Annexure-I.a.

WORK CONTRACT FOR THE INSTRUMENTATION ACTIVITIES RELATED TO THE GROUP AIIS/AISE

1. CRYO DIVISION

1.A.1. WORK DESCRIPTION-CRYO A&I:

A. Electrical check out of pressure sensors

1. Listing of sensors as per measurement plan & generation of check-list.
2. Receiving of pressure sensors from calibration lab with datasheets or logbooks.
3. Physical verification of pressure and electrical ports for any anomalies or defects.
4. Preparation and pasting the identification labels/tags with legend and Sl. no. of the sensor as per measurement plan and data sheet.
5. Electrical check out of pressure sensor.
   i) Continuity & isolation checking of electrical check-out cable
   ii) Checking of power supply DC voltage & its ripple content
   iii) Setting the Excitation for the sensor in the power supply
   iv) Measuring the millivolt output in table level
   v) Measuring the input resistance
   vi) Measuring the output resistance
   vii) Measuring the insulation resistance
   viii) Logging of all measured values in the check-list and other log sheets.
6. Issue of sensors to mechanical assembly team
7. Confirm and log the torque applied to sensors as well as measurement of canalization length for concerned sensor.
8. After assembling of sensors in the test article by the assembly team, repeat the activity number **A.5.**
9. After test conducted on the test article repeat the activity number **A.5.**
10. Physical examination of assembled sensors.

B. Electrical check out of RTD sensors

1. Listing of sensors as per measurement plan.
2. Receiving of sensors from calibration lab with datasheets or logbooks.
3. Physical verification of process and electrical ports for anomalies and defects.
4. Soldering/crimping of mating connectors.
5. Electrical checkout of sensor**.**
   i) Continuity & isolation checking of check-out cables
   ii) Checking of short point resistance
   iii) Checking of sensor element resistance
   iv) Checking of insulation resistance
   v) Logging of measured values in the check-list and other log sheets
6. Pasting the identification labels with legend and Sl.No on the corresponding sensor.
7. Issue of temperature probes to mechanical assembly team and confirm the sensors are issued as per measurement plan.
8. Confirm and log the torque applied to sensors.
9. After assembling of sensors by the assembly team, repeat the activity number **B.5.** and log the result in report.

C. Electrical check out of thermo couple sensors

1. Listing of sensors as per measurement plan.
2. Receiving of sensors from calibration lab with datasheets or logbooks.

3. Physical verification of process and electrical ports for any anomalies & defects.
4. Electrical checkout of thermo couple
   i) Continuity & isolation checking of electrical checkout cable.
   ii) Measuring of millivolt output of the sensor.
   iii) Measuring of resistance of the sensor.
   iv) Logging of measured values in the check-list and other log sheets.
5. Pasting the identification labels with legend and Sl. No. on the corresponding sensor.
6. Issue of sensor to assembly team and confirm the sensors are issued as per measurement plan.
7. Confirm and log the torque applied to sensor.
8. After assembling of sensor by the assembly team repeat the activity number **C.4.**

D. Electrical check out of turbine flow meters

1. Listing of sensors as per measurement plan.
2. Receiving of sensors from Project with datasheets.
3. Physical verification of process and electrical ports for any anomalies & defects.
4. Electrical checkout of flow meter.
   i) Continuity & isolation checking of electrical checkout cable.
   ii) Measuring the coil resistance of each coil.
   iii) Measuring the coil inductance of each coil.
   iv) Measuring the insulation resistance.
   v) Logging the measured values in check-list and other log sheets.
5. Pasting the identification labels with legend and Sl. no. on the corresponding sensors.
6. Issue of sensor to mechanical assembly team and confirm the sensors are issued as per measurement plan.
7. After assembling of sensor in the test/flight article by assembly team, repeat the activity number **D.4.** and log the results.
8. After test conducted on the hardware, repeat the activity number **D.4.** and log the results.

