अनुरक्षण एवं अभियांत्रिकी इकाई
MAINTENANCE & ENGINEERING UNIT
भाकृअनुप-भारतीय कृषि अनुसंधान संस्थान
ICAR-INDIAN AGRICULTURAL RESEARCH INSTITUTE
नई दिल्ली-१२
NEW DELHI-12.

No. 30-27/21-22MEU

Dated : 21-02-2022

e-TENDER NOTICE

Online quotation are hereby invited on behalf of the Director, IARI from the Contractors Registered with CPWD, MES, Railways, MCD, PWD or other Central/State Govt./Semi Govt. The contractor must have valid PAN and GST registration number and having experience of two similar nature of works in last three years for the work mentioned below:

Name of work & location	Estimated cost (₹)	Last date & time of bid submission	Date & time of bid opening
Installation of IOT and sensor operated climate controlled greenhouse as vertical farm at IARI New Delhi - 12.	Item Rate	Upto14:30 hours 14.03.2022	15.03.2022 at15:00 hours

The Online Tender Documents are available on IARI Website www.iari.res.in. & Central Portal www.eprocure.gov.in . Bids are to be submitted on central portal i.e. www.eprocure.gov.in .

Admn. Officer (Works)

Schedule of work

Name of work: Installation of IOT and sensor operated climate controlled greenhouse as vertical farm at IARI, New Delhi

30-27/21-22/MEU

Sl. No.	Item Description	Quantity	Units	Rate	Amount
1	2	4	5		
1	Complete roof and side structure made of hollow GI section size 2 mm thickness. GI Pipe 65 NB	220.000	Rm		
2	Complete roof and side structure made of hollow GI section size 2 mm thickness. GI Pipe 50 NB	430.000	Rm		
3	Complete roof and side structure made of hollow GI section size 2 mm thickness. GI Pipe 40 NB	315.000	Rm		
4	Complete roof and side structure made of hollow GI section size 2 mm thickness. GI Pipe 32 NB	1152.000	Rm		
5	Complete roof and side structure made of hollow GI section size 2 mm thickness. GI Pipe 25 NB	320.000	Rm		
6	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.	50.000	Cum		
7	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. 1:5:10 (1 cement : 5 coarse sand (zone-III): 10 graded stone aggregate 40 mm nominal size)	53.000	Cum		
8	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. 1:2:4 (1 cement : 2 coarse sand (zone-III) : 4 graded stone aggregate 20 mm nominal size)	28.000	Cum		

9	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. All kinds of soil	71.000	Each		
10	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. Cement mortar 1:6 (1 cement : 6 coarse sand)	45.000	Cum		
11	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. 1:4 (1 cement: 4 fine sand)	100.000	Sqm		
12	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. 1:4 (1 cement: 4 fine sand)	100.000	Sqm		
13	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)	200.000	Sqm		
14	Construction: IS-2645 Civil construction standard. CC foundation(1:3:6) Digging:2'x1.6" Base:-PCC 2" thick wide:- 13" First base line:13" second base line: 9" Height of wall : 1'-6" below GL and 2' above GL frame base block: 2'x9"x9" plastering: 1:4 Flooring: Concrete flooring for total area. Weed mat: Covering of floor under benched with weed mat, as approved by the engineer-in-charge. Supply and laying of weed mat UV stabilized GSM 140	600.000	Sqm		
15	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. All kinds of soil	17.500	Cum		

16	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Cement mortar 1:6 (1 cement : 6 coarse sand)	4.000	Cum		
17	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Cement mortar 1:4 (1 cement : 4 coarse sand)	13.000	Cum		
18	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. 1:5:10 (1 cement : 5 coarse sand (zone-III): 10 graded stone aggregate 40 mm nominal size)	6.000	Cum		
19	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead upto 50 m and lift upto 1.5m	15.000	Cum		
20	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. 1:4 (1 cement: 4 fine sand)	70.000	Sqm		
21	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. 1:4 (1 cement: 4 fine sand)	60.000	Sqm		
22	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Size of Tile 600x600 mm	26.000	Sqm		
23	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Hot finished welded type tubes	100.000	Kg		
24	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm (+ 0.05 %) total coated thickness with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineerin-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	35.000	Sqm		

25	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. 12.5 mm thick square edge PVC Laminated Gypsum Tile of size 595x595 mm, made of Gypsum plasterboard, manufactured from natural gypsum as per IS 2095 part I and laminated with white 0.16mm thick fire retardant PVC film on the face side and 12micron metalized polyester on the back side with all edges sealed with the face side PVC film which goes around and wraps the edges and is bonded to the edges and the back side metalized polyester film so as to make the tile a completely sealed unit.	24.000	Sqm		
26	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	60.000	Sqm		
27	Separate room for housing fertigation, chiller, filtration and PLC controller (24 sqm) 4" high concrete bases for mounting fertigation related equipment. Two or more coats on new work	70.000	Sqm		
28	Structure roof, side front & back truss will be covered with U. V. Stabilized polyfilm200 micron clear anti drip multilayered,	2010.000	Sqm		
29	Aluminum locking profile with pre coated Zig Zag spring for fixing of poly film (Roof top &Side). Aluminum locking profile	630.770	Rm		
30	Aluminum locking profile with pre coated Zig Zag spring for fixing of poly film (Roof top &Side). pre coated Zig Zag spring	877.500	Rm		
31	Aluminum (Thermal) shade net inside the Green House: Aluminate thermal net 50% inside the poly house fix with motorize automated system (1000 square meter) Aluminate (Thermal) shade net inside the Green house with fixture	1000.000	Sqm		
32	Aluminum (Thermal) shade net inside the Green House: Aluminate thermal net 50% inside the poly house fix with motorize automated system (1000 square meter) motorize automated system	1.000	Set		
33	Technical specifications cellulose pad: Evaporative cellulose pads are made from a specially formulated cellulose paper impregnated with special compounds to prevent rot, early moss formation and ensure a long service life.Size: 36000x1500x150mm (HXWXT) Paper ambient condition: 25◦C-45◦C nominal efficiency:88% estimated cooling load: 101,520BTUs/hrs Water flow:9.56LPM Temperature: 10to 12◦C below. Ambient @45%RH Self-cleaning feature: High saturation efficiency	48.000	Sqm		
34	54" fans with auto opening system with auto floating dampers SS/GI and SS Blades with 415 V,50HZ,1.5HP,1/3 ph motor with electrical cables, safety grills necessary fittings etc. complete.	6.000	Nos		
35	20-22inch high speed fans,220V,single phase	6.000	Nos		

