

## BOQ OF BOY'S HOSTEL BLOCK ( A,B,C & Canteen) with 10 to 15 Degree Tilt Estimated Capacity 200.10kWp

Sr No	Product	Unit	Qty	Unit Price (PKR)	Amount (PKR)
1	<b>MODULE MOUNTING STRUCTURE (MMS)</b>				
	<p>Designing, Supplying, Fabrication &amp; Installation of PV Mounting structure (Aluminium), Roof Mount Fixed frames with Civil Pads. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminium Section or hot dipped galvanized Steel Profile. The mounting structures and the civil pads must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) min wind speed pressure 150Km/hour in harsh environment. The design submission must be as per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminium AL6005/6063. The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 10 deg for self-cleaning purposes and not more than 20 deg and for optimal exposure to direct solar irradiation. The work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following:</p>	kWp	200.10	16.3	3,261,502
a	Designing of the structure as per design specification approved	Compliance			
b	Layout at Site	Compliance			
c	Civil pads work as per approved drawing and specification	Compliance			
d	Placing of Anchor Bolts & Base Plate as per design & length & Details	Compliance			
e	Tilt angle is to be maintained as per recommended.	Compliance			
f	The Contractor shall remove all the debris and clear the site as per direction	Compliance			
g	The Contractor shall submit the detail technical shop drawing before execution of work.	Compliance			
h	After completion of the work the contractor shall submit the as built drawing.	Compliance			

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10/11/23

2	<b>PV Modules-200.10KWp:</b>	Unit	Qty	Unit Price (PKR)	Amount (PKR)
	<p>Supply, Installation, Testing &amp; Commissioning (SITC) Mono Crystalline N-type 144 Cells Photovoltaic Solar Modules Tier 1 Type anti-reflective high transparency low iron tempered glass, with Earthing provision. The modules STC parameters must be as under:</p> <p>(a) Min Power Pmax 580 or above Wp rated power                      (b) Open circuit voltage (Voc) +/- 5% 48.47V-53.57V                      (c) MPP Voltage Vmpp 41.2V - 41.8V                      (d) MPP Current Impp 12.75A - 13.04A                      (e) Short Circuit Current Isc +/-5% 13.65A - 13.92A                      (f) Module Efficiency 21.5-22.5%                      (g) Operating Temp. Degree Centigrade -40 ~ +85                      (h) Maximum System Voltage 1500V UL 1000V IEC                      (i) Maximum Series Fuse Rating 25 A                      (j) Junction Box Protection Degree, IP 68                      (k) Connection box, 4.0mm<sup>2</sup> conductor cross section,                      (m) Cable with, MC4 male and female connectors,                      (o) Anodized Aluminium Frame and Support Bars                      (p) PVC duct, Clamps &amp; Accessories, support and labels to be stalled under PV Array.</p> <p>The Contractor shall provide manufacturer warranty for solar panel for a period not less than 25 years. Contractor must submit all the required certificates for each PV solar panel from manufacturer as per specification.</p> <p>All works and materials must be according to the drawings, specifications and supervisor engineer instructions and approval.</p>	kWp	200.10	44	8,852,648

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3	GRID-TIED INVERTER (PCU)	Unit	Qty	Unit Price (PKR)	Amount (PKR)
i)	<p>Supply, Installation, Testing &amp; Commissioning (SITC) DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection. The inverter with must be suited to any PV module configuration and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include the safety concepts such as (triple protection with Opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrester type (2) to ensure max availability. All works and materials must be according to the drawings, specifications and supervisor engineer instructions and approval.</p> <p>Make: Sungrow/Huawei/SMA Power Rating: 100KW &amp; above.</p>	EACH	1	1,612,472	1,612,472
<b>Brief specification is as under:</b>					
a	Max Input DC Voltage: 1100V				
b	MPPT Operating Voltage Range: 200V~1000V,				
c	Min 10 Independent MPPT Trackers,				
d	Minimum Efficiency 98.0%,				
e	Warranty: 10 Years				
f	Certification Required: CE, IEC 61727, IEC 62109-1/2, EN 50530, IEC 61727, IEC 61683				