E. Electrical check out of speed sensors

1. Listing of sensor as per measurement plan.
2. Receipt of speed sensor from calibration lab with data sheets or logbooks.
3. Physical verification of process and electrical ports for any anomalies & defects.
4. Electrical checkout of speed sensor :-
   i) Continuity & isolation checking of electrical check out cable.
   ii) Measuring the resistance of each coil
   iii) Measuring the inductance of each coil
   iv) Measuring the insulation resistance of the sensor.
   v) Logging the measured values in check-list and other log sheets.
5. Pasting the identification labels with legend and sl. no on the corresponding sensor.
6. Issue of sensor to assembly team and confirm the sensors are issued as per measurement plan.
7. After assembling of sensor in the test/flight article by assembly team, repeat the activity number **E.4.** and log the results.
8. After test conducted on the hardware, repeat the activity number **E.4.** and log the results.

F. Electrical checkout of vibration sensors

1. Listing of sensors as per measurement plan.
2. Receipt of vibration sensor from calibration lab with data sheets or logbooks.
3. Physical verification of process and electrical ports for any anomalies & defects.

4. Checking the thread of isolation stud & sensor by mating them to each other.
5. Checking the isolation stud for isolation and recording of the isolation resistance in check-list & other log sheets.
6. Pasting/mounting of the isolation studs on the test hardware.
7. Mounting of tagged vibration sensor on to the mounted & tested stud.
8. Checking & logging the isolation between hardware and vibration sensor in the check-list & other log sheets.

G. Bonding of surface RTD

1. Listing of sensor as per measurement plan.
2. Receipt of sensor from calibration lab with data sheets or logbooks.
3. Physical verification of process and electrical ports for any anomalies or defects.
4. Preparing of sensor for bonding
   a) Measure sensor element resistance
   b) Providing insulation sleeves to the terminal legs of sensor leads.
   c) Termination of sensors with the terminal pad by soldering.
   d) Extending of sensor leads by soldering pig-tail wire to the terminal pad.
   e) Cleaning of soldered joints & measuring the sensor resistance / insulation at the pig-tail end.
5. Pasting the identification labels with legend and Sl.no on the corresponding sensor.
6. Identification of sensors bonding location.
7. Sensor bonding
   a) Cleaning the identified Location with Iso-prophyl alcohol (Propan-2-ol).
   b) Rubbing of the identified surface using emery sheet.
   c) Again cleaning of the surface using Iso-prophyl alcohol.
   d) Positioning of sensor on the location with cellophane tape.
   e) Lifting of sensor and application of the bonding adhesive.
   f) Squeeze out the excessive adhesive and leave the sensors for 24 hours curing.
   g) Positioning the terminal pad adjacent to sensor, bond with adhesive following procedure similar to the sensor bonding and allow for 24 hours curing.
   h) Terminate the leads with terminal pad.
   i) Check the insulation resistance and confirm the insulation.
   j) Peal-off cellophane tape and apply protective coating and leave it again for 24 hours curing.
   k) Checking the sensor resistance, Insulation Resistance etc and logging the results in check-list & other log sheets.

H. Bonding of thermo couple

1. Preparing the T/C sensors.
2. Electrical check-out of the sensor by measuring and logging the ambient millivolt output.
3. Providing tag name to the sensor wire.
4. Cleaning of the identified location with Iso-Prophyl alcohol.
5. Rubbing of surface using fine emery sheet.
6. Again cleaning of the surface using Iso-Prophyl alcohol.
7. Positioning of sensor on the location with cellophane tape.
8. Apply the bonding adhesive and hold with cellophane tape for 24 hours.
9. Terminate the T/C wire with miniature connector.
10. Checking and logging of the sensor resistance in the check-list & other log sheets.