36	PVC water distribution system of (20-25mm dia pipe) for cooling pad with 1" screen filter.	1.000	Set		
37	LED light (9W) 1 no will be provided in buffer room compartment. Electrical device:- High quality ISI approved fittings with copper multi strand twisted FR grade cable and rigid stds of safety with proper M.C.B. with appropriate electrical points of 5 Amp & 15 Amps. Copper cable, MCB, Switch & socket , Fluorescent tube ,conduit-ISI approved quality.(Wire of brand like KEI, Finolex, Havells of approved by engineer-in-charge.)	1.000	Set		
38	Auto control pael: Micfoprocessor photosynthesis contro; panel: a) Microclimate tempresature controller. B) Main switch rotoy c) individual indicator Temperature controller: Real time microprocessor based user programmable PID controller. PLC based controller for temprerature, humanity & light with SMS a data logging facility: Electrical panel inlcuding distribution panel. a)color HMI-touch screen – make delta b) temperature+ RH transmitter+ plitz timer c) sensor probe platinum -100A d) software –PLC +HMI software e) Manual switch over option for manual control f) SMS alert system for individual chamber g) Data logging facility for individual chamber h) Online monitoring and control to make changes over app. Provision for incorporating climatic and fertigation related sensors in future, separate data logger for measuring power consumption.	1.000	Set		
39	Provision of climatic sensors mainly temperature , humidity,CO2and light sensors and fertigation related sensors like EC ,PH , TDS,DO,BOD,IOT based system with HMI panel for automation.	1.000	Set		
40	Both sides long roll-up plastic curtains, openable to 3m, on two width sides with manual gearsystem complete in all respect. 40 mesh nylon insect proof net (UVstablised) white colored to be fixed inside the curtain on sides leaving 1 m from the ground level. Nylon insect Net 40 Mesh on both with fixture.	192.000	Sqm		
41	Both sides long roll-up plastic curtains, openable to 3m, on two width sides with manual gearsystem complete in all respect. 40 mesh nylon insect proof net (UVstablised) white colored to be fixed inside the curtain on sides leaving 1 m from the ground level. Rolling Pipe 20mm NB	68.000	M		
42	Both sides long roll-up plastic curtains, openable to 3m, on two width sides with manual gearsystem complete in all respect. 40 mesh nylon insect proof net (UVstablised) white colored to be fixed inside the curtain on sides leaving 1 m from the ground level. PVC Gripper	115.000	Nos		
43	It consists of overhead, four way anti-leak foggers with 22-28 lph discharge which gives very fine drop lest size at spacing 2.5m X 2.5m, PVC pipe of 6 kg/cm2 pressure rating of various sizes, Air Release valve, PVC ball valves Flush valves for flushing of sub-man, plastic Disc Filter, fitting and Accessories.	1.000	Set		

44	Sprinker unit heavy duty butterfly nozzles sprinkers, filter, pipes, etc. for roof top cooling installed at above polyhouse Distance between sprinkers -2m Specification & make: 1. 3 phase pump make ISI 2. pipes size is in between 16 to 32 mm, as per requirement 3.nozzles types- fogger ultra fine 15 micron 4.nozzles water discharge 27 litre/hour. 5.all pipes are ISI mark 6.screen filter with appropriate capacity 7.end lateral will be providing for flushing	1.000	Set		
45	5mx2.5mx4m high insulated space within the polyhouse Multilevel 5 levels NFT grow racks MS steel racks with powder coated paint finish 5 level of growing witheach level 2 ft high LED grow lights suitable for growing leafy greens,herbs,and edible flowers. grow light >20mol/m2/day 1 TONN AIR conditioning unit connected with thermostat & PLC to keep grow room temperature below 28◦C 100 litre/day dehumidification capacity to keep grow room humidity level between 30% rh -60% RH .On/off operation automated via RH sensor & PLC PLC for lightning and irrigation control	1.000	Set		
46	Growing System 1.should provide vertical A-Frame growing racks(5 levels) based on Nutrient Film Technique that adheres to the following: a)UV stabilized whitecolour food grade material using calcium zinc stabilizer. b) minium plant spacing:5" c)the system shall be recirculating type d)A-FRAME dimension 10 ft longx6ft highx5ft wide e)vertical A-Frame growing racks should cover 30% area f)All necessary pumps, tanks and other accessories required for operation shall be ISI marked and of reputed make.	12.000	Set		
47	Growing System 2. should provide vertical growing towers as per the following specs: a. grow towers made of food grade material b.grow towers system to cover 30% area c.grow towers to be self –irrigation type with 40 plant capacity per tower d.grow towers to be of octagon shape with approx dimensions:6ft highx2ft base diameter.	80.000	Tower		
48	Growing System 3.vertical overlapping multilayer NFT system with grow light Galvanized iron metal frame-3mm thickness NFT UPVC channel –lead free-3mm thickness, size 100x60mm grow light over each NFT channel-200 to 300 PAR at 12 inches -15-18 watt per 4 ft length. plant capacity-5000.	10.000	Racks		
49	Growing System 4.NFT vertical A' frame system openable top NFT UPVC channel –lead free-openable top- 2mm thickness size 100x60mm. Galvized iron metal a frame -3mm thickness Plant capacity 1250.	7.000	Set		

