

OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER ,
EAST SINGHBHUM, JAMSHEDPUR

TENDER DOCUMENT FOR ESTABLISHMENT OF DIGITAL SCIENCE CENTER AND ROBOTICS

**OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER ,
EAST SINGHBHUM, JAMSHEDPUR**

TENDER NOTICE`

No. _____ Dated. _____

The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER, EAST SINGHBHUM, JAMSHEDPUR invites the following tender. The tender copy can be downloaded from OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER , EAST SINGHBHUM, JAMSHEDPUR portal <http://jamshedpur.nic.in> under “Tenders” section.

The administrative, technical, commercial bids and E.M.D. shall be submitted up to the end date & time mentioned below– Bid No. 02

Tender No.

Sr. No.	Description	EMD	Start date & Time for Bid	End date & Time for Bid Submission
1	Establishment of Digital Science Center with robotics in 02 School of, EAST SINGHBHUM, JAMSHEDPUR Bid No. SC-01/2018 Tender No. Dated.			

The tender document is available on OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER, EAST SINGHBHUM, JAMSHEDPUR portal <http://jamshedpur.nic.in> along with this tender notice.

The tenderer shall have to pay EMD in the format of a Bank Guarantee of amount Rs. 50,000 pledged in favor of “District Education Officer, East Singhbhum” from any scheduled bank.

The Authority OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER , EAST SINGHBHUM, JAMSHEDPUR shall not be liable for any omission, mistake or error in respect of any of the above or on account of any matter or thing arising out of concerning or relating to the tender or the bidding process, including any error or mistake therein or in any information or data given by the authority.

The District Tender Committee reserves the right to reject all or any of the tender(s) without assigning any reason at any stage.

Bidders shall note that any corrigendum issued regarding this tender notice will be published on the OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER , EAST SINGHBHUM, JAMSHEDPUR portal only. No corrigendum will be published in the local newspapers.

By Order of the

OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER ,
EAST SINGHBHUM, JAMSHEDPUR

Address for Communication : Office of The DDC, District Collectorate, East Singhbhum,
Jamshedpur.

Venue for opening of bid: OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER ,
EAST SINGHBHUM, JAMSHEDPUR

For detailed tender document please scroll down

To Establishment of Mini Science Center and Robotics in 02 Schools of East Singhbhum.

- **Bid No.** : SC-01/2018

Preamble- The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER , EAST SINGHBHUM, JAMSHEDPUR invites Tender For Establishment of Digital Science Center with Robotics Lab in 02 schools of the OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER , EAST SINGHBHUM, JAMSHEDPUR

Within **two months (60 Days)** period from date of acceptance as per the specifications attached separately with this document and as per the terms and conditions as mentioned therein

1. Scope of Work

The successful bidder is expected to deliver the following as part of the fulfilment of obligations under the agreement.

1. Provide 100 Table top models with backdrops and manuals, 3 robotics display models, 3 Robotics Kits with manuals and Videos and 3Tablets to impart STEM Education in students in 02 schools of East Singhbhum.
2. 3 Days initial training and 2 days refresher training after 6 months to the teachers imparting skills enabling them to teach students with concept and activity based learning through models and robotics.
3. Furniture – 30 Tables to keep the models and kits.
4. Necessary electrification, earthing, wiring and site preparation work for the deliverables should be provided.
5. Vinyl flooring in the allocated room is to be done with minimum 0.5 mm thickness vinyl mat
6. 1 year technical support and helpdesk service.
7. Internal Room painting of the allocated room for science Centre with various pictures related to science painted on walls and roof of the room and outside room
8. To provide a digital classroom set-up in the school with a projector, Interactive computing device, digital content related to science and a power back-up solution.
9. The detailed specifications of exhibits and other equipment's along with required quantities are provided in Annexure-1

2. Eligibility Criteria

The bidder/Lead bidder in case of consortium should meet the following pre-qualification criteria:

S#	Eligibility Criterion	Documentary Proof
1	The bidder must be a registered company in India, registered under the Companies Act 1956 and should be in existence since last 5 years or more.	Certificate of Incorporation
2.	The Bidder should have at least one year of experience in implementation and delivery of IT Projects in Education or Computer Education Projects in Education.	The Applicant shall provide certificate of experience/Work orders with supporting documents