I. Bonding of strain sensors

1. Listing of sensor as per measurement plan.
2. Checking & Receiving of strain sensors form calibration Lab with data sheet.
3. Measuring sensor Resistance.
4. Identity the sensor location as per CCB approved drawing/marking.
5. Identification of sensors bonding location on the hardware.
6. Sensor bonding
   a) Cleaning the identified Location with Iso-prophyl alcohol
   b) Rubbing of surface using emery sheet.
   c) Again cleaning of the surface using Iso-prophyl alcohol.
   d) Positioning of sensor on the location with cellophane tape.
   e) Lifting of sensor and application of the bonding adhesive.
   f) Squeeze out the excessive adhesive and leave the sensors for 24 hours curing.
   g) Positioning the terminal pad adjacent to sensor, bond with adhesive similarly and leave pad for 24 hours curing.
   h) Solder the sensor leads with Terminal pad.
   i) Solder the cable with the Terminal pad.
   j) Check the sensor Resistance and logging it.
   k) Check the insulation Resistance and logging it.
   l) Peal out cellophane tape.
   m) Apply the protective Coating and leave it.
   n) Checking and logging sensor resistance.
   o) Checking and logging insulation resistance.
   p) Identity the tag with respect to location.
   q) Put the tag on cable extension.
   r) Prepare the clearance report.

J. Instrumentation support during hydro tests

1. Strain Gauge Health check.
2. Identifying the location on Test article for strain gauge bonding.
3. Strain gauge bonding on the test article.
4. Solder the sensor leads with terminal Pads.
5. Solder the cable with Terminal pad.
6. Crimp the IMC connector pin with the cable.
7. Prepare the IMC connector.
8. Pressure sensor health check.
9. Providing the connection of Strain gauges and pressure sensor with DAS.
10. Updating the setting on DAS.
11. Chain functional checking.
12. Acquisition of the data during Hydro Test.
13. Stop acquisition once test if finished and Copy the data from internal memory to external media.
14. Process the data as per request.
15. Data conversion to excel format.
16. Copy Converted data to a CD.
17. Clear & format the external medium for future use.

K. Instrumentation support during test article welding

1. Thermo couple [T/C] Bead formation.
2. T/C continuity checking.

3. T/C Bonding (or) welding on to Test articles.
4. T/C continuity checking after bonding/welding.
5. Providing the connection with DAS.
6. Updating the setting on DAS.
7. Chain functional checking.
8. Acquisition of the data during weld.
9. Stop and Copy the data from internal memory to external media.
10. Process the data as per request.
11. Data conversion to excel format.
12. Copy Converted data copying to a CD.
13. Clear & format the external medium for future use.

L. Instrumentation support during valve response trials

1. Check the health of power supply.
2. Ensure the current setting is as required.
3. Check the health of the command chain (continuity and isolation).
4. Check the health of the pressure sensors (as per activity no: A.5).
5. Check the health of the pressure chain (continuity and isolation).
6. Updating the setting on DAS (for pressure and command).
7. Do the functional checking of command and pressure chain with DAS.
8. Providing Acquisition during response trial.
9. Stop and Copy the data from internal memory to external media.
10. Process the data as per request.
11. Convert the raw Data to excel format.
12. Copy converted data to a CD.
13. Clear & format the external medium for future use.

M. Support works for FRF tests

1. Connecting the equipments for FRF testing.
2. Calibration of four vibration channels with handheld calibrator.
3. Pasting vibration sensor in the required location/tubing.
4. Applying an impulse using impact hammer.
5. Logging of the results in the report and analysis of the FRF test.

N. Instrumentation support during Acoustic Emission monitoring

1. Continuity and insulation resistance checking of AE cables
   a) Continuity check of each AE cable laying between test bay to cable termination using multi meter.
   b) Insulation resistance checking of each AE cable using megger and logging.
2. Preparation of AE cable with both end BNC connectors.
3. Connecting the equipment for AE monitoring.
4. Calibration of each AE sensor by using Auto sensor test (AST), which provide computer controlled pulsing of each active AE channel.
5. Calibration of each AE sensor by using pencil tip break method.
6. Post test calibration of each AE sensor.
7. Monitoring, logging and analyzing of AE signal during proof pressure test and structural test of propellant tanks.
8. Post test analysis of the test results.