50	Growing System 5.Dutch bucket system: UPVC Dutch bucket-1 ltr capacity – with lid and net pot 16mm lateral pipe drip line 2LPH pressure controlled dripper base stand for dutch bucket costed wire tressling complete system with clips and thread plant capacity -160	160.000	Set		
51	Fertilization and auto dosing system with automation: irrigation control shall be mixing tank based with the following features Controller:PLC based user operating system touch screen based operator window 4 fertilizer dosing channels with capacity of 400 LPH 1 Acid dosing channel with capacity of 100 LPH EC CONTROL MODULE & Ph control module multistage system pump – stainless steel -316 grade @ 2.2 KW Field control: time interval (off/on) can be done sampling (EC&PH)Schedules field valves control fertigation dosing control: solenoid valves-4 nos(A,B,C&acid) flow monitoring-flow indicators to be provided for each dosing channel all necessary pressure monitoring gauges, pressure relief valves, non return valves, internal control valves, and pressure piping. field valves shall be controlled automatically on time base with single or multiple at one time as a group by pass mode operation.	1.000	Set		
52	Pumping System:4 mono block pumps of 2 hp(for NFT) (2 running 2 stand by) all pumps BIS/ISO certified One (1) mono block pump 1.5hp for cooling pand& one (1) mono block pump 3hp for fogger 3phse mono pump with automation All pump BIS/ISO certified mono block pumps of 2 hp with all fittings and accessories	4.000	Nos		
53	Pumping System: 4 mono block pumps of 2 hp(for NFT) (2 running 2 stand by) all pumps BIS/ISO certified One (1) mono block pump 1.5hp for cooling pand& one (1) mono block pump 3hp for fogger 3phse mono pump with automation All pump BIS/ISO certified mono block pumps of 1.5 hp with all fittings and accessories	1.000	Nos		
54	Pumping System:4 mono block pumps of 2 hp(for NFT) (2 running 2 stand by) all pumps BIS/ISO certified One (1) mono block pump 1.5hp for cooling pand& one (1) mono block pump 3hp for fogger 3phse mono pump with automation All pump BIS/ISO certified mono block pumps of 3 hp with all fittings and accessories	1.000	Nos		
55	Plumbing lines: UPVC pipe of (20-50mm dia) & length on pressure side. PVC pipe of (90-110mm dia) &length on non pressure side.	1.000	Set		
56	Valves and filters with automation (BIS/ISO certified) 4 solenoid valves with electric timer system manual control valve on each grow lane (UPVC) disc filters of ½,1,2,&3 inch capacity. timer –automation timer for pumps , valves, filter etc	1.000	Set		

57	Tanks : Overhead tank: all overhead tanks for dosing solution. 5 tanks -1000 litres each 3 layer (nutrition) underground tank: 3 underground tanks(each 5000 ltr) 1 underground tank for Raw and rain water storage (5000 ltr) Rain water harvesting system: all gutters should be connected with hanging anchored PVC pipes. 3 inch dia to the covered RCC drain provided around the structure. the final outlet of drains should be connected to the underground water tank for rain water storage. 1000 liters 3layer PVC tank	5.000	Nos		
58	Tanks : Overhead tank: all overhead tanks for dosing solution. 5 tanks -1000 litres each 3 layer (nutrition) underground tank: 3 underground tanks(each 5000 ltr) 1 underground tank for Raw and rain water storage (5000 ltr) Rain water harvesting system: all gutters should be connected with hanging anchored PVC pipes. 3 inch dia to the covered RCC drain provided around the structure. the final outlet of drains should be connected to the underground water tank for rain water storage. 5000 liters underground Cemented tank	4.000	Nos		
59	Tanks : Overhead tank: all overhead tanks for dosing solution. 5 tanks -1000 litres each 3 layer (nutrition) underground tank: 3 underground tanks(each 5000 ltr) 1 underground tank for Raw and rain water storage (5000 ltr) Rain water harvesting system: all gutters should be connected with hanging anchored PVC pipes. 3 inch dia to the covered RCC drain provided around the structure. the final outlet of drains should be connected to the underground water tank for rain water storage. Rain water harvesting system	1.000	Set		
60	RO water filtration: 1000 ltr/hr capacity water filtration system with all accessories as per BIS guidelines componenets: Raw water pump (1HP) SAND Filter, RO membrane micron filter (10 micron), UV filtertube (2 nos)	1.000	Set		
61	Chiller: 5 ton capacity to keep nutrient water temperature within a range of 12-20◦C for fresh as well as recirculated nutrient solution	1.000	Set		
62	Germination room: GI stand, UPVC germination tray -200 mtr(or as actual req.) for 25 day plants	1.000	Set		
63	Desktop with coloured printer & scanner: INTEL 7 PROCESSOR. 16 GB RAM,2 TB HARD DISK, WINDOW 10 LICENSED , MS OFFICE LICENSE,21 INCH SCREEN , 1KVA UPS, including all accessories.	1.000	Set		
64	Laptop: INTEL 7 PROCESSOR. 16 GB RAM,2 TB HARD DISK, WINDOW 10 LICENSED , MS OFFICE LICENSE,display 15 INCH including all accessories.	1.000	Set		
				Total	

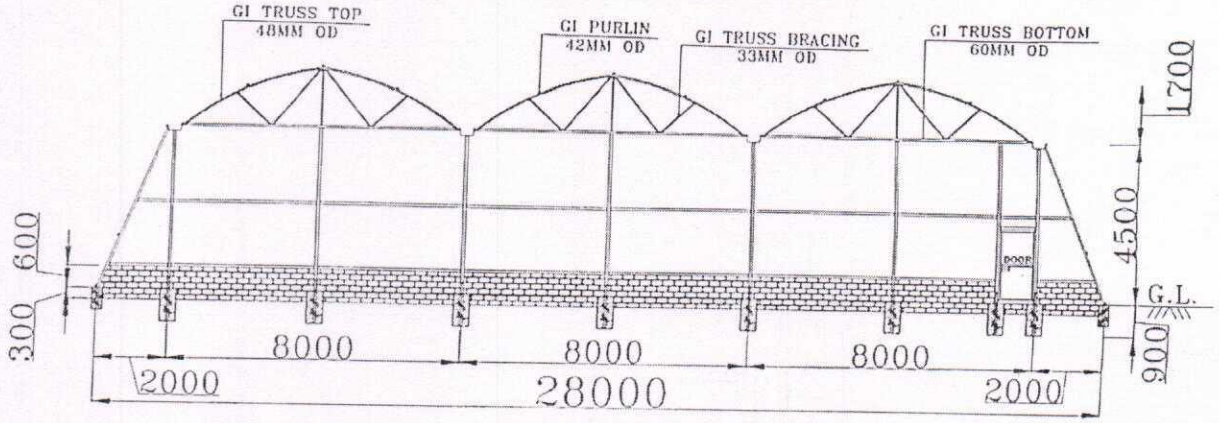
Subject to the following terms & conditions: -