		Note- If the Bidder has executed any similar projects in consortium then in that case the Bidder should be a lead bidder while Demonstrating experience.
3.	The bidder should have minimum annual turnover of Rs. 2 Crs during FY 2016-17 Note : The turnover refers to standalone of the company and not the group turnover of its subsidiaries / group companies etc.	Copy of the audited balance sheets of the company for 2016-17 or a CA certificate mentioning turnover from IT operations.
4.	The bidder should have executed a single project involving setting-up of computer labs/Smart class, Providing teacher training in at least 50 schools.	Work Orders and Completion Certificate/ Acceptance Certificate from client is mandatory to submit. Note- If the Bidder has executed any similar projects in consortium then in that case the Bidder should be a lead bidder while Demonstrating experience.
5.	The bidder should not have defaulted/black listed by any Govt. dept/PSU of India and there should not be any pending litigation against bidder with Central /Ctate government department	Self-declaration on the bidder's Letter Head is required
6.	The bidder should have valid ISO 9001:2008 certificate	Copy of the valid certificate from authorized agency.
7.	The bidder should have valid documentary proof of GST registration in Jharkhand and PAN registration number.	Self-Certified Copy of PAN /GST registration
8.	The bidder should have executed at least 3 different projects wherein they would have supplied IT hardware in schools.	Work order/agreement copy
9.	The bidder should be a profitable company in and should have a positive net worth during each of last 3 Financial years	Audited balance sheets or CA certificate
11.	Power of attorney for signing the offer and for further clarifications/negotiations	Copy of the Power of Attorney signed by board of the company
12.	Compliance statement	Clause by clause compliance statement of RFO

		document
13..	Receipt of Tender Purchase Fee	Receipt/Purchased Tender Document to be enclosed with the Technical proposal
14.	The bidder must provide Manufacturer Authorization forms (MAFs) from all OEM in the name of the bidder authorizing them to quote in this tender on their behalf. They should also provide technical compliance and brochures from OEMs.	MAFs, technical Compliances and product brochures

The bidder should submit (self-attested) documentary proof in support of each of the above conditions. The incomplete offers will be summarily rejected without any further correspondence.

Bidders who will qualify basis the above criteria may be called for a technical presentation in order to evaluate the technical understanding and capability of the bidders. Tendering authority have all the rights to reject or select the bidders for further evaluation on the basis of Technical Presentation and demonstration of capabilities by the bidder.

The price offers of only those parties who qualify in the first stage and make a satisfactory presentation shall be opened at time and date to be notified separately.

Tendering authority reserves the right to accept or reject any or all the offers without assigning any reason.

The offers are to be submitted to: _____,

3. Payment Terms:

1. 50% payment will be made on Delivery and Installation.
2. 25% payment will be made after initial Training of teachers.
3. 25% payment will be made after 1 year successful Service period.

In case the department is unable to provide schools for installation, payment shall be made for the schools in which installation has been completed.

- 4. Submission of tender:** The bids for the given tenders must be submitted along with EMD and all the documents at the address below by date _____ Time _____

Address: Office of The DDC, District Collectorate, East Singhbhum, Jamshedpur.

The technical cum prequalification bid should be submitted in one envelop and Financial bid should be submitted in another envelop. Both the envelops should be kept in one envelop with the name of the bidder written on it. Also tender reference number must be mentioned on the top of the envelops.

5. **Authentication for documents:** The responsibility to produce correct and authentic documents rests with the tenderer. If any document is detected to be forged, bogus etc., the tender shall be rejected and the tender deposit shall be forfeited. Any contract entered under such conditions shall also be liable to be cancelled at any time during its currency and further penal action like criminal prosecution, blacklisting etc. against the said contractors and/or the partners shall be instituted. The CONCERNED DEPARTMENT AUTHORITY shall also be entitled to recover from the contractors“ dues the damages / Losses occurred thereof.
6. **Translation of certificates:** If the certificate issued by any statutory authority is in language other than English or Hindi, then a translated copy of certificate in one of the languages mentioned by the department, and certified by the official translator shall have to be uploaded along with a copy of the original certificate.
7. **Sign and seal:** Affixing of signature while submitting the bid shall be deemed to be signed by bidder and mean acceptance of the terms, conditions and instructions contained in this tender document as well as confirmation of the bid/bids offered by the vendor which shall include acceptance of special directions/terms and conditions if any, incorporated.
- a) If a tender is submitted by a proprietary firm, it shall be signed and sealed by the proprietor of the said firm or authorized representative only.
 - b) If a tender is submitted by a partnership firm, it shall be signed and sealed by person/ partner holding the power of attorney on behalf of the said firm or authorized representative only.
 - c) If a limited company/ Societies/Trust submits and uploads a tender, it shall be signed and sealed by a person holding power of attorney or authorized representative only.
8. **EMD-** Paying E.M.D. The tenderer shall have to pay EMD of **Rs. 40,000/- (Fifty Thousand Only)** which can be accepted through bank guarantee only.
- i. **Refund of E.M.D.** The EMD shall be refunded to the unsuccessful tenderers in due course of time. However in the case if successful tenderer agrees, then the EMD shall be retained and adjusted against the 5% contract deposit for due execution of the contract.