1.A.2. WORK DESCRIPTION-STRUCTURAL TEST FACILITY:

O. Bonding of surface RTD

1. Listing of sensor as per measurement plan.
2. Receipt of sensor from calibration lab with data sheets or logbooks.
3. Physical verification of process and electrical ports for any anomalies or defects.
4. Preparing of sensor for bonding
   a) Measure sensor element resistance
   b) Providing insulation sleeves to the terminal legs of sensor leads.
   c) Termination of sensors with the terminal pad by soldering.
   d) Extending of sensor leads by soldering pig-tail wire to the terminal pad.
   e) Cleaning of soldered joints & measuring the sensor resistance / insulation at the pig-tail end.
5. Pasting the identification labels with legend and Sl.no on the corresponding sensor.
6. Identification of sensors bonding location.
7. Sensor bonding
   a) Cleaning the identified Location with Iso-prophyl alcohol (Propan-2-ol).
   b) Rubbing of the identified surface using emery sheet.
   c) Again cleaning of the surface using Iso-prophyl alcohol.
   d) Positioning of sensor on the location with cellophane tape.
   e) Lifting of sensor and application of the bonding adhesive.
   f) Squeeze out the excessive adhesive and leave the sensors for 24 hours curing.
   g) Positioning the terminal pad adjacent to sensor, bond with adhesive following procedure similar to the sensor bonding and allow for 24 hours curing.
   h) Terminate the leads with terminal pad.
   i) Check the insulation resistance and confirm the insulation.
   j) Peal-off cellophane tape and apply protective coating and leave it again for 24 hours curing.
   k) Checking the sensor resistance, Insulation Resistance etc and logging the results in check-list & other log sheets.

P. Bonding of thermo couple

1. Preparing the T/C sensors.
2. Electrical check-out of the sensor by measuring and logging the ambient millivolt output.
3. Providing tag name to the sensor wire.
4. Cleaning of the identified location with Iso-Prophyl alcohol.
5. Rubbing of surface using fine emery sheet.
6. Again cleaning of the surface using Iso-Prophyl alcohol.
7. Positioning of sensor on the location with cellophane tape.
8. Apply the bonding adhesive and hold with cellophane tape for 24 hours.
9. Terminate the T/C wire with miniature connector.
10. Checking and logging of the sensor resistance in the check-list & other log sheets.

Q. Bonding of strain sensors

1. Listing of sensor as per measurement plan.
2. Checking & Receiving of strain sensors form calibration Lab with data sheet.
3. Measuring sensor Resistance.
4. Identity the sensor location as per CCB approved drawing/marking.
5. Identification of sensors bonding location on the harware.
6. Sensor bonding

a) Cleaning the identified Location with Iso-prophyl alcohol
b) Rubbing of surface using emery sheet.
c) Again cleaning of the surface using Iso-prophyl alcohol.
d) Positioning of sensor on the location with cellophane tape.
e) Lifting of sensor and application of the bonding adhesive.
f) Squeeze out the excessive adhesive and leave the sensors for 24 hours curing.
g) Positioning the terminal pad adjacent to sensor, bond with adhesive similarly and leave pad for 24 hours curing.
h) Solder the sensor leads with Terminal pad.
i) Solder the cable with the Terminal pad.
j) Check the sensor Resistance and logging it.
k) Check the insulation Resistance and logging it.
l) Peal out cellophane tape.
m) Apply the protective Coating and leave it.
n) Checking and logging sensor resistance.
o) Checking and logging insulation resistance.
p) Identity the tag with respect to location.
q) Put the tag on cable extension.
r) Prepare the clearance report.

R. LVDT mounting

1. Functional check of LVDT: Health check of the LVDT, for known displacements of 0%, 50% & 100% of transducer measurement range.
2. Mounting & null adjustment: Mounting of the respective LVDT on its mounting fixture & null adjustment in mounted condition on the test day.