1. The work shall be executed as per CPWD specifications.

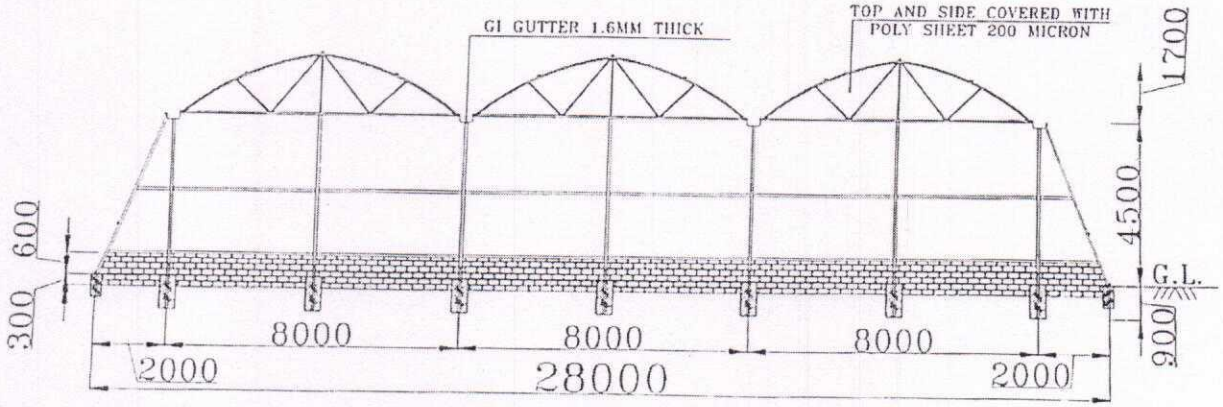
2 Income Tax, & work cess as per norms shall be recovered from the bill.
3 1% water and electrical charges will be recovered from the bill if supplied by the Department.
4 The work shall start within 3 days from the date of award and complete within one month failing which a penalty @1% per week delay will be imposed on the bill amount maximum upto 10%.
5 All the material, laboures, T & P etc. required will be arranged by the firms itself.
6 The agency shall deposit a security @ 3% of the sanctioned amount.
7 Any other item to be required at site to complete the work be executed as per lowest quoted rates. On DSR-2018
8 The rates quoted shall remain valid for 180 days from the date of opening of quotations/tenders.
9 A running payment may be made of the successful completion of work for 1/3rd or more amount of work.
10 The Director, IARI has the right to reject any or all the quotations/tenders without assigning any reason.

Name of Signature of the Agency: .....

HI-TECH POLY HOUSE
(36.0 X 28.0 X 6.2 X 4.5 M)