OR

The EMD of the tenders who have been awarded the contract will be refunded only after 5% contract deposit is paid to The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER, EAST SINGHBHUM, JAMSHEDPUR.

The EMD of contractors, who have submitted BG in lieu of 5% contract deposit, will be refunded only after the confirmation letter of the Bank issuing this BG is received and verification of the same along with contract documents by C.A.’s office.

9. **Contract deposit value:** Successful tenderer shall have to pay a contract deposit @ 5% of the total contract cost either in the form of Bankers“ Guarantee from the Bankers approved by the The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER, EAST SINGHBHUM, JAMSHEDPUR & same will be retained 6 months after completion of contract period.

10. Other conditions

- i. **Execution of written contract:** In the event of the tender being accepted, the full amount of the contract deposit must be paid and the contract must be signed by all the partners of the firm. If one or more partners are not available for this purpose, the signatory must produce a power of attorney authorizing him to sign on behalf of the absent partners. All such power of attorney must be registered in the office of the Accountant and/or District Education Officer should be informed accordingly.
In case of joint stock Company the contract must be sealed with the seal of the company in the presence of and signed by two Directors or by person duly authorized to sign the contract for the company by a power of Attorney. All such power of attorney must be registered in the office of the Accountant and/or District Education Officer should be informed accordingly.
Tenderers failing to pay the contract deposit and / or failing to submit all the documents to execute the contract within 30 days from the receipt of the contract document, shall be deemed to have committed a breach of the undertaking given by them in their tender and their EMD shall be forfeited, along with the penal action including blacklisting of the tenderer. His tender shall also stand rejected. Without the contract being executed, no bills shall be admitted for payment.
- ii. **Refund of contract deposit:** Contract deposit will be refunded within a month after satisfactory completion of contract period of the project.
- iii. **Unconditional offer:** Tenderers shall quote a firm & unconditional offer. **Conditional offers shall not be considered and shall be treated as non-responsive.** Bonus/complimentary / discount offer given with condition will also be rejected. Bonus/complimentary / discount offer without any condition will not be considered for evaluation of comparative assessment. The net price quoted will only be considered for determining the lowest bidder irrespective of unconditional Bonus/ complimentary / discount offer.
- iv. **Variation in rate:** Tenderer's shall fill in the tender carefully after noting the items and its specifications. No variation in rates etc. shall be allowed on any grounds such as clerical mistake, misunderstanding etc. after the tender has been submitted.
- v. **Firm price**
The prices quoted shall be firm and no variation will be allowed on any account whatsoever. The rates are quoted include of all Taxes only.
- vi. **Alternative clauses in tender.** No alteration or interpolation will be allowed to be made in any of the terms or conditions of the tender & contract and/or the specifications and /or in the schedule of quantities. If any such alteration or interpolation is made by the tenderer, his tender shall be rejected.
- vii. **Validity.** The validity of the offer should be for at least **90 days** from the date of the opening of the tender.

- viii. **Product Names.** The tenderer must state the brand name of the product, if any.
- ix. **Manufacturer's address.** The manufacturer's complete address, or bidder's details, list of partners with their names and commercial and residential addresses must be indicated in the Annexure.
- x. **Order:** Orders will be placed by District Education officer along with school-wise details of requirement of Mini science center & Robotics.
- xi. **Delivery:** The Tenderer should give free delivery to the respective school within Jurisdictions of The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER , EAST SINGHBHUM, JAMSHEDPUR within **60** days from the date of placing the orders.
- xii. **Contract:** The Contract Document means the entire document along with any attachments and all documents forming part of the Contract (and all parts of these documents) are intended to be correlative, complementary and mutually explanatory. The contract shall be read as a whole. The Contract Agreement means the agreement entered into between the The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER, EAST SINGHBHUM, JAMSHEDPUR or the Office authorized by DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER, EAST SINGHBHUM and the bidder. The date of the Contract Agreement shall be recorded in the signed form.
- 11. Acceptance of Tender:** The decision of the DISTRICT TENDER COMMITTEE shall be final and binding and DISTRICT TENDER COMMITTEE do not pledge to accept the lowest or any tender. The DISTRICT TENDER COMMITTEE reserves the right to reject any or all tenders and relax/ stringent any of the condition of tender without assigning any reasons.
- 12. Acknowledging communications.** Every communication from the DISTRICT EDUCATION OFFICER, EAST SINGHBHUM to the tenderer should be acknowledged by the tenderer/ Quotationer /Supplier with the signature of authorized person and with official rubber stamp of the tenderer/ supplier.
- 13. Jurisdiction of courts** In case of any claim, disputes or differences arising in respect of a contract, the causes of action there at, shall be deemed to have arisen in JHARKHAND and all legal proceedings in respect of any such claim, disputes or differences shall be instituted in a Competent Court in the Jamshedpur only.
- 14. Taxes and Duties.** All the rates quoted by the tenderer should be inclusive of all duties, levies, Excise Duty, Custom Duty and taxes etc. If there is any increase in above taxes/ duties during the period of contract repayment claim will not be entertained by The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISIONER , EAST SINGHBHUM, JAMSHEDPUR
- 15. Rejection.** If the particulars furnished by the tenderer are found materially incorrect or misleading, such tender shall be rejected and their EMD shall be forfeited and he shall be liable for further action like black-listing etc. Any change occurring within their institute like change in name of firm, change of partner, change in the constitution, change in brand name of the product, merger with any other