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		Unit	Qty	Unit Price (PKR)	Amount (PKR)
ii)	<p>Supply, Installation, Testing &amp; Commissioning (SITC) DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection. The inverter must be suited to any PV module configuration and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include the safety concepts such as (triple protection with Opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrestor type (2) to ensure max availability. All works and materials must be according to the drawings, specifications and supervisor engineer instructions and approval.</p> <p>Make: Sungrow/Huawei/SMA Power Rating: 60KW &amp; above.</p>	EACH	1	1,037,654	1,037,654
	<b>Brief specification is as under:</b>				
a	Max Input DC Voltage: 1100V				
b	MPPT Operating Voltage Range: 200V~1000V,				
c	Min 04 Independent MPPT Trackers,				
d	Minimum Efficiency 98.0%,				
e	Warranty: 10 Years				
f	Certification Required: CE, IEC 61727, IEC 62109-1/2, EN 62109 IEC 62116, IEC 60068				

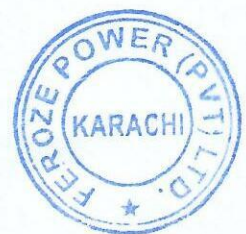
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Supply, Installation, Testing & Commissioning (SITC) DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection. The inverter with must be suited to any PV module configuration and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include the safety concepts such as (triple protection with Opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrester type (2) to ensure max availability. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.

Make: Sungrow/Huawei/SMA  
Power Rating: 30KW & above.

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966,319

**Brief specification is as under:**

- a Max Input DC Voltage: 1100V
- b MPPT Operating Voltage Range: 200V~1000V,
- c Min 04 Independent MPPT Trackers,
- d Minimum Efficiency 98.0%,
- e Warranty: 10 Years
- f Certification Required: CE, IEC 61727, IEC 62109- 1/2, EN 62109 IEC 62116, IEC 60068

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4	BREAKER BOXES	Unit	Qty	Unit Price (PKR)	Amount (PKR)
a	DC BOX				
i)	Supply, Installation, Testing & Commissioning (SITC) of DC box/Array Junction Box with all accessories for outdoor usage with proper cable glands as per cable size. DC Combiner Box shall be provided One SPD (Surge Protection device) and One DC Protection Breaker (MCB) per string. DC Protection 20A,1000VDC, MCB 4POLE Qty: 14 Nos DC SPD's Type II Qty: 14 Nos MCB Make: Schneider/ABB/Zjbeny DC SPD's Make: Schneider/Dehn/Zjbeny	EACH	1	220,668	220,668
ii)	Supply, Installation, Testing & Commissioning (SITC) of DC box/Array Junction Box with all accessories for outdoor usage with proper cable glands as per cable size. DC Combiner Box shall be provided One SPD (Surge Protection device) and One DC Protection Breaker (MCB) per string. DC Protection 20A,1500VDC, MCB 4POLE Qty: 8 Nos DC SPD's Type II Qty: 8 Nos MCB Make: Schneider/ABB/Zjbeny DC SPD's Make: Schneider/Dehn/Zjbeny	EACH	1	126,096	126,096

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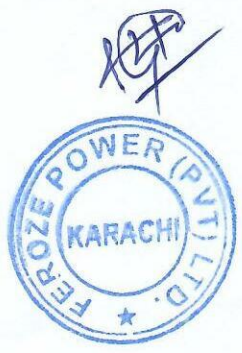
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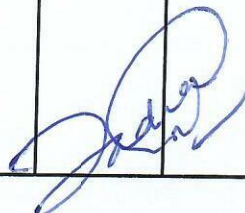
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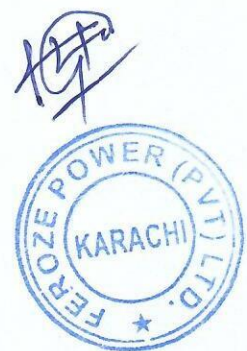
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iii)	Supply, Installation, Testing & Commissioning (SITC) of DC box/Array Junction Box with all accessories for outdoor usage with proper cable glands as per cable size. DC Combiner Box shall be provided One DC SPD (Surge Protection device) and One DC Protection Breaker (MCB) per string. DC Protection 20A,1500VDC, MCB 4POLE Qty: 4 Nos DC SPD's Type II Qty: 4 Nos MCB Make: Schneider/ABB/Zjbeny DC SPD's Make: Schneider/Dehn/Zjbeny	EACH	1	63,048	63,048
					