S. Inward inspection

1. Inward inspection of major electronic equipments & tools like data loggers, acquisitions systems and programmable logic controllers
   a) Checking for the correct quantity
   b) Correctness of models supplied
   c) Ensuring intactness of equipments
   d) Finding visual defects

2. Inward inspection of Sensors include pressure, temperature, vibration, displacement, acoustic, level, differential pressure and vacuum sensors before given for mounting to fluid lines
   a) Checking for correct quantity
   b) Make model no
   c) Availability of closures for electrical and mechanical ports
   d) Finding visual defects
3. Inward inspection of Signal conditioners include barriers, relays and power supplies before given for mounting in instrumentation rack
   a) Checking for correct quantity
   b) Make model no
   c) Availability of closures for electrical and mechanical ports
   d) Finding visual defects

T. Filing & Maintenance

1. Stock entry, Maintenance and verification of Instrumentation items like sensors, signal conditioners, data loggers, acquisitions systems, tools and PLC

   a) After inward inspection, the correct quantity of item available in stock along with its description and serial no has to noted in log book
   b) Updation of the log book as when items are taken for commissioning activities
   c) Stock verification to ensure the correctness of material flow status in every week

2. Filing and Maintenance of calibration charts of sensors, test and measuring equipments
    a) Filing of the calibration chart of sensors like pressure, temperature, vibration, displacement, acoustic, level, differential pressure and vacuum sensors
    b) Filing of the calibration chart of test & measure equipments like multimeters, oscilloscopes, function generators, clamp on meters
    c) Proper updation of file as and when equipments are added
    d) Maintenance of master list of all charts

3. Filing and Maintenance of test facility documents like test request documents, chronology documents, performance reports, wiring diagrams, schematic diagrams, detailed engineering documents and other documents
    a) Filing the documents as and when received
    b) Maintaining order of documents properly
    c) Numbering of each file
    d) Maintaining master list of all files

4. Filing and Maintenance of ISO documents
    a) Filing the documents as and when received
    b) Maintaining order of documents properly
    c) Numbering of each file
    d) Maintaining master list of all files

5. Maintenance of instrumentation system database which includes tags, equipment serial no, rack no, i/o card details etc
    - The instrumentation system includes measurement system, command system, data acquisition system and control system.
    - All these systems have many equipments like sensors, transmitters, relays, barriers, power supply, input/ output cards etc.

    a) Data base management of each equipments
    b) Maintaining of serial number, tag number and other details of each equipments

6. Maintenance of spare availability list for all instrumentation equipments
    - The instrumentation system includes measurement system, command system, data acquisition system and control system.
    - All these systems have many types of equipment like sensors, transmitters, relays, barriers, power supply, input/output cards etc.

    a) The data base management of all spare items.
    b) Maintenance of wired spares list and spares on shelf.
    c) Maintenance of serial number, tag number, location and other details for each spare equipment.
    d) Verification of list once in a month.

U. Function checking

1. Function checking of electronics equipments
    - The electronic equipments need to be checked for proper functioning.
    - The equipments include multi meters, oscilloscope, function generators, clamp on meters and hand held calibrators
2. Functional checking of sensors, transmitters and other field devices
    a) Checking of sensors, pressure transmitters, temperature transmitters, flow meter with its transmitters, proximity switches and solenoids for proper functioning.
    b) Checking of the different functions and features available on these field devices
    - Only electrical checks need to be done.

3. Function checking of signal conditioners
   - The signal conditioners include relays, barriers and power supply.
   a) Checking of the signal conditioners for proper functioning.
   b) Checking of the different functions and features available on the equipment

V. Continuity, insulation resistance, etc. checking

1. Continuity and insulation resistance checking of cables
   a) Preparation of cable ends for continuity check.
   b) Continuity check using multi meter.
   c) Insulation resistance checking using megger and logging.
   d) For multi core cables, core to core and core to screen insulation resistance shall be measured and logged.
2. Continuity checking between all termination points in instrumentation rack

- In cable terminal room and control room, instrumentation racks will be positioned and wired by department.
- There will be termination points in each rack in signal conditioners/terminal blocks/connectors.
  a) Verification of these terminations by continuity check
  b) Ensuring proper termination

3. Continuity checking and cable colour code verification between all termination points in field junction boxes, sovs and transmitters

- In test bay and field, cable termination at junction boxes, sov and transmitters will be made by department.
  a) Verification of terminations by continuity check.
  b) Ensuring proper termination.
  c) Verification of cable colour coding with reference to document supplied by department.