institutions, contract work, if any, allotted to another firm, any freshly initiated court case should be promptly intimated to the The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER, EAST SINGHBHUM, JAMSHEDPUR. If the tenderer fails to submit such information during the tenure of the contract, that shall invite legal action and black-listing as well.

- 16. Penalty:** If the successful tenderer fails to comply with work/purchase order within the delivery period stipulated, the District Tender Committee shall exercise his discretionary power either :-
To recover from bidder as agreed, the liquidated damages or by way of penalty ½% (half percent) of the price of the materials which the bidder has failed to Establish mini science center and Robotics as aforesaid per week or part thereof during the contract period up to maximum limit @ 10% of the contract cost.
- 17. Blacklisting.** The firm shall be black-listed, if it is found that:-
i) Forged documents are submitted OR
ii) If it becomes responsive on the basis of submission of bogus certificate/information. OR
iii) In case of non-supply of materials or supply of substandard quality or supply of materials found to have been previously used or having reconditioned parts.
- 18. Payment of legal and stationery charges:** These charges are to be paid by the successful bidder on receipt of acceptance letter for the supply of the material as per prevailing circular.
- 19. Stamp duty:** The contract agreement shall be adjudicated for the payment of stamp duty by successful bidder and accordingly the successful bidder shall have to pay the stamp duty on contract agreement as per the Government Directives.
- 20. Amendment to tender documents:** Before deadline for submission of tender offer, the The DISTRICT TENDER COMMITTEE may modify any tender condition included in this tender document by issuing addendum/corrigendum/clarification and publish it on the portal of The OFFICE OF THE DISTRICT MAGISTRATE –CUM- DEPUTY COMMISSIONER, EAST SINGHBHUM, JAMSHEDPUR. Such addendum/corrigendum/clarification so issued shall form part of the tender documents. All tenderers shall sign and seal such addendum/ corrigendum/ clarification in Packet A.
- 21. Confidential Information:** The drawings, specifications, prototype, sample and such other information furnished to the contractor relating to the supply of material shall be treated as confidential and shall not be divulged to any third party. It shall remain the property of The DISTRICT TENDER COMMITTEE. If, during the process of execution of the contract, any improvement, refinement or technical changes and modifications are effected by the contractors, such changes shall not affect the title to the property and all the information, specifications, drawings etc. including the improvement/modifications effected by the contractor shall continue to be the property of the The DISTRICT TENDER COMMITTEE.
- 22. Risk & Cost Purchase:** In case, the bidders shall at any time during the continuance of these presents fail to supply satisfactorily, the articles within the prescribed time as herein provided or in case, shall fail at once to replace any articles that may have been rejected as herein provided with other, of approved quality, the DISTRICT TENDER COMMITTEE shall be at liberty forthwith to procure the same in

the open market at the risk and cost of the bidders. The extra cost thereof (if any) and all expenses thereby incurred, which shall include charges of 5% minimum to a maximum of 15 % shall be payable by and/or may be deducted from any moneys due or become due to the Contractor/s under this or any other contract/s between the Contractor/s and the The DISTRICT TENDER COMMITTEE, The DISTRICT TENDER COMMITTEE may, however fix such other subsequent date as he may think fit by which the delivery of the said article and or execution of the said work shall be completed.

