**INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE**
2A & 2B, Raja S.C. Mullick Road, Kolkata-700032, West Bengal, India.
Phone: 2473 4971/3372/3073, Fax (91) (33) 2473 2805, e-mail: wssb@iacs.res.in

**NIT NO.: IACS/WS/SB/16-17/ 97 DATE: - 28/02/2017**

**NOTICE INVITING TENDER**

Sealed Item Rate tenders in **TWO ENVELOPE SYSTEM (viz. Technical Bid & Financial Bid**) are invited from bonafide, resourceful and eligible bidders for the work of **" Supply, Installation, testing & commissioning of Standalone Solar Street Lighting System with LED Light Fittings along the Campus street from Main Gate No. 2 to Gate No. 4 near residential complex at IACS, Jadavpur, Kolkata".** The work is estimated to cost **Rs 8,98,170/- (Rs. Eight Lakhs Ninty Eight Thousand One Hundred Seventy only).** The tender will comprise of the items like ***Earnest Money Deposit in proper form & shape, copy of eligibility documents (i.e. Credential), copy of PAN Card, copy of valid MNRE approval , copy of valid trade license, Company profile and any other document in support of technical capability along with quoted price with respect to the Bill of Quantities (BOQ) provided with the tender document.***

**The minimum eligibility criteria for the bidders will be as follows:**

**(1) Completion of one similar work of value not less than 80% of the estimated cost put to tender under Government, Semi-Government, PSU, Govt. funded Autonomous Body, Large Commercial House, Corporate Sector, Educational Institute during the last 3 (three) years to be reckoned from the date of issue of the NIT.**

**(2) Completion of two similar work of value not less than 60% of the estimated cost put to tender under Government, Semi-Government, PSU, Govt. funded Autonomous Body, Large Commercial House, Corporate Sector, Educational Institute during the last 3 (three) years to be reckoned from the date of issue of the NIT.**

**(3) Completion of three similar work of value not less than 40% of the estimated cost put to tender under Government, Semi-Government, PSU, Govt. funded Autonomous Body, Large Commercial House, Corporate Sector, Educational Institute during the last 3 (three) years to be reckoned from the date of issue of the NIT.**

**(4) The bidder should be an approved Channel Partner/PV System integrator/registered manufacturing Company/Firm/Corporation in India manufacturing at least one of the major components of Solar Street Light System of Ministry of New and Renewable Energy, Govt. of India.**

**(5) Authorized dealers, companies/firms/corporations and subcontractors are not eligible to participate in the bid.**

**(6) The bidder must be in possession of valid Test Report of LED based SSLS from any of the following test centers:-**

**(i) Solar Energy Centre-State/Central, (ii) Electronics Regional Test Laboratory-Kolkata, West Bengal, (iii) Central Power Research Institute, Bangalore, (iv) Any other test centre approved by MNRE. The latest TC should confirm that, Solar**

**Street Lighting system are as per MNRE Spec. which are available on MNRE web-site. The Test Certificate issued before April'2012 not acceptable.**

**Similar work shall mean** the **Work consisting of SITC of standalone type Solar Lighting System, Installation of Street Light Pole, earthing** etc. preferably in research Centre/ educational institute/ Central or State Govt. Project, Large Commercial House, Corporate Sector, Educational Institute etc.

**The Earnest Money Deposit of Rs. 17,970/- (Rupees Seventeen Thousand Nine Hundred Seventy only)** to be submitted with the tender in the form of **Demand Draft/Banker's Cheque/Pay Order** of a schedule Bank to be drawn in favor of "**Indian Association for the Cultivation of Science" payable at Kolkata** failing which the tender shall be treated as cancelled.

The stipulated **time of completion of this work is 30 ( Thirty) days from the date of receiving the Work Order**.

**Cost of Tender Form : Rs. 500/-** per set (nonrefundable) by cash.

**Tender Issue Date : 02.03.2017 to 09.03.2017** (up to 2.00 P.M. on each working day)

**Last date of application:** **08.03.2017 (up to 2.00 P.M.).** Application should be made on printed letterhead of the firm mentioning the NIT no. & Name of work).