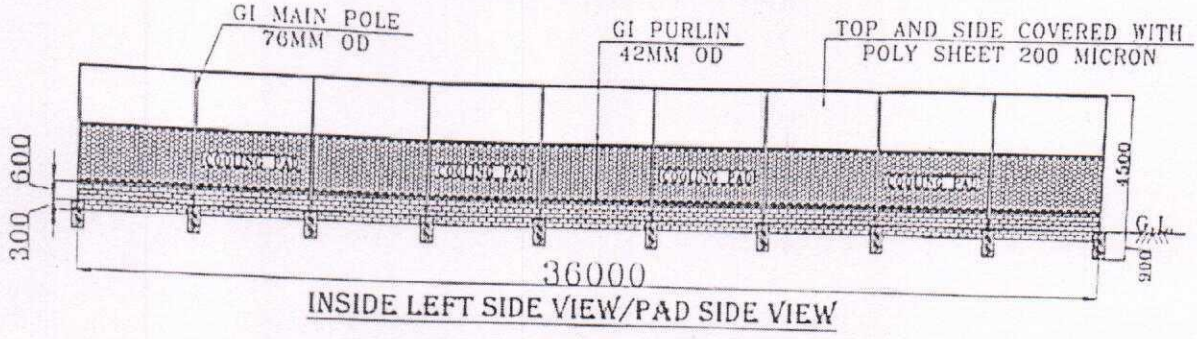


FRONT VIEW

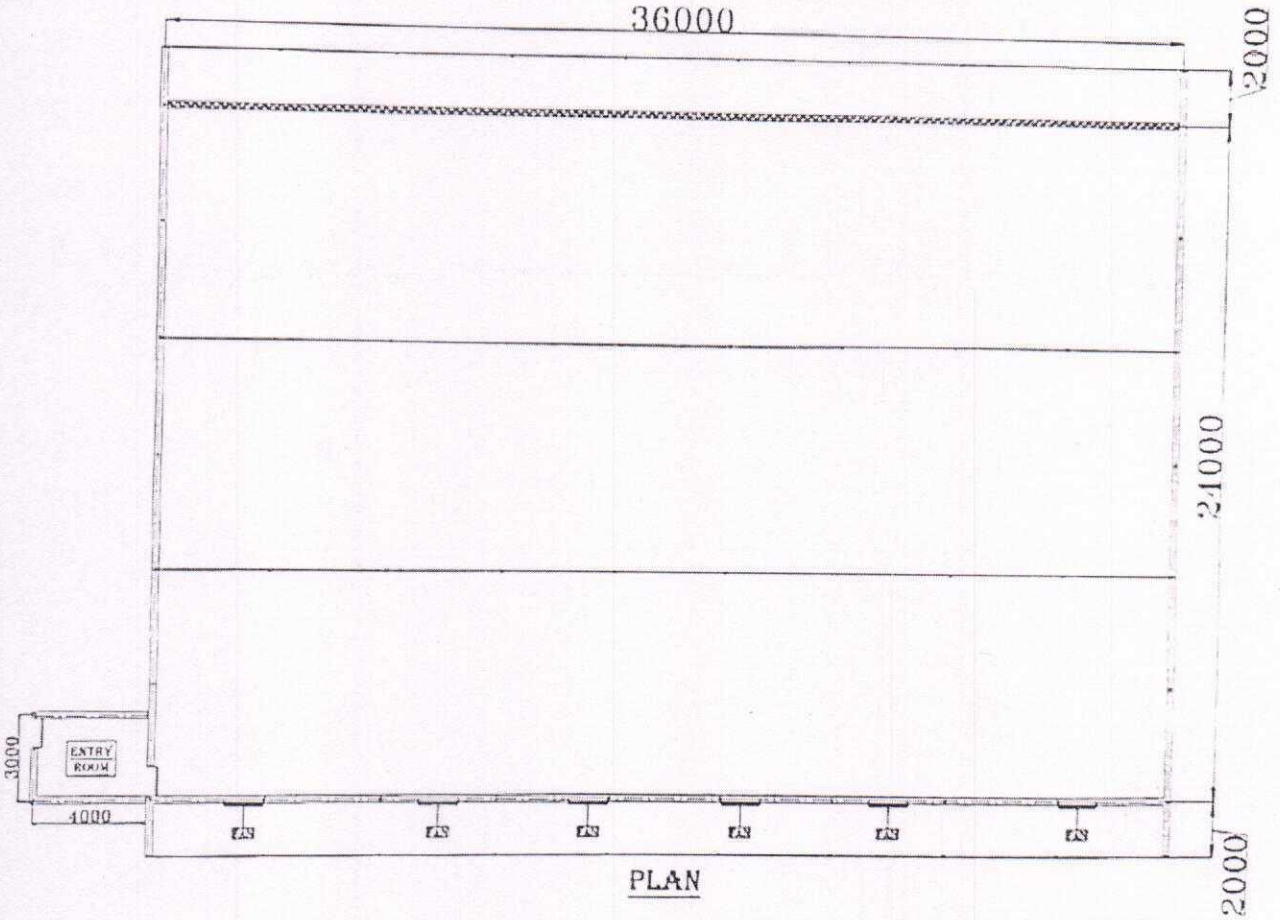


BACK VIEW

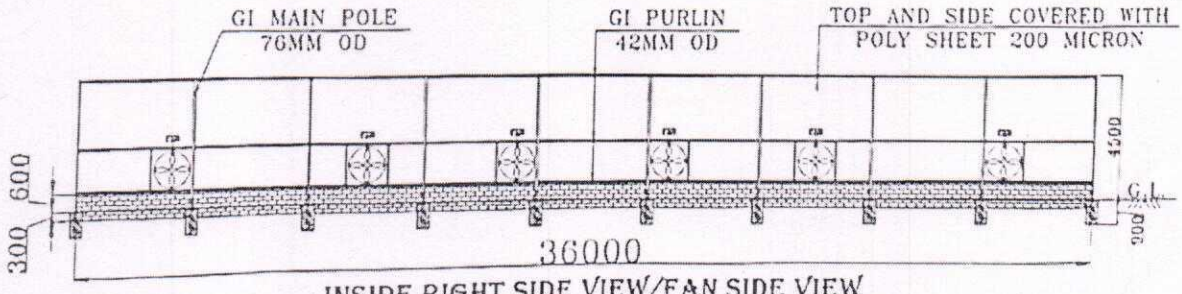
HI-TECH POLY HOUSE
(36.0 X 28.0 X 6.2 X 4.5 M)



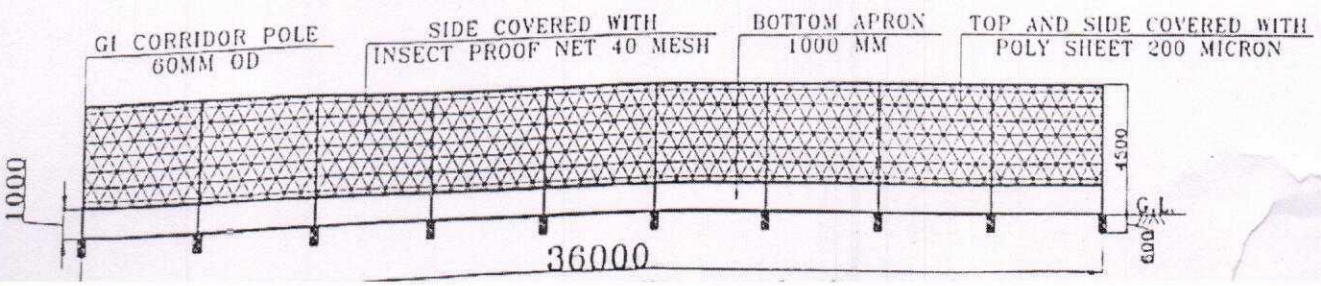
INSIDE LEFT SIDE VIEW/PAD SIDE VIEW



PLAN



INSIDE RIGHT SIDE VIEW/FAN SIDE VIEW



Installation of IOT and sensor Operated Climate Controlled Greenhouse as Vertical Farm (Technical Specifications)

Dimensions:	28 m x 36 m
Orientation	East-West
Greenhouse Size	1008 Sq mtr
Number of bays	4
Bays width	8 m.
Greenhouse width	36 m.
Greenhouse length	28 m.
Side Height	4.5 m.
Centre Height	6.0 m
Shape	Gothic
Gutter Height	4.5 m
Gutter Slope	2 %

A. Climate Controlled Greenhouse Specification

B. Item Wise Description (as per BIS guidelines)

S. No.	Item	Description
01.	Structure	Frame: Hot dip galvanized Steel Structure: Using galvanized hollow square sections for Columns, Trusses, Purlins, Clamps, Brackets and Nut bolts. All Structure, Rafters, Perlins, Trusses are hot dip galvanized and design as per IS 875 standard. WIND LOAD STRENGTH:- 140 km/hr rigid, wind resistant frame. GALVANIZED COAT: - ISI standard:- IS 4736-1968/ISO65-1973 GALVANIZED STEEL:- ISI standard Thickness: - 2mm Material List: - Anti-corrosive, Humidity resistant GI pipe 1 Main/ Secondary (Column) with 76mm 2 mm thick 2 Bottom Cord with 48mm 2 mm thick 3 Top Cord with 48mm 2 mm thick 4 Bracing 32mm 2 mm thick 5 Purlins 42 mm 2 mm thick 6 Pillars 76mm x 60mm x 2 mm / equivalent thick in every 5 meters in the Internal lines 7 Spans Square tubing of 48 x 2 mm thick 8 Gutter 2mm thick Aluminium preferred