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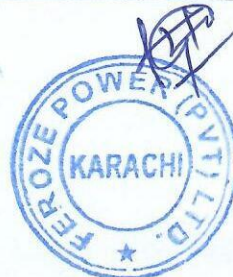
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b	AC COMBINER BOX (LV PANEL)				
	LV PANEL FOR BLOCK A,B & C	Unit	Qty	Unit Price (PKR)	Amount (PKR)
i)	<p>Supply, Installation, Testing &amp; Commissioning (SITC) of AC Combiner Box (LV Panel) with floor standing, locally fabricated in 16-gauge, Colour Code: RAL7035, MS Powder Coated, Copper Glands, Lugs, Phase indication lights, Digital Ammeter &amp; Voltmeter, Bus bar for 3 Phases, Neutral &amp; Ground, Glands at Bottom In &amp; Out, CT's, Energy meter with all related accessories for outdoor usage with waterproof enclosure.</p> <p>AC Breaker 250A,4P, MCCB,600V, Qty:01 AC Breaker 125A, 4P, MCCB, 600V, Qty:01 Main AC Breaker 400A,4P, MCCB,600V, Qty:01</p> <p>AC SPD with HRC Fuses (Make: Dehn/Schneider/ABB)</p> <p>Energy Meter: Janitza or Equivalent CT's: Ficco/Saci or Equivalent</p> <p>MCCB Make: Schnieder/ABB/Terasaki</p>	EACH	1	750,935	750,935
	LV PANEL FOR CANTEEN				
ii)	<p>Supply, Installation, Testing &amp; Commissioning (SITC) of AC Combiner Box (LV Panel) with floor standing, locally fabricated in 16-gauge, Colour Code: RAL7035, MS Powder Coated, Copper Glands, Lugs, Phase indication lights, Digital Ammeter &amp; Voltmeter, Bus bar for 3 Phases, Neutral &amp; Ground, Glands at Bottom In &amp; Out, CT's, Energy meter with all related accessories for outdoor usage with waterproof enclosure.</p> <p>AC Breaker 63A,4P, MCCB,600V, Qty:01</p> <p>AC SPD with HRC Fuses (AC SPD with HRC Fuses (Make: Dehn/Schnieder/ABB) Energy Meter: Janitza or Equivalent</p> <p>CT's: Ficco/Saci or Equivalent</p> <p>MCCB Make: Schnieder/ABB/Terasaki</p>	EACH	1	207,235	207,235



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5	CABLES				
a	DC CABLES	Unit	Qty	Unit Price (PKR)	Amount (PKR)
i)	<p>Supply, Installation &amp; Testing of DC Cable, 1 Core 4mm<sup>2</sup> Cu/XLPO/XLPO cable complete in all respect with accessories to connect the PV solar cells together and to the inverter directly to have a complete operational circuit, clamps, trays, and cable end terminations which shall be DC plug and socket connectors. The allowable voltage drops for DC cables between PV Arrays and inverter less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC Standard Double insulated: Cross link polyolefin, Tinned copper conductor.</p> <p>Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5, Cable should be Certified from TUV Approved. Standard: EN50618 Make: Imported</p>	Meter	200	192	38,420
	<p>Supply, Installation &amp; Testing of DC Cable 1 Core 6mm<sup>2</sup> Cu/XLPO/XLPO cable complete in all respect with accessories to connect the PV solar cells together and to the inverter directly to have a complete operational circuit, clamps, trays, and cable end terminations which shall be DC plug and socket connectors. The allowable voltage drops for DC cables between PV Arrays and inverter less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard Double insulated: Cross link polyolefin, Tinned copper conductor.</p> <p>Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5, Cable should be Certified from TUV Approved. Standard: EN50618 Make: Imported</p>	Meter	3850	279	1,075,758