**Last date of Submission of Tender: 09.03.2017 (up to 2 PM**). **Complete Tender Form along with EMD in a sealed envelop super scribing the name of the work, NIT no. and due date of opening on the top of the envelop addressed to the Registrar, IACS, Jadavpur, Kolkata 700032 to be submitted to the Receiving/despatch Section of IACS.**

**Date of Opening** : The **Technical Bid** will be opened on **09.03.2017 (at 3.00 P.M in presence of the intending bidders).** The **Financial Bid** will be opened subsequently with prior intimation to the technically qualified bidders only after evaluation of Technical Bid. If holiday is declared on the schedule date of opening, the tenders will be opened on the next working day at the same time in presence of the intending bidders.

**Acceptance of Tender :** IACS authority is not bound to accept the lowest Tender and reserves the right to reject any or all the tenders without assigning any reason thereof.

**Details of Bid Documents**:

(i) **The Technical Bid (i.e. Envelope-I**) shall consists of the following documents:

(a)Earnest Money Deposit (EMD) in proper form and shape,

(b) Proof of Eligibility Criteria,

(c ) Photo copy of PAN card, Valid Trade License, ESI & EPF registration certificate, Service Tax registration certificate, VAT registration Certificate, Professional Tax registration certificate, IT return copy for the last three financial years, Bank solvency certificate for Rs. 10 lakhs, Company profile etc. & any other papers found to be suitable in support of their technical competency.

(d) Other papers/drawings of tender documents duly signed **except Financial Bid**.

(ii) **The Financial Bid (i.e. Envelope – II)** shall consists of the following documents

Schedule of Works along with Bill of Quantity as provided with the tender documents. The rate should be quoted in figure and word both. (b) Bank Account Details of the firm mentioning the Beneficiary name, Account Number, Bank Name, Branch Name, IFS Code & MICR Code.

**Other terms & conditions:**
The EMD shall be treated as part of the security deposit (10% of the total bill value shall be retained by IACS as Security Deposit) for the successful bidder. Tender submitted without EMD or EMD not in proper form & shape shall be summarily rejected. The Security Deposit will be released after twelve months from the date of successful completion of work. The EMD for unsuccessful bidders will be refunded on demand after finalization of work order.

Deviation limit for individual item, trade and contract as a whole is **25% (twenty five percent).** However, the department reserves the right to execute in part or whole and can drop any item of the "schedule of work" of the tender. No claim whatsoever will be entertained in this regard.

If the contractor fails to maintain the required rate of progress or to complete the work and clear the site on or before the contract or extended date of completion, he shall without prejudice to any other right or remedy available under the law, pay compensation the amount calculated at the rates stipulated below or such smaller amount as the Director may decide (whose decision in writing shall be final and binding) on the amount of the tendered value of the work for every completed day / week (as applicable ) that the progress remains below or that the work remains incomplete.

i) Completion period not exceeding 30 days (stipulated) @1% per week or part thereof provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 5% of the tendered value of work.

The Engineer in Charge may without prejudice to his any other rights or remedy against the contractor in respect of any delay, inferior workmanship, any claims for damages and / or any other provisions of this contract or otherwise, and whether the state of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases.

i. if the contractor fails to rectify/replace the defects in spite of written notice by Engineer – in-Charge
ii. If the contractor suspends the progress of work so that in the opinion of the Engineer-in-Charge he will be unable to secure completion of the work by the date of completion and do not improve performance even after written notice.
iii. If the contractor neglects to carry out his obligation under the contract and / or commits defaults in complying with any of the terms and conditions and does not remedy if even after written notice.

When the contractor has made him liable for action under any of the aforesaid cases, the Engineer-in-Charge on behalf of IACS shall have powers

a. To determine or rescind the contract. Upon such rescission, the full security deposit recoverable under the contract shall be liable to be forfeited and shall be absolutely at the disposal of IACS.
b. After giving notice to the contractor to measure up the work done by him, get the balance work done by another contractor. Any expenses which may be incurred in excess of the sum which would work had been executed by him, shall be borne and paid by the original contractor and may be deducted from any of his dues.

Complete Tender Document will also be available on the Web-site of IACS at www.iacs.res.in which may be downloaded for submission. The downloaded tender must contain the requisite tender fees of **Rs. 500/-** (Rupees Five Hundred only) in the form of Demand Draft (nonrefundable) / Pay Order/ Bankers Cheque in a Separate Envelope failing which the tender shall be cancelled.

**Conditional tender including conditional rebates shall be summarily rejected.**
**The quoted rate shall be inclusive of all taxes & duties, levies, cess etc i/c service tax also.** Nothing extra will be paid to the Contractor except the accepted rate.

In case of any discrepancies, the office copy of the tender document will be referred and shall be binding to the contractor.

