test for the DDR3 and Flash memories for total range

II. System functional test cases

1. Reception of data from one of the RS-232 channels, packetization and sending to PC over another channel.

Note: All these testcases will be covered as part of the functional testing software during ATP and must will be developed by the vendor for testing of the units, deliver the same to IITH.

For any technical query related to enquiry you may to contact

Prof. Amit Acharyya , Department of EE, Email: amit_acharyya@ee.iith.ac.in

For Commercial query

Mr. M Venkatesh - Senior Assistant Registrar, Email : ar.purchase@iith.ac.in

Mr. K Ramesh Kumar - Assistant Registrar Email : ar.stores@iith.ac.in

Ms. D Chanchala Devi- Joint Registrar, Email : hos.snp@iith.ac.in

With CC: office.stores@iith.ac.in

TERMS AND CONDITIONS

1. **Warranty & Maintenance contract:** The supplier shall warranty equipment/material, system components for a minimum period of one year following satisfactory installation and commissioning. The defects, if any, during the guarantee/warranty period are to be rectified free of charge by arranging free replacement wherever necessary. All expenditure including government levies on account of the replacement are to be borne by the supplier/agent.
2. **Payment terms:** 100% payment will be released after supply, installation of the material and training to the satisfaction of the User/IITH and submission of the delivery details and invoice through GeM Portal.
3. **e-Delivery / Delivery period:** Software / Material should be delivered and installed within 3 weeks from the date of issue of purchase order. The offered delivery period shall have to be strictly adhered to in case an order is placed.
4. **Installation & Testing:** The installation shall be completed within a week from the date of intimation regarding the arrival of the equipment in the Institute. The installed system shall be performance tested at our premises in accordance with the manufacturer's/supplier's recommendation/specifications. Tests shall demonstrate the proper operation of the instrument and all components.
5. The Technical Committee will examine all the Technical aspects of the bids received. Further, the Technical Committee may seek additional information from the existing users at IIT Hyd or from other Institutes, these feedbacks will be considered for technical evaluation, the bidders will also be called for technical presentations if it is required so.
6. Kindly furnish your PAN & GST Number etc. in your quotation for our records.
7. Institute reserves the right to cancel the bidding process at any stage.
8. **Requirement of registration:** Vide Ministry of Finance OM No. 6/18/2019-PPD dated 23rd July 2020.

- a. Any bidder from a country sharing a land border with India will be eligible to bid in this tender only if the bidder is registered with the Department for Promotion of Industry and Internal Trade (DPIIT).
- b. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- c. "Bidder from a country which shares a land border with India" for the purpose of this Order means:
 - i. An entity incorporated, established or registered in such a country; or
 - ii. A subsidiary of an entity incorporated, established or registered in such a country; or
 - iii. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - iv. An entity whose beneficial owner is situated in such a country; or
 - v. An Indian (or other) agent of such an entity; or
 - vi. A natural person who is a citizen of such a country; or
 - vii. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above
- ii. For details about registration procedures please visit the above mentioned OM. Mandatory documentary evidence regarding the bidder's registration with DPIIT is to be submitted along with the tender, failing which the tender shall be liable for rejection. Bidders are also requested to submit the Model Certificates **as per Annexure** for this tender as mentioned in the Ministry of Finance OM No. 6/18/2019-PPD dated 23rd July 2020.

9. Public Procurement (Preference to Make in India), Order 2017:

- i. IIT Hyd shall compare all substantially responsive bids to determine the lowest valued bid. This Institute is following and abide with the Public Procurement (Preference to Make in India), Order 2017, DIPP, MoCI Order No. P-45021/2/2017-B.E.II dated 15th June 2017 and its subsequent amendments. Accordingly preference will be given to the Make in India products while evaluating the bids, however, it is the sole responsibility of the bidder(s) to specify the product quoted by them is

of Make in India product along with respective documentary evidence as stipulated in the aforesaid order in the technical bid itself.

- ii. As per the above order and its subsequent amendments “Local Content” means the amount of value added in India which shall be value of the item procured (excluding net domestic indirect taxes) minus the value of the imported content in the item (including all the custom duties) as a proportion of the total value, in percent. Accordingly the suppliers will be classified in following categories.
 1. Class I local Supplier – has local content minimum 50%
 2. Class II local Supplier – has local content minimum 20%

- b. **Verification of Local Content** : The Class I Local Supplier /Class II Local Supplier at the time of bidding shall be required to indicate the percentage of local content and provide self-certification as per **Annexure** that the items offered meet the local content requirement. The details of the location(s) at which the local value addition is made also needs to be specified.