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b	AC Cables	Unit	Qty	Unit Price (PKR)	Amount (PKR)
	Supply, Connecting and termination of the power cables with all required works in different sizes of ducts/pipes, Cable lugs, clamps, and all needed fittings to connect cables terminals from source to destination. According to drawings, specifications, instructions, and demand of the supervising engineer as follow: Brand: Pakistan Cable/Fast Cable or Equivalent as Engineer Approved.				
i)	4C x 95mm <sup>2</sup> , 0.6/1kV Cu/XLPE/PVC Pure Copper	Meter	20	16,998	339,958
ii)	4C x 35mm <sup>2</sup> , 0.6/1kV Cu/XLPE/PVC Pure Copper	Meter	20	6,336	126,716
iii)	4C x 10mm <sup>2</sup> , 0.6/1kV Cu/PVC/PVC Pure Copper	Meter	20	1,954	39,072
iv)	4C x 240mm <sup>2</sup> , 0.6/1kV Cu/XLPE/PVC Pure Copper	Meter	40	38,420	1,536,797
c	<b>Earthing Cables</b>				
	Supply, Installation & Testing of Earthing Cable, Including PVC Pipe with related accessories. Brand: Pakistan Cable or Equivalent as Engineer Approved.				
i)	1 core 2.5/4 sqmm, CU/PVC/FLEX (Green)	Meter	180	314	56,582
ii)	1 core, 10 sqmm, Bare Conductor	Meter	230	1,519	349,272
iii)	1 core, 50 sqmm, CU/PVC/FLEX (Green)	Meter	25	2,070	51,750
iv)	1 core, 10 sqmm, CU/PVC/FLEX (Green)	Meter	40	545	21,795
v)	1 core, 95 sqmm, CU/PVC/STD(Green)	Meter	40	4,131	165,229

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6	EARTHING SYSTEM	Unit	Qty	Unit Price (PKR)	Amount (PKR)
i)	Supply, Installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm Dia 3 meters (10feet) long driven copper rod, complete with clamps lugs, washer/bolts, connected with 2x70mmsq bare copper 50mm Dia G.I pipe/UPVC pipe class 'D/E' up to Earth chamber, job includes cad-welding of copper conductor to earth electrode rod at one end and provision/fixing of cable lugs at other end, including all accessories and RCC inspection chamber, heavy duty G.I. Cover having earth symbol, etc as per the specifications and Drawings and to the entire satisfaction and approval of the Engineer. Earthing result should be less than 5 Ohm for AC combiner, less than 1 Ohm for DC combiner and less than 5 Ohm for structure/lighting protection system.	Each	7	75,676	529,729
7	<b>LIGHTNING PROTECTION SYSTEM</b>				
i)	Supply, Installation, Testing & Commissioning of 16mm Copper lightning Arrestor (Height=1m), with Base Plate, 10ft GI Pipe and Civil Pad for mounting.	Each	4	232,848	931,392
ii)	Supply, Installation, Testing & Commissioning of test clamp. Test Clamp shall be made of copper	Each	4	25,000	100,000
iii)	Supply, Installation & Testing of 1 core, 70 sqmm CU/PVC/STD (Green) Earthing Cable, Including PVC Pipe with related accessories.	Meter	140	2,096	293,388

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8	CABLE TRAY	Unit	Qty	Unit Price (PKR)	Amount (PKR)
i)	Supply and installation of following sizes 16SWG heavy Duty G.I Perforated Cable Tray 100mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size, MS round bar, elbows, Tee, Nuts, Bolts, Washer, Hilti drop-in anchor, etc. Complete in all respect, as per the specification and drawings.	Meter	75	7,610	570,765
ii)	Supply and installation of following sizes 16SWG heavy Duty G.I Perforated Cable Tray 150mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size, MS round bar, elbows, Tee, Nuts, Bolts, Washer, Hilti drop-in anchor, etc. Complete in all respect, as per the specification and drawings.	Meter	25	11,796	294,906
9	<b>CIVIL &amp; MISCELLANEOUS WORK</b>				
i)	Supply and installation of 5-inch UPVC conduit class E with sockets, Bends, Elbows, T-Joints, Clamps for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc, complete in all respects.	Meter	30	4,432	132,964
ii)	Construct of concrete manholes/cable chambers (900mm x 900mm x 900mm deep) with heavy duty RCC covers with anti-rust paint, including all required sleeves for pulling underground power cables laid in pipes.	Each	3	232,964	698,893
iii)	Removal/Cutting of trees at some designated place.	Job	1	58,241	58,241
iv)	Supply and installation of 24000 BTU (2 Ton) inverter Split A.C Brand: Gree/Kenwood or Equivalent	Each	1	331,808	331,808
v)	Re-fixing Paver as in Position including providing sand required.	Job	1	11,642	11,642
vi)	Supply & Installation of Water Distribution Network for Solar Plant Cleaning including PVC water pipe, drain channel & pump for water supply.	Job	1	640,565	640,565