02.	Cladding Material Apron	U V stabilize POLY FILM 200 Microns CLEAR Anti Drip Multilayered (As per IS guidelines). Aluminium locking profile with pre coated zig zag spring for fixing of poly film. (Roof Top and Sides) 60 cm above the ground around the entire structure with thick Greenhouse Plastic minimum 200 micron
03.	Aluminate (Thermal) Shade net Inside the Green House	Aluminate thermal net 50% inside the poly house fix with motorize automated system (1000 square meter)
04.	COOLING SYSTEM	COOLING SYSTEM: - Evaporative Cooling Technical Specifications Cellulose Pad: Evaporative cellulose pads are made from a specially formulated cellulose paper impregnated with special compounds to prevent rot, early moss formation and ensure a long service life. Size: - 1500 x 600 x 150 mm (H x W x T) Paper ambient condition; - 25ºC – 45 ºC Nominal Efficiency: - 88% Estimated cooling load: 101,520 BTUs/ Hrs. Water Flow: 9.56LPM Temperature: - 10 to 12°C Below. Ambient.@ 45% RH. Self-cleaning feature. High saturation efficiency
05.	Cooling Pad Assembly	Cooling Pad Assembly, Top & Sides with Aluminum Gutter 6" x 6" and Bottom 6" x 6". Mono block water pump fixed inside. 2 No. Mono block water pump. 1.5 hp each Mono block water pump with all necessary plumbing, hard ware etc.
06.	Axial Fan	54" Fans with Auto opening system Aluminum floating dampers and SS Blades with 415V, 50 HZ, 1.5 HP, 1/3 ph motor with electrical cables, safety grills necessary fitting. 8 No
	Air circulating fans	24 inch high speed fans, 220V, single phase - 8 No.
07.	Electrical Wiring	Electrical Wiring:- Lights Fluorescent Tube light 1 no. will be provided in Buffer room compartment . Electrical Device: High quality ISI approved fittings with copper multi strand twisted FR Grade cable and rigid Stds of safety with proper M.C.B . with appropriate electrical points of 5 Amp & 15 Amps . Copper Cable, MCB, Switch & Socket, Fluorescent Tube, Conduit- ISI approved
08.	Automatic Control Panel	Auto Control Panel :- Microprocessor Photosynthesis control Panel :- (User friendly) a) Microclimatic Temperature Controller e) Main Switch (Rotory) f) Individual Indicator. Temperature Controller: - Real time microprocessor based user programmable PID Controller. PLC based Controller for Temperature, Humidity & Light with SMS a data logging facility:- Electrical Panel including distribution panel. b) Color HMI - touch screen - Make Delta c) Temperature + RH transmitter + Plitz Timer. d) Sensor probe Platinum -100A e) Software - PLC + HMI Software. f) Manual switch-over option for manual control.

		g) SMS alert system for individual chamber. h) Data logging facility for individual chamber. I) Online monitoring and control to make changes over app.
09	Automation with Sensors and IOT	Provision of Climatic sensors mainly temperature, humidity, CO_2 and light sensors and fertigation related sensors like Ec, ph, TDS, DO, BOD. IOT based system with HMI panel for automation
10	Data Loggers	Provision for incorporating climatic and fertigation related sensors in future, separate data logger for measuring power consumption
11	Civil Work	CONSTRUCTION: IS- 2645 Civil construction Standard . CC foundation (1:3:6) Digging: - 2' x 1'6" BASE: - PCC 2" thick WIDE:- 16" FIRST BASE LINE:- 13" SECOND BASE LINE:- 9" Frame Base Block:- 2' x 9" x 9". Plastering :- 1: 6 Flooring: • Concrete flooring for total area, 3inch thickness • 4" high concrete bases for mounting fertigation related equipment • Separate room for housing fertigation, chiller, filtration, and PLC controller. (~50sqm)
12.	Buffer Room & Doors	Entry Room: 4 m. x 4 m. – 1 no. cladding- polycarbonate UV stabilize Three Doors - The doors are made of a frame of square UPVC profiles with covering sheet are put on top of this, clipped on with L profiles. The standard width is 2 m. Height- 2 m Width-2 m Sanitation- Disposable robes, gloves, shoe coverings, Footbath system with Disinfection mats
13.	Side Ventilation System	Side Ventilation: - On both sides Long. Roll-up plastic curtains, open able to 3 m. on two width sides with manual system complete in all. 40 mesh nylon insect proof net (UV stabilised) white coloured to be fixed inside the curtain on sides leaving 1 m. from the ground level.
14.	Fogging system	Fogging unit heavy duty motor with nozzles, filter, pipes etc., to raise RH up to 85% +/- 5% provided humidity created is not expelled from the greenhouse. Inter nozzle spacing 2.5 x 2.5 m. <u>Specification &Make:-</u> 1) 3phase- Pump make- ISI 2) Pipes size is in between 16 to 32mm, as per requirement. 3) Nozzles types- Fogger Ultra-fine 15 micron. 4) Nozzles water discharge 27 litre./hour 5) All pipes are ISI mark. 6) Screen filter with appropriate capacity. 7) End lateral will be providing for flushing.
15.	Roof top Cooling	Sprinkler unit heavy duty Butterfly Nozzle sprinklers, filter, pipes etc., for roof top cooling, installed at above Polyhouse.