The bidders can be debarred for a period up to two years as , per Rule 151(iii) of GFR 2017, in case of false declaration.

Complaint Redressal Mechanism:

In case any complaint received by the procuring agency or the concerned Ministry/Department against the claim of a bidder regarding local content/domestic value addition in a product, the same shall be referred to competent authority at IITH or the relevant Ministry .

The bidder against whom the complaint is received shall be required to furnish the necessary documentation in support of the domestic value addition claimed in the product to authority. If no information is furnished by the bidder, such laboratories may take further necessary action, to establish the bonafides of the claim

A complaint fee of Rs. 2 lakh or 1% of the value of the domestically manufactured products being procured (subject to a maximum of Rs.5 lakh), whichever is higher, to be paid by Demand Draft to be deposited with Procuring Institute. In case, the complaint is found to be incorrect, the complaint fee shall be forfeited. In case, the complaint is upheld and found to be substantially correct, deposited fee of the complainant would be refunded without any interest.

False declarations will be in breach of the Code of Integrity under Rule 175 (1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred

for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

- 10. Note for MSME/NSIC/Start up Bidder :** If in the view of bidder, any exemption / relaxation is applicable to them from any of the eligibility requirements, under any Rules / Guidelines/ Directives of Government of India, bidder may submit their claim for the applicable exemption /relaxation, quoting the valid Rule/Guidelines/ Directives with a copy of such notification. In this case the bidder must submit necessary and sufficient documents along with the technical bid, in support of their claim. The relevant and valid certificates in support of claim of exemption must be submitted along with the Technical Bid.

These exemptions /relaxation are meant for procurement of only goods produced and services rendered by MSEs. Traders/ distributors/ sole agent/ Works Contract are excluded from the purview of the policy.

This Bid is also governed by latest General terms and conditions as per GeM

ANNEXURE -B

FORMAT OF COMPLIANCE STATEMENT OF SPECIFICATIONS

1	2	3	4	5	6
S. N.	Name of specifications/part / Accessories of tender enquiry As per Annexure A of the Tender Document.	Specifications of quoted Model/ Item	Compliance Whether "YES" Or "NO"	Deviation, if any, to be indicated in unambiguous terms	Whether the compliance / deviation is clearly mentioned in technical leaflet/ literature
1					
2					
3					
n					

NOTE: The bidder should also submit the Brochure with technical details of the product supporting the compliance statement.

ANNEXURE - C

UNPRICED TECHNICAL BID
(Bidder should provide the following details on Letter head)

Quotation No :

Date:

Name of the Bidder _____

GeM bid No. _____

Sr.No	Item Description	Country of Origin	Make & Model	HSN Code	GST %	Qty
1						
2						
3						
n						

Other Terms & Conditions

1	Payment terms	:
2	Delivery Period from the date of Issue of PO	:
3	Warranty	:
4	Any other additional terms	:

MANUFACTURER’S AUTHORIZATION & WARRANTY SUPPORT DECLARATION

(ON OEMs Letter head)

Date:

Tender No / GeM bid no:

To
The Director,
Indian Institute of Technology Hyderabad,
Kandi, Hyderabad – 502 284

We, _____ [name of Manufacturer], who are official manufacturers of [Insert type of goods manufactured] having factories at [insert full address of Manufacturer’s factories], do hereby authorize [insert complete name of Bidder] to submit a bid the purpose of which is to provide the following goods, manufactured by us [insert name and or brief description of the goods], and to subsequently negotiate and sign the contract.

We hereby extend our full guarantee, warranty, availability of spare parts and AMC support in accordance with the Terms and Conditions of Contract with respect to the Goods offered by the above firm.