**Copy to:**

i) Doffice, IACS
ii) Roffice, IACS **ACTING REGISTRAR**
iii) Workshop Superintendent, IACS
iv) In-Charge, Elect. Engg. Section, IACS
v) Engineer-I, Civil Engg. Section, IACS
vi) F&AO, IACS-He is requested to allocate the fund before placement of Work Order.
vii) In-Charge, Computer Centre-He is requested to upload this tender document in IACS website.
viii) Security Officer, IACS
ix) Notice Board

## TENDER DECLARATION

I/We have read and examined the notice inviting tender schedule of quantities, terms and conditions and all other contents of the tender document.

I/We hereby tender for execution of the work as per schedule of quantities as per specification, drawing and instructions.

I/We agree to keep the tender open for Ninety days from the date of submission and not to make any modifications in its terms and conditions.

A sum of Rs._____ is hereby forwarded in Demand Draft/ Bankers cheque of a Scheduled Bank as earnest money which shall be retained by IACS towards security Deposit to execute all the works as per schedule of quantities.

I/We agree that should I/We fail to commence the work specified in the schedule of quantities an amount equal to the amount of the earnest money mentioned above shall be absolutely forfeited to the IACS without prejudice to any other right or remedy available in law.

Date_____ Signature of Contractor

Postal address

Witness _____

Address/Occupation _____

_____

_____

**Acceptance**

The above tender is accepted by me for and on behalf of Indian Association for the Cultivation of Science for a sum of Rs._____ (Rupees _____ _____ _____). The letters referred to below shall form part of this contract agreement.

a) _____

b) _____

For and on behalf of
Date :_____ Indian Association for the Cultivation of Science

Signature

_____

Designation

_____

## SECTION - 1
## SPECIAL CONDITIONS OF CONTRACT

### 1.1 General

1.1.1 These Special Conditions of Contract supplement the General Instructions. General Conditions of Contract, Bill of Quantities and basic rates and Technical Specifications and tender drawings enclosed thereto, and shall be considered as part of the Tender Papers. Where the provisions of these Special Conditions of Contract are at variance with General Conditions of Contract, the Provisions of these Special Conditions of Contract shall prevail.

1.1.2 The several documents forming the tender are to be taken as mutually complementary to one another. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scaled dimensions.

1.1.3 If there are varying or conflicting provisions in the documents forming part of the contract, the Engineer-In-Charge shall be the deciding authority with regard to the intentions of the provisions and his decision shall be final and binding on the contractor.

1.1.4 The Employer reserves the right to exclude any of the Schedule items on reasons of the rates not being reasonable or subsequent change of design for evaluation of tender and deciding the contract during execution or work.

1.1.5 The Contractor may be required to carry out any addition or alteration work other than the specified in the schedule of work / bill of quantities as and when required, by the 'Employer' within the completion period of the project.

### 1.2 Execution of work

1.2.1 All the works to be carried out as per the approved drawing and direction of the Engineer- In-Charge.

1.2.2 Water & Power supply: - It will be provided by IACS free of cost for the beneficial use of IACS only. However, the contractor shall have to arrange for utilizing the same at their cost and risk.

**1.3 Period of Completion**

1.3.1 Time is the essence of contract. Therefore, timely completion of project is very important. Normally no extension of time will be given. However, on account of delay if any, for the reason beyond the control of the contractor, necessary time extension may be granted if applied for by the contractor prior to the expiry of schedule time of completion.

*1.3.2* No price variations shall be admissible on the contract rate for any item during the entire period of contract including extension periods. *The Contractor shall not have any claim whatsoever in this regard except statutory variation of duties and Taxes imposed by Govt. of India/State Govt subsequent to the offer submitted by the contractor.*

**1.4 Quality of materials and works**

All the materials to be used in the execution of the contract shall be of the approved quality and of the class most suited for the purpose specified. The work shall also conform to the following Acts, Rules and Orders:

i) Indian Factories Act
ii) Indian Electricity
iii) National Building Code
iv) National Electrical Code
v) Indian Standard Specifications

1.4.1 All erection work shall be of the best workmanship & quality to the entire satisfaction of the Employer. The Contractor shall ensure that the equipment and services under the scope of this contract whether manufactured or performed within the Contractor's premises or at his subordinate's premises or at the work site or at any other place are strictly in accordance with the provisions of this contract. For this purpose, if necessary the Contractor shall adopt necessary quality assurance programme to control such activities at all stages.