- 23.** The DISTRICT TENDER COMMITTEE, EAST SINGHBHUM, JAMSHEDPUR reserves its right to inspect the manufacturing premises of the company as and when required.
- 24.** Bidder shall not have been debarred/black listed by The DISTRICT TENDER COMMITTEE, EAST SINGHBHUM, JAMSHEDPUR./central Govt./state Govt./ Public sector undertaking/any other Local body. If in future, it comes to the notice of The DISTRICT TENDER COMMITTEE, EAST SINGHBHUM, JAMSHEDPUR / if it is brought to the notice of The DISTRICT TENDER COMMITTEE, EAST SINGHBHUM, JAMSHEDPUR during the currency of this contract, that any disciplinary/penal action is taken against the bidder due to violation of terms and conditions of the tender allotted to Bidder. The bidders / manufactures which amounts to cheating/depicting of malafide intention anywhere in The DISTRICT TENDER COMMITTEE, EAST SINGHBHUM, JAMSHEDPUR or either by any of central Govt./state Govt./Public sector undertaking/any other Local body, The DISTRICT TENDER COMMITTEE, EAST SINGHBHUM, JAMSHEDPUR will be at discretion to take appropriate action as it finds fit.
- 25.** All the above conditions should be strictly adhered to failing which the tender will be treated as non-responsive and no correspondence will be entertained in the matter.

Annexure -1

A. List and specifications of Science exhibits

S. No	Exhibit Name	Exhibit Detail	Concept
1	KE-PE Track	Kinetic energy to potential energy, Conversion, Kinetic energy, Potential energy	Water falls from the sky, Book falling from top, Slides
2	Gyroscope	Angular momentum, Conservation of angular momentum	Computer Pointing Devices, Spinning Tops, Racing Cars, Robotics, Mono Rail Trains
3	Cone runs uphill	Mass, Centre of gravity, Angle of inclination	Mass, Centre of gravity, Angle of inclination
4	Tower of Pisa	Centre of gravity, Angle of inclination	Mass, Centre of gravity, Angle of inclination

5	Law of inertia	Newton's First law, Force , Inertia, Gravitational force	When a bus suddenly starts (tend to fall backward), A body thrown vertically upwards rises to a certain height and then falls down, When moving bus suddenly stops (thrown forward),
6	Newton's Action-Reaction law	Newton's law, Action reaction forces, Gravitational, electrical, and magnetic forces, Contact interactions	Shooting a rifle, Fill a balloon with air, Hit someone really hard, Contact interactions
7	Bumpy Track	Velocity, Fundamental Quantity - Mass, Length, Time	Shortest path is not always faster, Acceleration due to gravity, Introduction of Fundamental Quantity - Mass, Length, Time
8	Wind Mill	Electricity generator, Wind energy, Wind Speed	Modern windmills, Wind Power, Pumping water, grinding grain, etc.
9	Mechanical advantage using Lever	Law of lever, Force	See Saw (Kid's Play), Hammer Claw (nail removal), Scissors, Pliers
10	Pulley Block	Mechanical advantage of pulley, Force, Weight, Gravitational force, Friction Tension, Acceleration of mass	Dumbwaiters (to lift and lower books and plates), Construction Cranes
11	Archimedes Screw	Simple machine, Screw, Displacement	Irrigating crops, Lifting water from mines and ship bilges Modern industrial pumps
12	Axel and Wheel	Simple machine, Effect of Diameter of wheel	Importance of Diameter of wheel to minimize the effort and maximize the output.
13	Pinhole Camera	Rectilinear propagation of light, Inverted image, Light ray	Solography (to capture solar eclipse), Overhead projector, Surveillance
14	Zoetrope	Illusion of motion, Illusion	To create animated GIFs and for video display technologies such as streaming video
15	Newton's disk	Properties of white light, Dispersion of light	Important discovery, It proves that light is not colorless but has color in it which together converge to give a faded white color which we consider colorless

16	Tangram	Seven different shapes makes multiple diagram	Interesting puzzle. To get familiarize with basic geometric shapes.
17	Floating magnets	Properties of magnet, Repulsion of magnet	Maglev Trains operate without wheel in Japan, Computer Disk, Credit and Debit Cards, Industrial Sorter.
18	Magnetic Field Tube	Formation of Magnetic field	Alignment of magnetic lines in 3D view, Magnetic field
19	Viscosity Tubes	Liquid viscosity, Rate of fall	Liquid viscosity, Rate of fall
20	Color Shadow	Color light, Color mixtures, Shadow	Color light, Color mixtures, Shadow
21	Pythagoras model	Pythagoras theorem, Square of hypotenuse	Missile trajectory, Geologist (for finding center or source of earthquake), NASA (to trace spacecraft)
22	Sum of the angle of the Triangle	The triangle and its properties	Elementary theorem of math. "sum of all three angles of any triangle=180 "
23	Two Congruent right Triangles	Two Congruent right Triangles arranges to make different shapes	Comparison of area of different geometric shapes. Perimeter and Area
24	Hyperbola Model	Hyperboloid, Properties of hyperbola, Curves, Conic sections	Hyperbolic structures are used in cooling towers of Nuclear Reactors, Dulles Airport is in shape of Hyperbolic, parabolic, Lampshades, Gear transmission
25	Hand Pump	During the intake stroke the inlet valve opens the cylinder volume is increased and water drawn, Pressure, Gravitational force, Valve system	Industrial, Marine, Irrigation , Leisure activities
26	Floating Ball	Bernoulli's principle , Air flow	Bernoulli's principle , Air flow
27	Corner mirror	Angle of reflection, Angle of incidence	Safety reflectors for cars
28	Infinity Tunnel	Reflection on parallel surface	Multiple reflection at Zero degree angle between two mirrors, Mirror House, $(N=360/a-1)$