Authorized representative of the Manufacturer

Authorized representative Bidder

Signature:

Signature:

Name:

Name:

Address:

Address:

Mobile No:

Mobile No:

Email ID:

Email ID:

Declaration for Local Content (on OEM's Letter Head)

**(To be given on Company Letter Head - For tender value below Rs.10 Crores)
(To be given by Statutory Auditor/Cost Auditor/Cost Accountant/CA for tender value above Rs.10 Crores)**

Date: _____

To,
The Director,
Indian Institute of Technology Hyderabad,
Kandi, Sangareddy 502284

Sub: Declaration of Local content

Tender Reference No: _____

Name of Tender / Work: - _____

1. Country of Origin of Goods being offered: _____

2. We hereby declare that items offered has ___% local content (**Please provide exact %**).

3. Details of location at which local value addition will be made / made: (Complete address to be mentioned) _____

"Local Content" means the amount of value added in India which shall, be the total value of the item being offered minus the value of the imported content in the item (including all customs duties) as a proportion of the total value, in percent.

*"*False declaration will be in breach of Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law."*

**Yours Faithfully,
(Signature of the Bidder/OEM, with Official Seal)**

ANNEXURE F

CERTIFICATE BY BIDDER- DPIIT REGISTRATION

“ I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, / if from such a county, has been registered with the Competent Authority (copy of the Registration Certificate enclosed) . I hereby certify that his bidder fulfils all requirements in this regard and is eligible to be considered.

Signature with Date and Stamp
Of the Bidder

ANNEXURE G

DECLARATION REGARDING CLEAN TRACK/NO LEGAL ACTION

(to be provided on letter head of the firm)

I hereby certify that the above firm namely _____ is neither blacklisted by any Central/State Government/Public Undertaking/Institute nor any criminal case registered / pending against the firm or its owner / partners anywhere in India preceding three years from the date of publishing of tender.

I also certify that the above information is true and correct in any every respect and in any case at a later date it is found that any details provided above are incorrect, any contract given to the above firm may be summarily terminated and the firm blacklisted.

Date:

Authorized Signatory

Name:

Place:

Designation:

Contact No.:

ANNEXURE -H

BIDDER INFORMATION FORM

Company Name : _____

Registration Number : _____

Manufacturer /Distributor for the quoted product : _____

Registered Address : _____

Name of Partners /Director: _____

City : _____

Postal Code : _____

Company's Establishment Year : _____

Company's Nature of Business : _____

Company's Legal Status (tick on appropriate option)

- 1) Limited Company
- 2) Undertaking
- 3) Joint Venture
- 4) Partnership
- 5) Others (In case of Others please specify)

Company Category

- 1) Micro Unit as per MSME
- 2) Small Unit as per MSME
- 3) Medium Unit as per MSME
- 4) Ancillary Unit
- 5) SSI
- 6) Others (In case of Others please specify)

CONTACT DETAILS

Contact Name: _____

Email Id : _____

Designation : _____

Phone No : (_____) _____

Mobile No : _____

BANK DETAILS

Name of Beneficiary : _____

A/c. No. CC/CD/SB/OD: _____

Name of Bank : _____

IFSC NO. (Bank) : _____

Branch Address and Branch Code: _____

Other Details

Vendor's PAN No. _____

Vendor's GST _____

ANNEXURE – I

PREVIOUS SUPPLY ORDER LIST FORMAT

Order placed by <i>{Full address of Purchaser}</i>	Order No. and Date	Description and quantity of ordered equipment	Value of order	Contact Person along with Telephone no., Fax no. and e-mail address.

Note: Technical Committee may seek additional information from the existing users at IIT Hyd or from other Institutes, these feedbacks will be considered for technical evaluation.

Signature and Seal of the Manufacturer/ bidder

Place:

Date:

ANNEXURE – J

ACCEPTANCE OF TENDER TERMS
(To be given on Company Letter Head)

Date: DD/MM/YYYY

To,

The Director
Indian Institute of Technology Hyderabad
Kandi – 502 285.Telangana, India

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No/GeM Bid no: _____

Name of Tender / Work: -

Dear Sir,

1. I/ We have downloaded / obtained the tender document(s) for the above mentioned ‘Tender’ from the web site(s) namely _____ as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents (including all documents like annexure(s), schedule(s), etc .), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.

3. The corrigendum(s) issued from time to time by your department/ organisation too have also been taken into consideration, while submitting this acceptance letter.

4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.

5. I / We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organisation shall without giving any notice or reason therefore or summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

Yours Faithfully,

(Signature of the Bidder, with Official Seal)