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**FUEL SAVER CONTROLLER**

Sr No	Product	Unit	Qty	Unit Price (PKR)	Amount (PKR)
10	<b>Fuel Saver Controller</b>				
	<p>Design, Supply, installation, testing and commission of Deif/Encombi or Equivalent Fuel Saver Controller System Solution for the Integration of PV Power Plant into Electrical Network based on Gensets.</p> <p>Fuel Save controller should performs the following tasks:</p> <ul style="list-style-type: none"> <li>a) Monitoring of the genset's power and operating status</li> <li>b) Monitoring of the load and grid status</li> <li>c) Calculation of suitable values for the maximum power output of the PV inverters according to defined parameter settings and the current status of gensets and load</li> <li>d) Control and communication interface to PV inverters</li> <li>e) Internal logging of all relevant system data</li> <li>f) Provision of relevant system data for local and remote monitoring</li> <li>g) Emergency shutdown of the PV inverters in case of a system malfunction</li> <li>h) Online Dashboard access to monitor solar power plant, Gensets &amp; Grid and hourly plant report.</li> </ul> <p>The bidder shall provide the complete technical details of the system</p>	Each	1	640,332	640,332

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**REMOTE MONITORING SYSTEM**

Sr No	Product	Unit	Qty	Unit Price (PKR)	Amount (PKR)
11	<b>DATA MANAGER with REMOTE MONITORING SYSTEM</b>				
	<p>Design, Supply, installation, testing and commission of data Manager with Remote Monitoring System consists of the following parameter:</p> <ul style="list-style-type: none"> <li>a) Total energy generation of PV Plant</li> <li>b) Instantaneous Power been generated by solar PV plant</li> <li>c) Performance ratio of PV plant</li> <li>d) Current load of client</li> <li>e) Load profile v/s energy generation.</li> <li>f) Daily Solar Plant report in PDF from</li> </ul> <p>Data should be store on server for not more than 10 min time interval. Data must be access through internet via user friendly GUI.</p>	Each	2	75,676	151,351.20

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**NET METERING**

Sr No	Product	Unit	Qty	Unit Price (PKR)	Amount (PKR)
13	<b>NET METERING</b>				
	Service of Grid study & Net metering application process & handling as per K.E approved criteria complete in all respects or directed by Engineer. This also include the services charges & fee for assessment of Grid Load service charges for Load Inspector etc. Only the cost of K.Electric/Neptra Challan shall be paid by IBA	Job	1	116,482	116,482.21

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**OPERATION & MAINTENANCE**

Sr No	Product	Unit	Qty	Unit Price (PKR)	Amount (PKR)
14	<b>OPERATION &amp; MAINTENANCE</b>				
	<p>Two years of operations and maintenance is an integral activity of this EPC project, which will determine the success of this project. It is to be noted that 2 years O&amp;M will be initiated after project closet is intended that the project performs as per design "Performance Commitment Table" while also maintaining the project to ensure reliability and longevity for 25 years. Industry best practices to be used to operate and maintain the solar PV Project. All necessary preventive and corrective actions to be shared and implemented before the start of the O&amp;M contract.</p> <p>The following key performance metrics to be monitored and reported which are as follows:</p> <ul style="list-style-type: none"> <li>• Annual Performance Ratio</li> <li>• Monthly Performance Ratio</li> <li>• Power Performance Index</li> <li>• Energy performance Index</li> <li>• Inverter wise performance</li> <li>• Cleaning Schedule</li> </ul> <p>Performance Ratio (burn test) to be carried out for 15 days once project is completely installed and ready for testing. Monthly Reports to be shared covering all aspects of solar PV performance including an event log. Any system under performance or failure of an equipment will automatically trigger the requirement of a detailed root cause analysis RCA (based on site-based tests) and a report will have to be submitted at the earliest completion of an RCA.</p>	Job	1	582,411	582,411.06
<b>Total</b>					27,974,401
<b>SST</b>					3,386,004
<b>Grand Total Amount</b>					31,360,405
<p><b>Grand Total Amount Rupees (in words): Thirty One Million Three Hundred and Sixty Thousand Four Hundred and Five.</b></p>					



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