29	Kaleidoscope	Multiple reflections , Reflection symmetry, Image patterns(symmetric pattern), Light reflection	Attorneys and dentists have been known to keep them in their offices and waiting rooms to calm nervous of hyper tense clients, Children Toys, Exhibition Center
30	Periscope	Laws of reflection, Angle of reflection, Incident ray, Reflected ray , Rectilinear propagation of light	Tanks, Submarines, Used for viewing the interiors of nuclear reactors, Trench Periscope
31	Human Body	Human torso with option of removing and putting the organ back	Body organs, organ system, placement of organs, functions of organs and organ system
32	Cycle Operated Pump	Cycle type mechanism used to pump the water	Low pressure, high pressure, vacuum, priming and water level
33	LED Based Heart System	Explanation of various parts of heart and their usage in LED format	Parts of heart , functions of various parts and circulation system
34	Eye Model	Puzzle based eye model showing various parts and functions	Various parts of eye and their functions along with the placement
35	Ear Model	Structure based model showing various parts and function of ear	Various parts of ear and their function
36	Cell Structure	Model showing cell structure and its parts	Cell as basic fundamental unit, parts of cell and their placement
37	Contraption	One step actuating other step and finally completing the task and process gets repeated by actuation	Various energy conversion
38	Battery Making	A setup of battery	Various parts of battery like - cathode, anode and electrolyte, chemical reaction generating voltage, reactivity series , oxidation & reduction
39	Electrolysis of Water	A setup showing breakdown of water in oxygen and hydrogen	Oxidation & reduction, chemical reaction, testing of hydrogen and oxygen, process of electrolysis, voltage, surface area of cathode and anode
40	Acid Base and Salts	Setup with litmus and PH paper arrangement to test the nature of a liquid	Properties of acids, bases & salts, ph of solution, litmus papers, acid and bases indicators and properties of acid & bases

41	Layer of soils	A setup showing various layers of soils	Various layers of soils, analysis of components of soil
42	Bio Pesticides	Representation of various bio pesticides	Ways to make bio pesticides, their uses, advantages
43	Hydro Turbine	Generating electricity by flowing water using peloton wheel mechanism	Working of hydro turbine, penstock, peloton wheel, generator, nozzle, dam and flow of liquids
44	Solar power system	With panel, controller and battery setup	Working of solar panel, function of controller, battery, charging voltage, self-discharge
45	Sound in different Medium	A setup showing how sounds travel in different mediums	Effect of speed, amplitude and wavelength of sound in different medium, creating sound proof structures
46	Maglev	Magnetic levitation train and propulsion via fan	Properties of magnet, their functions, friction, newton's third law
47	Infinity Well	5 cm depth is converted in infinite depth via multiple reflection	Multiple reflection, properties of plane mirror
48	Magnetic crane	Magnetic effect of electric current.	Laws of motion, work power energy, various motion
49	Vacuum Cleaner (Home-made)	Creation of low pressure	Pressure, vacuum, low pressure and high pressure
50	Geothermal energy	Underground heat energy	Production of geo thermal energy and its uses
51	Rain Gauge	Height of water level show the magnitude of rain fall.	Measurement of rainfall
52	Electrostatic force (model)	static electric charge	Ways to generate electrostatic force, electrostatic attraction and repulsion
53	Smoking is Bad	An experiment showing the effect of smoking	Pollution, Filtration, Hydrocarbons
54	Meiotic cell division	Different stages of meiosis I and meiosis II	Different stages of meiosis I and meiosis II