**1.4.2 The contractor shall not be allowed to engage sub-contractor directly or indirectly unless it is officially permitted by IACS.**

## 1.5 Inspection

1.5.1 The Contractor shall provide without any extra cost to the Employer all materials, equipment, tools, labour and maintenance of every kind which the Employer's Inspecting Engineer may consider necessary for any test and examination to be made at the Contractor's or the Sub-Contractor's (if approved) premises and at site and shall pay all cost attended thereon.

1.5.2 All the equipment and materials shall be tested / inspected by the Employer or its authorized Inspecting Engineer and approved before they are installed / used in the execution of the works covered in the contract. If the Contractor uses any equipment / materials without the prior approval of Employer, those are liable to be rejected. The Contractor shall furnish, as and when demanded by the Engineer-in-Charge the T.C. (Test Certificate) and G.C (Guarantee Card) for verification of quality and make of the materials.

1.5.3 The Inspecting Engineer or his authorized Representative shall have at all times access to the Contractor's premises and shall have the power to

i) Inspect and examine the materials and workmanship of the work at any time at the site of erection

ii) Reject any part of the work submitted by the Contractor as not being in accordance with the contract.

iii) Reject the whole of the work including equipment tendered for inspection if after the inspection of such portion as he may, in his discretion think fit he is justified that the same is unsatisfactory.

iv) Mark the rejected equipment with a rejection mark so that the same may be easily identified

v) Re-inspect at the time of erection at site any equipment both previously inspected and approved by the inspecting Engineer at the Contractor or Sub-contractor's (if approved) premises. Not withstanding any approval given earlier, the Contractor shall make good such rejections made based on such re-inspection at site to the satisfaction of the Engineer.

vi) The decision of the Inspecting Engineer as regards to the acceptance or rejection of equipment / work shall be final and binding to the Contractor.

1.5.4 Consequence of Rejection

On the equipment / assemblies being rejected by the Inspecting Officer of the Employer at destination of the Contractor shall replace such rejected equipment/assemblies of the forthwith but in any event not later than a period of 2 (two) weeks in the case of minor equipment and 4(four) weeks in case of a major equipment from the date of rejection. The Contractor shall bear all the costs of replacement including freight, etc., but without being entitled to any extra time on this account. The decision as to whether the equipment is to be classified as Minor or Major for the purpose of this clause shall be that of an Engineer and is not questionable.

**1.6 Installation**

**1.6.1** All works connected with and inclusive of installation and erection under this contract shall be done in accordance with the standard and established methods of installation and erection of electrical equipment and shall comply with relevant Indian Electricity Rules, National Electrical Code, BIS Codes of Specifications and Standards. The work shall also be strictly in accordance with the instructions / recommendations of the manufacturers. **The equipment shall be leveled carefully before being fixed finally in position. All fragile and sensitive equipment shall be protected adequately and handled carefully during installation and erection.**

**1.7 Commissioning Tests**

1.7.1 As soon as the installations are ready for commissioning, the Contractor shall arrange for all the tests/ inspection as required by the relevant ISS and / or IE Rules and advise the Employer and others concerned. Employer shall depute their Inspecting Officer for witnessing the tests and to carry out inspection independently and also jointly with other concerned agencies where ever necessary and only after the installation passes the required tests and inspection, it should be commissioned / energized. The contractor shall arrange all testing equipments/apparatus/instruments as will be required for conducting the tests without any extra cost.

1.7.2 Visual Inspection shall include checks for satisfactory workmanship, all connections, painting, cleanliness of all fittings etc., and compliance with Indian Standard Specifications.

1.7.3 (i) Manufacturer's test Certificates shall be furnished on demand.
(ii) Certificates of compliance to routine test shall also be furnished.
(iii) Routine tests certificates are required to be submitted.

1.7.4 Earth resistant shall be measured separately for each earth electrode.

2 **Warranty: -** The contractor shall stand guarantee that all the equipments and the works executed under this contract shall be free from all defects and faults in materials, design, workmanship and manufacture and shall be acceptable standards for the contracted works and in full conformity to the technical specifications, drawings and other contract stipulations for a period of 12 months from the date of completion of the project.

3 Completeness of tender: -
All sundry fittings, assemblies, accessories, hardware items, foundation bolds, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various component of the work shall be deemed to have been included in the tender whether such items are specifically mentioned in the tender documents or not.