		Distance between sprinklers- 2 m **Specification & Make:-** 1) 3phase- Pump make 2) Pipes size is in between 16 to 32mm, as per requirement. 3) Nozzles types- Butterfly nozzle Sprinkler Ultra-fine 15 micron. 4) Nozzles water discharge 27 litre./hour 5) All pipes are ISI mark. 6) Screen filter with appropriate capacity. 7) End lateral will be providing for flushing.
16.	**Thermally Insulated Space with LED lighting**	• 10m x 5m x 4m high insulated space within the polyhouse • Multilevel 5 levels NFT Grow Racks • MS steel racks with Powder coated paint finish. • 5 levels of growing with each level 2 ft high. • LED Grow lights suitable for growing leafy greens, herbs, and edible flowers. • Grow Light DLI > 20 mol/m2/day • 5 ton air conditioning unit, connected with thermostat & PLC to keep grow room temp below 28C • 100 litres/day dehumidification capacity to keep grow room humidity level between 30% rh -60% Rh. On/Off operation automated via RH sensor & PLC • PLC for lighting and irrigation control
17.	**Growing Systems**	1. Should Provide **Vetical A- Frame** Growingracks (5 levels) based on Nutrient Film Technique technique that adheres to the following: a. UV stabilized white colour food grade material using Calcium Zinc Stabiliser. b. Minimum Plant spacing: 5" c. The system shall be recirculating type d. A-Frame dimension 10ft long x 6ft high x 5ft wide e. Vertical A-frame growing racks should cover 30% area. f. All necessary pumps, tanks and other accessories required for operation shall be ISI marked and of reputed make. 2. Should provide **Vertical growing towers** as per the following specs: a. Grow Towers made of food grade material. b. Growtowers system to cover 30% area. c. Grow towers to be self-irrigation type with – 40 plant capacity per tower. d. Grow towers to be of octagon shape with approx.. dimensions: 6ft high x 2 ft base diameter 3. Vertical overlapping multilayer NFT system with grow light – ▶ Galvanized Iron metal frame – 3mm thickness ▶ NFT UPVC channel – Lead free – Open able top – 2mm thickness – ▶ size 100x60mm ▶ Grow light over each NFT channel – 200 to 300 PAR at 12 inches – 15-18 watt per 4 ft length. ▶ Plant Capacity – 11500 4. NFT vertical 'A' frame system Openable top- ▶ NFT UPVC channel – Lead free – Openable top – 2mm thickness ▶ – size 100x60mm ▶ Galvanized Iron metal 'A' frame – 3mm thickness ▶ Plant capacity – 3400 5. Dutch bucket system-

		▶ UPVC Dutch bucket – 11ltr capacity – with lid and net pot ▶ 16mm lateral pipe drip line ▶ 2LPH pressure controlled dripper ▶ Base stand for Dutch bucket ▶ Costed wire Trellising complete system with clips and thread ▶ Plant Capacity - 430
18	Fertigation and auto dosing system with automation	Fertigation-Irrigation control shall be Mixing Tank Based with the following features: • Controller: PLC based • User operating System: Touch Screen based operator Window • 4 Fertilizer dosing channels with capacity of 400 LPH • 1 Acid dosing channel with capacity of 100 LPH • EC control Module & pH Control Module • Multistage System Pump -Stainless Steel- 316 grade @ 2.2 Kw • Field control: Time intervals (Off & ON) can be done • Sampling (EC & PH) Schedules – • Field Valves control • Fertigation Dosing Control: Solenoid Valves – 4 Nos (A, B,C& Acid) • Flow monitoring- Flow indicators to be provided for each dosing channel • All necessary Pressure monitoring gauges, Pressure Relief Valves, non-return valves, internal control Valves and pressure piping. • Field valves shall be controlled automatically on time base with single or multiple at one time as a group. • Bypass mode operation
19	Pumping System	4 mono-block pumps of 2hp (for NFT) (2 Running 2 standby) One (1) mono-block pump 1.5hp each for cooling pad & Foggers 3Phase mono-block pump with Automation. All pumps BIS/ISO certified
20	Plumbing lines	▶ UPVC pipe of required diameter & length on pressure side. ▶ PVC pipe of required diameter & length on non pressure side.
21	Valves and Filters with Automation (BIS/ISO certified)	▶ 4 Solenoid valves with electric timer system. ▶ Manual control valve on each grow lane (UPVC). ▶ Disc filters of ½, 1, 2 & 3 inch capacity Timer- Automation timer for Pumps, Valves, Filter etc
22	Tanks Rain Water Harvesting System	Overhead Tank – All overhead tanks for dosing solution. 5 Tanks – 1000 ltr each 3layer (Nutrition) Underground Tank – - 3 Underground Tanks (each 5,000 ltr) - 1 Underground Tank for Raw and Rain water storage (5000 ltr) All gutters should be connected with hanging anchored PVC Pipes 3 inch dia to the covered RCC drain provided around the structure. The final outlet of drains should be connected to the underground water tank for rain water storage
23	RO Water Filtration	1000 ltr/hr capacity water filtration system with all accessories as per BIS guidelines Components: ▶ Raw water pump (1HP)

		▶ Sand Filter ▶ RO Membrane ▶ Micron filter (10 micron) ▶ UV Filter Tube (2 No.)
24	Automatic Weather Monitoring Station	Data logger based automatic weather station for measuring temperature, humidity, solar radiation, rainfall, ET, Wind Speed and Direction and additional CO_2 sensor
25	Chiller	3 ton capacity to keep nutrient water temperature within a range of 5-20 c for fresh as well as recirculated nutrient solution.
26	Germination Room	▶ GI stand ▶ UPVC germination tray – 200mtr (or as actual req.) for 25 day plants. ▶ Automatic water circulation / sprinkle system (including storage tank).
27	Desktop WITH Colored Printer & Scanner	INTEL 7 PROCESSOR. 16GB RAM, 2 TB HARD DISK, WINDOW 10 LICENSED, MS OFFICE LICENCE, 21 INCH SCREEN, I KVA UPS, All accessories included
28	LAPTOP	INTEL 7 PROCESSOR. 16GB RAM, 1 TB HARD DISK, WINDOW 10 LICENSED, MS OFFICE LICENCE, 21 INCH SCREEN, I KVA UPS, DISPLAY 15 INCH, All accessories included

Special Instructions to the Contractors/Bidders for the e-submission of the bids online through this e-Procurement Portal