55	Lens explorer	Types of lenses, properties of lenses and images formed by various lenses	Types of lenses, properties of lenses and images formed by various lenses
56	Exploration with concave and convex mirrors	Types of mirrors, properties of mirrors and images formed by them	Types of mirrors, properties of mirrors and images formed by them
57	Working model of generator	Working of generator, armature, poles, brushes, magnets	Working of generator, armature, poles, brushes, magnets
58	Scuba Diver	Float & Sink, varying density, archenemies principle	Float & Sink, varying density, archenemies principal
59	Tri-Mixing Liquids	Density	Different types of densities
60	Series and Parallel Circuits	Circuits, open and close circuits, series and parallel, conductors and insulators, voltage drop in series and parallel circuits	Circuits, open and close circuits, series and parallel, conductors and insulators, voltage drop in series and parallel circuits
61	Skeleton System	Human body structure showing details of human bones and structure	Bones & Joints
62	Solar System	Representation of planets around sun and showing their orbits	Planet & Universe
63	Hand Pump	Exhibit showing how water is pumped from ground	Pressure, Single way valve
64	Color Shadow	Torches are arranged in such a manner that there combinations gives various colors, upon keeping an object in the path of light we get a colored shadow	Light, Basic Colors, Shadow Formation
65	Motor Making	Exhibit shows magnetic effect of current, upon pressing switch the coil starts rotating under magnetic field	Magnetic effect of current
66	Generator Making	Exhibit showing induction of voltage when a coil is rotated in changing magnetic field	Electromagnetic induction
67	Tongue Model	Exhibit showing various parts of tongue and their functions	Tongue Explanation
68	Teeth Model	Exhibit showing various types of teeth present in human body	Types of teeth
69	Kidney Model	Exhibit showing functions of kidney using filter paper	Kidney functioning

70	Total Internal Reflection	Exhibit showing total internal reflection using laser light in a glass cage structure	Law of refraction
71	Electric Bell	Exhibit showing working of electric bell demonstrating application of electromagnetism	Electromagnetism
72	FM Radio	A working model of FM radio with open circuits	Frequency modulation
73	Scissor Lift	A model representing how hydraulics is used to make lift	Pascal law, force multiplication, restricted mechanism
74	Centrifugation	An exhibit showing the effect of circular motion, we rotate the handle and see the effect	Motion & Its Effect
75	Mirror Maze	These mirrors will form various types of images like fat, thin, long short etc.	Law of Reflection, Types of Mirror & Properties
76	Gear Train	An arrangement of gears in which on rotation of one gear some gears rotate fast, some slow, some unidirectional and some reverse directional	Gears & Force , Motion Relation
77	Pulley Setup	An arrangement to lift weight from different pulleys and then understanding the setup as in why different loads	Pulley and Motion Relation
78	Newton Cradle	Proof of law of conservation of momentum	Momentum
79	Cone Moving Up	A heavy object instead of moving from top to bottom, will move from bottom to top with our application of any force	Center of gravity
80	Spectroscope	Exhibit demonstrating spectrum of light	Spectrum
81	Electroscope	Exhibit demonstrating static charge behavior	Static Electrostatic Force
82	Van de Graff generator	Exhibit showing charge concentration and increasing voltage	Static Charge & Voltage Concentration
83	Nose Model	Exhibit showing various parts and functions of nose	Nose
84	Layers of Atmosphere	Exhibit showing various layers of atmosphere, their distance from surface of earth, and various phenomenon in various layers	Layers of atmosphere

85	Rising Water With Motion	Exhibit showing pumping action with rotary motion	Motion & its effect
86	Solenoid	Exhibit showing actuation using electromagnetism	Electromagnetism
87	Newton - 3rd Law Model	Exhibit showing every action has equal and opposite reaction	Newton's 3rd Law
88	Archimedes Principal	An exhibit with weighing scale measuring the water displaced	Archimedes Principal
89	Pascal Law	An exhibit showing pressure is same in all the directions	Pascal law
90	Air Cannon	An exhibit with syringes of different sizes with firing mechanism	Relation between pressure and volume
91	Sensor Setup	An exhibit with various sensors and showing detection	Sensors & Working
92	Wind Vane	Exhibit with arrow arrangement, which upon rotation show the direction of wind flow	Resistance offered by flowing wind
93	Pressure Measuring Arrangement	Exhibit with barometer arrangement showing the increase or decrease in pressure	Measuring Device
94	Tornado	Two bottle arrangement with a specifically designed bottle cap to create tornado	Effect of pressure difference on flowing liquid
95	Boyle's Balloon	A blown balloon inside the bottle with a single way valve on the top of bottle	Pressure Difference
96	Bernoulli's Law Demo	An arrangement with funnel, ball and connecting pipe to show the principle	Bernoulli's Theorem
97	Mirrors at Angle	Two plane mirrors arrange in such a manner that different number of images are formed	Reflection at angle
98	Planetary Body Model	A chart showing the present pollution situation on earth	Pollution & Solution
99	Telescope	A model with combination of lenses to see far off objects	Lenses & Refraction
100	Seismograph	A model with pointed marker to record vibrations	Earthquakes