4 Works to be done by the Contractor: - Unless and otherwise mentioned in the tender documents, the following work shall be done by the contractor, and therefore, their cost shall be deemed to be included in their tender cost

i) Cutting and making goods all damages caused during installation and restoring the same to their original finish.
ii) Painting of poles, MS angle / bracket or any other fitting etc.

5 Tools for handling and erection: - all tools and tackles required for handling of equipments and materials at site of works as well as for their assembly and erection and also necessary testing instruments shall be responsibility of the contractor.

**6 Workmanship :**

i) Good workmanship is an essential requirement to be complied with. The entire work of manufacture / fabrication, assembly and installation shall conform to sound engineering practice involving highly skilled workers.

ii) The work shall be carried out under the direct supervision of a highly experienced Supervisor, for the type of work involved, employed by the contractor, who shall rectify the defects pointed out by the Engineer-in-charge during the progress of work.

**i. General requirements and components: -**

i) **Quality of Materials**: -
a) All the materials and equipments supplied by the contractor shall be new. They shall be of such design, size and materials as to satisfactorily function under the rated condition of operation and to withstand the environmental conditions at site.

b) All the components shall conform to relevant IS specification wherever existing. Materials with ISI certification marked shall be preferred if not otherwise mentioned the tender.

**c)** For items of materials for which makes are approved by the Dept., only such approve makes shall be permitted in the work in accordance to the preference of the Engineer-in-Charge of the employer.

d) **Commissioning on completion:** Before the workman leaves the work finally, the contractor must be sure that the installation is ready for commissioning after due testing.

**7 Completion plan and completion certificate**

i) For all the works, completion certificate after completion of work shall be submitted to the Engineer In-Charge.

ii) 'As built' drawing to be submitted along-with Test/completion certificate which is an essential part for consideration of final bill.

8 **Payment terms & conditions**:

(a) 60% amount of the work value shall be paid against supply & delivery of supply items in good condition after submission of Original Commercial Invoice raised by the Contractor in Triplicate (1+2) along with delivery challan of supply items & duly certified, measured and recorded in MB by IACS officials treated as a "1st R/A" Measurement cum Bill.

(b) Balance 40% amount of the work value shall be paid after satisfactory Installation, Testing & Commissioning of the entire work at site after submission of Original Commercial Invoice raised by the Contractor in Triplicate (1+2) along with all required documents as per Work Order & duly certified, measured and recorded in MB by IACS officials treated as a "2nd R/A and Final" Measurement cum Bill.

(c) The Security Deposit @ 10% will be deducted by IACS from the each R/A Bill of the Contractor.

**NOTE**: No price escalation due to any reason (including any change in the applicable Taxes, Duties, Surcharge etc.) shall be considered by IACS during the validity/extended validity of the Contract Agreement.

## SECTION - 2
## GENERAL TERMS AND CONDITIONS

1. Submission of a tender/quotation by a tenderer/ quotationer implies that they have inspected and examined the site and its surroundings and satisfied themselves as to the nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves, obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender.

2. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools and plants, water electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract document.

3. The tender/quotation for the work shall remain open for acceptance for a period of thirty days from the date of opening of tender/quotation. If any tenderer withdraws his tender before the said period or makes any modifications in the terms and conditions of the tender which are not acceptable to IACS, then the IACS shall without prejudice to any other right or remedy be at liberty to forfeit 50% of the said earnest money as aforesaid.

4. All conditions/terms listed under "Terms and conditions" are applicable for all tenders/ quotations.

5. The successful tenderer /contractor, on acceptance of his tender by the accepting Authority, shall, within 7 days from the stipulated date of start sign this contract/agreement.

6. The Director, Indian Association for the Cultivation of Science (IACS) does not bind himself to accept the lowest or any tender and reserves to himself the authority to reject any or all tenders received without the assignment of any reason.