4. Continuity checking and colour code verification of inter rack interface cables

- In cable terminal room and control room, instrumentation racks will be positioned and wired by department.
- These racks will be interlinked via multicore cables terminated in connectors. The terminations will be done by department.
  a) Verification of terminations by continuity check.
  b) Ensuring proper termination.
  c) Verification of cable colour coding with reference to document supplied by department.

5. Checking and verification of ferruling details of wired instrumentation racks

   a) Positioned and wired instrumentation racks in cable terminal room and control room
   b) Providing a ferrule for each termination point.
   c) Reading and verifying the ferrule against the document provided by department

W. Wiring works

1. 2 core/4 core cable laying and wiring works
   a) All cable routes shall be carefully measured and cut to the required length, leaving sufficient amount for the final connections of the cable to the terminals on either end.
   b) Laying and termination of multi core cables at various junction boxes / terminal blocks.
   c) Supply of cable harnessing materials, end terminals & identification ferrules is in the scope of contractor.
   d) Cables shall be rigidly supported on cable trays, individually or in groups as required.
   e) Distance between the two cable supports shall not be more than 1 m.
   f) Each of the cables shall be tagged with cable number punched clearly at 15meter intervals.

g) All wires shall be checked for proper identification, continuity and insulation before taking up wiring connections.
h) Power cables and control cables shall be laid in separate cable trays as per IEEE 518-1982.

2. Equipment mounting and wiring works

a) Mounting of equipments in rack or in wall with suitable fasteners and mounting materials.
b) Termination of cables in crimping type connectors/terminal blocks /equipments.

X. Cable laying

1. Instrumentation cables shall be routed and harnessed along perforated cable trays or ladder trays.
2. Cable shall be of single piece and joint is not allowed from one termination to the other termination.
3. Cables shall be rigidly supported on cable trays, individually or in groups as required using individually cast or malleable iron galvanized clips. Distance between the two cable supports shall not be more than 1 m.
4. Physical protection shall be provided wherever required.
5. Each of the cables shall be tagged with cable number punched clearly in anodized aluminum tags and tied to the cable at both the ends & also at 5meter intervals.
6. All wires shall be checked for proper identification, continuity and insulation before taking up wiring connections.
7. Power Cables and control cables shall be separated as per IEEE 518-1982.
8. All cable screens/shields shall be earthed.
9. Care should be taken to avoid sharp bending and kinking of conductor, damaging of insulation and stressing the cable beyond the pulling force.
10. While terminating the cable at the devices, a loop involving around 0.5 mtr. extra cable shall be provided if required.

Y. Cable glanding and Termination

1. Proper identification, continuity check and insulation check of all cables shall be carried out before termination. Insulation resistance values shall be recorded.
2. The cables shall be routed through appropriate glands (SS glands/polymide glands).
3. The termination of cables shall be carried out in crimping type connectors/terminal blocks / terminal blocks of equipments.
4. Where ever required, Cable shield shall be neatly prepared and terminated in single core wire soldered to it.
5. Standard wiring practice shall be followed.
6. All cable termination shall be provided with identification ferrule.

Z. Cable glanding and connector wiring

1. Proper identification, continuity check and insulation check of all cables shall be carried out before termination. Insulation resistance values shall be recorded.
2. The cables shall be routed through appropriate glands (SS glands/polymide glands).
3. The termination of cables shall be carried out in crimping type connectors.
4. Where ever required, Cable shield shall be neatly prepared and terminated in single core wire soldered to it.
5. Standard wiring practice shall be followed.
6. All cable termination shall be provided with identification ferrule.