1. Bidder should do Online Enrolment in this Portal using the option Click Here to Enroll available in the Home Page. Then the Digital Signature enrolment has to be done with the e-token, after logging into the portal. The e-token may be obtained from one of the authorized Certifying Authorities such as eMudhraCA/GNFC/IDRBT/MtnlTrustline/SafeScrpt/TCS.
2. Bidder then logs into the portal giving user id / password chosen during enrolment.
3. The e-token that is registered should be used by the bidder and should not be misused by others.
4. DSC once mapped to an account cannot be remapped to any other account. It can only be Inactivated.
5. The Bidders can update well in advance, the documents such as certificates, purchase order details etc., under My Documents option and these can be selected as per tender requirements and then attached along with bid documents during bid submission. This will ensure lesser upload of bid documents.
6. After downloading / getting the tender schedules, the Bidder should go through them carefully and then submit the documents as per the tender document, otherwise, the bid will be rejected.
7. The BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant coulmns, else the bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.
8. If there are any clarifications, this may be obtained online through the e-Procurement Portal, or through the contact details given in the tender document. Bidder should take into account of the corrigendum published before submitting the bids online.
9. Bidder, in advance, should prepare the bid documents to be submitted as indicated in the tender schedule and they should be in PDF/XLS/RAR/DWF formats. If there is more than one document, they can be clubbed together
10. Bidder should arrange for the EMD as specified in the tender. The original should be posted/couriered/given in person to the Tender Inviting Authority, within the bid submission date and time for the tender
11. The bidder reads the terms and conditions and accepts the same to proceed further to submit the bids.
12. The bidder has to submit the tender document(s) online well in advance before the prescribed time to avoid any delay or problem during the bid submission process.
13. There is no limit on the size of the file uploaded at the server end. However, the upload is decided on the Memory available at the Client System as well as the Network bandwidth available at the client side at that point of time. In order to reduce the file size, bidders are suggested to scan the documents in 75-100 DPI so that the clarity is maintained and also the size of file also gets reduced. This will help in quick uploading even at very low bandwidth speeds.
14. It is important to note that, the bidder has to Click on the Freeze Bid Button, to ensure that he/she completes the Bid Submission Process. Bids Which are not Frozen are considered as Incomplete/Invalid bids and are not considered for evaluation purposes.
15. In case of Offline payments, the details of the Earnest Money Deposit(EMD) document submitted physically to the Department and the scanned copies furnished at the time of bid submission online should be the same otherwise the Tender will be summarily rejected.
16. The Tender Inviting Authority (TIA) will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues.
17. The bidder may submit the bid documents online mode only, through this portal. Offline documents will not be handled through this system.
18. At the time of freezing the bid, the e-Procurement system will give a successful bid updation message after uploading all the bid documents submitted and then a bid summary will be shown with the bid no, date & time of submission of the bid with all other relevant details. The documents submitted by the bidders will be digitally signed using the e-token of the bidder and then submitted.
19. After the bid submission, the bid summary has to be printed and kept as an acknowledgement as a token of the submission of the bid. The bid summary will act as a proof of bid submission for a tender floated and will also act as an entry point to participate in the bid opening event.
20. Successful bid submission from the system means, the bids as uploaded by the bidder is received and stored in the system. System does not certify for its correctness.
21. The bidder should see that the bid documents submitted should be free from virus and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.
22. The time that is displayed from the server clock at the top of the tender Portal, will be valid for all actions of requesting bid submission, bid opening etc., in the e-Procurement portal. The Time followed in this portal is as per Indian Standard Time (IST) which is GMT+5:30. The bidders should adhere to this time during bid submission.
23. All the data being entered by the bidders would be encrypted at the client end, and the software uses PKI encryption techniques to ensure the secrecy of the data. The data entered will not be viewable by unauthorized persons during bid submission and not viewable by any one until the time of bid opening. Overall, the submitted bid documents become readable only after the tender opening by the authorized individual.
24. During transmission of bid document, the confidentiality of the bids is maintained since the data is transferred over secured Socket Layer(SSL) with 256 bit encryption technology. Data encryption of sensitive fields is also done.
25. The bidders are requested to submit the bids through online eProcurement system to the TIA well before the bid submission end date and time (as per Server System Clock.

The following documents (Scan copy) must be furnished upload with the technical bid failing which tender will not be accepted at all.

1. GST registration/ PAN card copy
2. Registration certificate of CPWD, MES, Railways, MCD, PWD or other Central/State Govt./Semi Govt.
3. Certificate declaring that the firm has not been debarred/Black listed by the Govt. Deptt./Court of law for doing any business in India.
4. Bid Security Declaration Document
5. The tender documents duly signed by the concerned firm accepting the same should be attached with technical bid.
6. The firm should have experience of two similar nature of works in last three years. Firm should submit experience certificate/ orders in support.
7. Income tax return for last 3 financial years (2018-19, 2019-20 &2020-21) must be attached.
8. Annual financial turnover of the firm for each year should be minimum Rs. 5 crore or above for last 3years. The bidder has to submit the copies of audited balance sheet for the year of (2018-19, 2019-20 &2020-21).
9. Firm / companies should have ISO 9001:2015, 14001: 2015.
10. The Firm /company should have prior experience of 7 years or above for the construction of similar items. Copies of work orders must be enclosed along with the technical bid. Agency should have executed two similar works of value Rs. 45.00 lacs & above or one work of Rs. 60.00 lacs and above.
11. samples of all required items must be submitted before due due of opening of tender.

FORMAT OF BID SECURITY DECLARATION FROM BIDDERS IN LIEU OF EMD

(On Bidders Letter head)

I / We, the authorized signatory of M/s....., participating in the subject tender No. .....for the item / job of ....., do hereby declare :

- That I / we have availed the benefit of waiver of EMD while submitting our offer against the subject Tender and no EMD being deposited for the said tender.
- That in the event we withdraw/modify our bid during the period of validity Or I/we fail to execute formal contract agreement within the given timeline OR I/we fail to submit a Performance Security within the given timeline Or I/we commit any breach of Tender Conditions/ Contract which attracts penal action of forfeiture of EMD and I/we will be suspended from being eligible for bidding / award of all future contract(s) of ME Unit, Directorate, IARI, New Delhi-11012 for a period of one year from the date of committing such breach.

Signature and Seal of Authorised Signatory of bidder

Name of Authorized Signatory.....

Company Name.....

CERTIFICATE TO BE SIGNED BY THE TENDERER

It is certified that I have read and understood and will comply with all instructions contained in Terms & conditions of this tender documents. All pages submitted with this tender document from page ____ to ____ have been filled properly and signed with seal of the firm/company.

Signature of tenderer: .....

Name in block letters: .....

Name of firm: .....

Full address: .....

.....

i) Telephone No. : .....

ii) Mobile No. : .....

iii) Fax No. : .....

iv) Email ID : .....

Signature of Tenderer with office seal