## SECTION - 3
## General Rules and Directions

1. The tenderer shall fill in the rates both in words and figures. The amount against each item is also to be filled in. In case of any discrepancy, the rates quoted by contractor in words shall be taken as correct.
2. Sales Tax, purchase tax, turnover tax or any other tax on material in respect of this contract shall be payable by the contractor. IACS will not entertain any claim whatsoever in respect of the same. The quoted rate shall be inclusive of all taxes and duties i.e. cess, surcharge etc. Nothing extra shall be paid in addition to the quoted rate.
3. Canvassing whether directly or indirectly in connection with tenders is strictly prohibited and the tender submitted by the contractor who resorts to canvassing will be liable to rejection.
4. The contractor whose tender is accepted will be required to furnish by way of Security Deposit for the fulfillment of his contract, an amount equal to 10% of the tendered value of the work. The Security Deposit will be collected by deductions from the running bills and Final bill of the contractor at the rates mentioned above and the earnest money if deposited in cash at the time of tenders will be treated as part of the Security Deposit.
5. On acceptance of tender, the name of the accredited representative of the contractor who would be responsible for taking instructions from the Engineer in Charge shall be communicated in writing to the Engineer in Charge.
6. All the works shall be carried out as per Indian standard specifications of B.I.S./ Specification laid down by IACS is to be followed.
7. The time allowed for execution of the work or the extended time in accordance with these conditions shall be the essence of the contract.
   In case of any event causing delay for which the contractor is not responsible, the contractor shall immediately give notice thereof in writing to the Engineer in charge but shall nevertheless make best endeavors to prevent or make good the delay.
   The Director, IACS may consider the notice and allow suitable extension of time for completion of work.
8. The contractor shall submit "running account bill" and final bill in triplicate supported by detailed measurements and shall provide necessary assistance, Labour and tools for checking the measurement and quality of work.
9. The contractor shall execute the whole and every part of the work in the most substantial and workman like manner both as regards materials and otherwise in every respect in accordance with specifications. Unless otherwise given in the Contract documents the specification will mean standard specification of Central Public Works Department corrected up to date, Bureau of Indian Standard Specifications, and/or any other published standard or code.
10. The Engineer in Charge shall have the power to make alteration in, omission

from, additions to, or substitutions for the original specifications drawings, design and instructions that may appear to him to be necessary or advisable.

The rates for such altered, additional or substituted work shall be determined by the Engineer in Charge as under.

(i) Rate entered in the schedule of rates mentioned in the award letter Plus/minus the percentage by which the tendered amount of the works awarded is higher or lower than the corresponding estimated amount.
(ii) Market rates.

11. Deviation limit for individual item, trade and contract as a whole, is 25% (twenty five percent). No claim whatsoever will be entertained in this regard.

12. The contractor shall provide all necessary superintendence during execution of work and as along there after as may be necessary for proper fulfilling of the obligations under the contract.

13. Security deposit will be refunded to the contractor if no complaint is pending on Record till after 12 (twelve) months after completion of the work and no labour complaint is pending against the contractor in respect of the work.

14. The contractor shall pay their workers as per the provisions of Minimum wages Act fixed and notified by the Government from time to time.

(i) No person below the Age of 14 years shall be employed to act as a workman.

(ii) First AID Box shall be made available by the contractor at all work sites.

(iii) The contractor shall provide all safety measures to his workmen like working platform, suitable scaffolding, gangways, ladder, helmets, gumboots, gloves safety belts, insurance coverage etc. according to the situation and nature of work.

(iv) In every case where compensation is to be paid to a workman employed by the contractor, as per provisions of Workmen's Compensation Act. The contractor shall arrange to pay such compensation in full and IACS will recover the same from the dues and/or security deposit of the contractor and make arrangement to pay the same to the concerned.

15. In case of any dispute arising out of this contract during the progress of the work or after the cancellation, termination, completion or abandonment, the decision of the Director, IACS, shall be final and binding on the contractor.

It is also a term of the contract that if the contractor does not raise any claim in writing within 90 days from the date of cancellation, termination, completion or abandonment, the claim of the contractor shall be deemed to have been waived and absolutely barred and IACS shall be discharged and released of all its liabilities under the contract in respect of these claims.