1.B. WORK CONTENT:

Sl. no.	Work content with identification name	Quantity	UoM
1.	1-Activities A.1 to A.5	4000	nos
2.	1-Activities A.6 to A.10	5000	nos
3.	1-Activities B.1 to B.6	3000	nos
4.	1-Activities B.7 to B.9	3000	nos
5.	1-Activities C.1 to C.5	2500	nos
6.	1-Activities C.6 to C.8	2500	nos
7.	1-Activities D.1 to D.5	400	nos
8.	1-Activities D.6 & D.8	400	nos
9.	1-Activities E.1 to E.5	200	nos
10.	1-Activities E.6 & E.8	200	nos
11.	1-Activities F.1 to F.8	3000	nos
12.	1-Activities G.1 to G.7	3000	Locations
13.	1-Activities H.1 to H.10	4000	Locations
14.	1-Activities I.1 to I.5	5000	Locations
15.	1-Activities I.6.a to I.6.r	5000	Locations
16.	1-Activities J.1 to J.17	1500	Channels
17.	1-Activities K.1 to K.7	12000	Channels
18.	1-Activities K.8 to K.13	12000	Channels
19.	1-Activities L.1 to L.13	400	Channels
20.	1-Activities M.1 to M.2	8000	nos.
21.	1-Activities M.3 to M.5	8000	nos.
22.	1-Activities N.1.a to N.1.b	20000	nos.
23.	1-Activity N.2	5000	nos.
24.	1-Activity N.3	200	nos.
25.	1-Activities N.4 to N.8	5000	nos.
26.	1-Activities O.1 to O.6	500	Locations
27.	1-Activity O.7	500	Locations
28.	1-Activities P.1 to P.3	500	Locations
29.	1-Activities P.4 to P.8	500	Locations
30.	1-Activities P.9 & P.10	500	Locations
31.	1-Activities Q.1 to Q.5	500	Locations
32.	1-Activities Q.6.a to Q.6.g	500	Locations
33.	1-Activities Q.6.h to Q.6.r	500	Locations
34.	1-Activities R.1 to R.2	100	nos
35.	1-Activities S.1.a to S.1.d	100	nos
36.	1-Activities S.2.a to S.2.d	1000	nos
37.	1-Activities S.3.a to S.3.d	100	nos
38.	1-Activities T.1.a to T.1.c	1000	nos
39.	1-Activities T.2.a to T.2.d	4000	nos
40.	1-Activities T.3.a to T.3.d	1000	nos
41.	1-Activities T.4.a to T.4.d	1000	nos
42.	1-Activities T.5.a to T.5.b	8000	nos
43.	1-Activities T.6.a to T.6.d	4000	nos
44.	1-Activity U.1	1000	nos
45.	1-Activities U.2.a to U.2.b	6000	nos
46.	1-Activities U.3.a to U.3.b	3000	nos
47.	1-Activities V.1.a to V.1.d	8000	nos

48.	1-Activities V.2.a to V.2.b	4000	nos
49.	1-Activities V.3.a to V.3.c	6000	nos
50.	1-Activities V.4.a to V.4.c	3000	nos
51.	1-Activities V.5.a to V.5.c	4000	nos
52.	1-Activities W.1.a to W.1.h	6000	nos
53.	1-Activities W.2.a to W.2.b	2000	nos
54.	1-Activities X.1 to X.6	4000	nos
55.	1-Activity X.7	1000	nos
56.	1-Activities X.8 to X.10	2000	nos
57.	1-Activities Y.1 to Y.6	2000	nos
58.	1-Activities Z.1 to Z.6	2000	nos

1.C. CONTRACT CONDITIONS - TECHNICAL:

1. Based on our past experience, the average number of personnel required to carry out the **1.B. Work content are 06 Diploma holders and 04 ITI holder for 2 years.** However, depending on the work load, the Contractor may require to deploy more people as and when required.
2. The persons should have educational qualifications as min. **Diploma in Electronics & Communication** or **Electrical & Electronics branches of Engg. & min. ITI in Electronics/Electrical trade**.
3. The **1.B.Work content table** in the Tender contains 58 rows of items starting as **'1-Activity(ies)-XX'**.