Note:

1. The basic electrification, site preparation, Vinyl flooring is to be done in the allocated room
2. All the above mentioned exhibits to have a backdrop, which should be pasted on room's wall or near the Exhibit

B. List and specifications of Robotics Solution

S. No	Detail	Concept	Quantity
1	Fork Lift Robot	Force, Motion, Types of Motors, Switches, Concept of Torque, Lever, Gear & Pullies and other mechanism	3
2	Foot Ball Playing Robot	Robot with pushing mechanism and with free ultra-high speed motion	3
3	Fire Detecting Robot	Microcontroller based fire detecting robot based on smoke sensor	3
4	Micro Controller Based - Line Tracer & Obstacle Detecting Robot	Working of sensors, types of sensors, controllers, various parts of controllers, sensors, programming, burning of program, types of cables	3
5	Advanced Robotic Kit	Force, Motion, Types of Motors, Switches, Concept of Torque, Lever, Gear & Pullies and other mechanism, Structures, Stability of structures, Specification of motors, Selection of gears & pullies	3
6	Programmable Robotic Kit	Controllers, 8 types of sensors, cables, their usage and interface, programming on blocks as well as on C, debugging of program, logic building, putting own idea	3
7	7" 4G Tablet	OS Windows/Android, RAM 1 GB, Form Factor-Touchscreen	3

C. Specifications of Digital Classroom

Sr. No.	Equipment	Specifications	Quantity
1.	Projector	DLP Technology, Short throw, 3000 ANSI Lumens, Lamp life- 5000 hours, Wall/Ceiling mounted with necessary cabling, along with 6'x4' wooden white board	1
2.	Interactive computing device	Intel Pentium Dual Core Processor (3 rd Gen), 4 GB RAM, 500 GB HDD, Wifi enabled, 2 USB 3.0 Ports with 255 touch point interactivity & Automatic Calibration, With Windows 10 license, Inbuilt or external Bluetooth Speaker of 30 Watts, Ceiling/Wall mounting and necessary cabling, Pre-loaded with Educational Content mapped to the Curriculum	1

3.	UPS	<p>Total Capacity 1500 VA, SPV Modules: Mono/ Multi Crystalline Silicon PV cells fitted with bi pass diodes. The modules should also have been tested & confirm to IEC 61215 standards., 12 V low maintainance Tubular Batteries DC Bus Voltage \geq 48VDC, 2 hours of backupp, 3600 VAH, buildin UPS, Single Phase input 120 - 280 V, 50 HZ+-6%, Output Wave form Sine Wave, Transfer time < 6 msec, Voltage THD < 3% on linear load, Battery Battery sizing details to be enclosed; Batteries of well-known brands to be supplied with OEM Warranty Certificate for 5 years duration. Grid charger CVCC battery charger to charge in 8-10 hours' time, Deep discharge protection, Battery reverse polarity protection, Over charging protection Display /Indications and alarm, LED indication Solar ON, Mains ON, Inverter ON, Battery Low, Over load, Inverter Fault, Battery Model, LCD Meter Display All Input/ Output Parameters Audible Alarm Battery Low, Over Load, Fault, Battery Operation, Over Temperature, Audible Noise < 65 dB at 1 meter distance, Temperature Range 0°C to 45°C Relative Humidity 10-95% RH non-condensing, Junction Box Dust and vermin proof to provide termination of cables along with tags</p> <p>NOTE: Suitable length of cable shall be provided for interconnection of modules, charge controller, battery bank, Inverter, etc Warranty Certificates from Solar Panel OEM & Battery</p> <p>Module Mounting Structure: Suitable to accommodate solar modules, made of MS angles, duly galvanized to avoid corrosion. The mounting structures for SPV modules should be without too many welding joints and fixed to the roof top. Roof top space (without shading) to be made available. Approx. 250 sq. ft. required for 2KW installation. OEM Certifications: a) ISO 9001 & ISO 14001. b) Test report as per IEC Standards for Solar Hybrid UPS (PCU) from MNRE approved Lab c) Test report as per IS Standards for Batteries. d) SPIB / SMERA / CRISIL or equivalent Solar Grading Certification of rating SPC or better. e) Minimum supply & installation of 500 Solar Hybrid UPS anywhere in the country either directly or through System Integrators.</p>	1
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