# SECTON - 4

| SCOPE OF WORK | | | |
|---|---|---|---|
| **Name of work: "Supply, Installation, testing & commissioning of Stand alone Solar Street Lighting System with LED Light Fittings along the Campus street from Main Gate No. 2 to Gate No. 4 near residential complex of IACS Campus, Jadavpur.** | | | |
| | | | |
| **Sl. No.** | **Description of Work** | **Qty** | **Unit** |
| 1 | **Stand alone type Solar Lighting System :** | | |
| a) | Supply of following materials for providing Stand alone type Solar Lighting System with 3 days Autonomy Dusk to Dawn micro controller operation comprising with (a) 5.0 m hight GI pole (medium class) of 65mm dia GI pipe (Make: TATA / Zindal or equivalent) along with necessary base and top plate, (b) Luminarie having Aluminium Pressure Die-casted housing conforming to IP-65 protection including supply of 18 watt LED lamp (Make: Philips /Crompton /Osram/Havells/MESCAB), (c) PV Module of 12V/80Wp (Make: Delta Power / Webel Solar /Evergreen Solar or equivalent), (d) SMF Battery (VRLA) of 12V/100 Ah (Make: Exide/Amara Raja/TATA Green or equivalent) alongwith Battery box, (e) Suitable rated Inverter cum charge controller (Make: Delta Power / SMA or equivalent), comlete with all other accessories viz. connecting wires / cables, switches etc.as required to comlete the job in all respects as per the direction of Engineer in Charge.<br>**Note: (i) All items should be maintained ISI marked, (ii) The system lights at dusk and switches off at dawn automatically.** | 20 | sets |
| | **Installation, Testing & Commissioning :** | | |
| b) | Erection of above GI pole in cement concrete1:3:6 (1 Cement:3 sand and :6 Graded Stone aggregate 40mm nominal size) foundation (size:1000mm depth x 400mm dia.) including excavation and refilling and secured with holding clamps, bolts, nut, etc. as required under the direction of the Engineer-in-Charge. | 20 | Job |
| c ) | Providing and making GI Pole collar with cement concrete (1 Cement : 3 coarse sand and :6 Graded stone aggregate 20mm) of size and shape(600mm hight x 300mm dia.) including plastering etc. as required under the direction of the Engineer-in-Charge. | 20 | each |
| d) | Testing and commissioning of above Stand alone Solar Street Lighting System including connections / terminations of wires /cables etc. as required to complete the same in all respects as per direction of the Engineer-in-Charge. | 20 | each |
| 2 | **Earthing: -** | | |
| a) | Providing Earthing with 25mm dia 2m long G.I. earth spike as per relevant IE rules viz. IS:3043 under the direction of the Engineer-in-Charge. | 20 | sets |
| b) | Providing Earth Conductor with 6 SWG GI wire from earth electrode to poles in 15mm dia medium class GI pipe as per IS: 3043 including excavation & refilling as per direction of the Engineer-in-Charge. | 50 | Mtr |

# SECTION – 5

## TECHNICAL SPECIFIICATIONS & MANUFACTURER'S WARRANTY

A standalone solar photo voltaic street lighting system (SLS) is an outdoor lighting unit used for illuminating a street or an open area. The Solar Street Llighting System consists of solar photovoltaic (SPV) module, a luminaire, storage battery, control electronics, inter-connecting wires / cables, module mounting pole including hardware and battery box. The luminaire is based on White Light Emitting Diode (W)LED), a solid state device which emits light when electric current passes through it. The luminaire is mounted on the pole at a suitable angle to maximize illumination on the ground. The PV module is placed at the top of the pole at an angle facing south so that it receives solar radiation throughout the day, without any shadow falling on it . A battery is placed in a box attached to the pole.

Electricity generated by the PV module charges the battery during the day time which powers the luminaire from dusk to dawn. The system lights at dusk and switches off at dawn automatically.

### BROAD PERFORMANCE SPECIFICATIONS

| | |
|---|---|
| **PV MODULE** | **80 WP** |
| **BATTERY** | **SMF BATTERY (VRLA), 12V / 100 AH.** |
| **LIGHT SOURCE** | **WHITE LIGHT EMITTING DIODE (W-LED), 18W** |
| **LIGHT OUT PUT** | **MINIMUM 15 LUX WHEN MEASURED AT THE PERIPHERY OF 4 METER DIAMETER FROM A HEIGHT OF 4 METER. THE ILLUMINATION SHOULD BE UNIFORM WITHOUT DARK BANDS OR ABRUPT VARIATIONS, AND SOOTHING TO THE EYE. HIGHER LIGHT OUTPUT WILL BE PREFERRED.** |
| **MOUNTING OF LIGHT** | **MINIMUM 4 METER POLE MOUNTED FROM GL** |
| **ELECTRONICS EFFICIENCY** | **MINIMUM 85% TOTAL** |
| **DUTY CYCLE** | **DUSK TO DAWN. THE SYSTEM SHOULD AUTOMATICALLY SWITCH IS ON AT DUSK, OPERATE THROUGHOUT THE NIGHT AND AUTOMATICALLY SWITCH IS OFF AT THE DAWN.** |
| **AUTONOMY** | **3 DAYS OR MINIMUM 42 OPERATING HOURS PER PERMISSIBLE DISCHARGE** |

## TECHNICAL DETAILS

## PV MODULE

- Indigenously manufactured PV module should be used.
- The PV module should have crystalline silicon solar cells and must have a certificate of testing conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited Laboratory.
- The power output of the module(s) under STC should be a minimum of 80Wp at a load voltage of 16.4±0.2V.
- The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
- The module efficiency should not be less than 12%.
- The terminal box on the module should have a provision for opening it for replacing the cable, if required.

- Each PV module must use a RF identification tag (REID inside the module laminate), which must contain the following information:

  - ✓ Name of the manufacturer of PV Module
  - ✓ Model or Type Number
  - ✓ Serial Number
  - ✓ Month and year of the manufacture
  - ✓ I-V curve for the module
  - ✓ Peak Wattage of the module at 16.4 volts
  - ✓ Im, Vm and FF for the module
  - ✓ Unique Serial No and Model No of the module

## BATTERY

- Battery shall be flooded electrolyte Tubular Lead Acid, Low Maintenance type with low antimony lead alloy plates and ceramic vent plugs. The batteries should conform to IS 1651/ IS 13369 A copy of the relevant test certificate for the battery should be furnished. The battery of reputed Indian make Exide, Amar raja, Tata Green (Tested by Central Electro-chemical research laboratory, CECRI, Tamilnadu for relevant IS 1651 / IS 13369/ EC 61427 standard) shall only be used.
- The battery will have a minimum rating of 12V, 100Ah at C/10 discharge rate.
- 75% of the rated capacity of the battery should be between fully charged and loaded cut off conditions.
- Battery should conform to the latest BIS/International standards.

## LIGHT SOURCE

- The light source will be a white LED type.
- The colour temperature of white LED used in the system should be in the range of 5500K-6500.

- W-LEDs should not emit ultra violet light.
- The light output from the white LED light source should be constant throughout the duty cycle.
- The lamps should be housed in an assembly suitable for outdoor use.
- The temperature of heat sink should not increase more than $20^0$C above ambient temperature during the dusk to dawn operation.
- High power LED of minimum 1 watt each capacity capable to withstand maximum 1 amp driving current having lens angle greater than 120 degree shall be used. The LED of Make or equivalent (Having LM67 and LM 20 test report) shall only be suede.

**ELECTRONICS**

- The total electronic efficiency should be at least 85%.
- Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.
- No Load current consumption should be less than 20mA.
- Th PV module itself should be used to sense the ambient light level for switching ON and OFF the lamp.
- The PCB containing the electronics should be capable of solder frère installation and replacement.
- Necessary lengths of wires/ cables, switches suitable for DC use and fuses should be provided.

**ELECTRONIC PROTECTIONS**

Adequate protection is to be incorporated under “No Load” conditions e.g. when the lamp is removed and the system is switched ON.

- The system should have protection against battery overcharge and deep discharge conditions.
- Fuse should be provided to protect against short circuit conditions.
- Protection for reverse flow of current through the PV module(s) should be provided.
- Electronics should have temperature compensation for proper charging of the battery throughout the year.
- Adequate protection should be provided against battery reverse polarity.
- Load reconnect should be provided at 50% of the battery capacity status.\

**MECHANICAL COMPONENTS**

- A corrosion resistant metallic frame structure should be fixed on the pole to hold the SPV module.

- The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that the module can be oriented at the specified till angle.
- The height of the pole should be 5.0 meters and final installation as per approved drawing.
- The pole should have the provision to hold the luminaries.
- The lamp housing should be water proof and should be painted with a corrosion resistant paint
- A vented,. acid proof and corrosion resistant metallic / poly propylene co-polymer ultraviolet stabilized plastic box with a locking arrangement for outdoor use should be provided for housing the battery.
- Provision for clamping the battery box with pole on an angle iron frame at more than 10 feet height must be made for the safety of the battery.

**INDICATORS**

The system should have two indicators, green and red. The green indicator should indicate the charging under progress and should glow only when the charging is taking place. it should stop glowing when the battery is full y charged. Red indicator should indicate the battery "load cut off' condition.

**MANUFACTURERS WARRANTEE**

- PV modules used in LED based solar lights must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 20 years.
- The warrantee card to be supplied with the solar street light must contain the details of the system supplied. The manufactures can provide additional information about the system and conditions of warranty as necessary
- The warrantee of battery should be minimum 3 years.
- The warranty of LED Light Fittings should be minimum 1 (one) year.