

Physics B-Tech

(GCT MARDAN & SARDAR GARHI)

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S.No.	Description of Items with Specification	Qty.
1	Vernier caliper: Stainless steel made in plastic cover calibrated in centimeter and inches least count $1/20$ mm	48 No
2	Solid cylinder of different sizes: Brass solid cylinder of length 3-6cm, dia. 1-2cm	48 No
3	Screw Gauge: Stainless steel made in wooden box, 10-20mm main scale, 100 div on circular scale	48 No
4	Copper wire: Dia. 1mm to 20mm	4m each
5	Weight box: 0.1mg to 500g	12 boxes
6	Spring balance (scale in gm. and Newton): Range 1-100gm (1 N), 1-1000gm (10 N)	48 No (12 No. each)
7	Meter rod: Full meter rod 1-100cm half meter rod 1-50cm	48 No (12 each type)
8	Wooden wedge: with metal strip fixed on sharp end size 6"×3"	48 No
9	Stand metallic: Iron stand with rectangular base and two clamps	24 No
10	Grave Sand apparatus with pulleys: Wooden with two pulleys and leveling screws, spirit level	24 No

21	Graduated cylinder: Pyrex glass,graduated in ml	24 No
22	Scale pan: Metal circular pan supported by strings	24 No
23	Steam generator: Aluminum vessel with cork lid and retainer on an adjustable hot plate with thermal circuit breaker, volume 250ml	24 No
24	Screw driver 6" (flat and star) :	2 set of six
25	Plier 6":	02 No
26	Sextant: Student model, Comprising 220mm radius, withsighter adjustable half mirror and scale 0 to 130 with Vernier reading to five minimum in wooden case.	12 No
27	Hygrometer: With wet and dry bulb,thermometer on polished zinc scale polypropylene frame with polythene reservoir with spare wires temperature range in centigrade -5 to 50×0.5 and 0 to 100	24 No
28	Set of weights: 13 pieces set of Brass weights in storage block. 1×1g,2×2g,1×5g,1×10g.2×20g,1×50g,1×100g,2×200g,1×500g ,1×1000g.	12 sets
29	Kundt's tube with scale and Accessories: Transparent acrylic tube with scale and end plates with tubing nozzles for filling with various gases,built-in speaker at one end, a bore and guide for accommodating moving piston or probe microphone at the other end. Includes retaining clips for mounting on stands and a connector lead for the speaker,length 1000mm,dia 70mm,tube nozzle 7mm	12 sets

	<p>dia.</p> <p>Accessories for each set:</p> <p>1Probe micro phone with frequency range 20hz-20000hz with DIN plug for battery box,barrel foot, 1function generator (230V,50hz),1 whistle,a 1700hz tuning fork,1 bottle of corkpowder.</p>	12 sets
30	<p>Hook's law apparatus with helical spring:</p> <p>Pointer and scale graduated in cm and mm hanging weights 6×50gm, 5 helical springs of lengths 120mm, 145mm, 150mm. 147mm,142mm.</p>	12 sets
31	<p>Physical balance:</p> <p>With leveling screws in wooden casing and weight box 0.5gm-500gm weights.</p>	04 sets
32	<p>Convex lenses:</p> <p>Of different focal lengths from 10cm to 50 cm</p>	120 No (24 each type)
33	<p>Concave lenses:</p> <p>Of different focal lengths from 10cm to 50cm</p>	120o (24each type)
34	<p>Concave mirrors:</p> <p>Of different focal lengths from 10cm to 50cm</p>	120No (24 each type)
35	<p>Convex mirrors:</p> <p>Of different focal lengths from 10cm to 50cm</p>	120No (24 each type)
36	<p>Fletcher trolley complete:</p> <p>Light metal track 1720×150 min wide with leveling feetcovered with stops at either end, aluminum pulley 50mm dia., clamp for vibrator and automatic Pen release. Metal trolley with three wheels mounted.on ball bearings. Five hooks to accommodate cylindrical masses approximate 350gm. Vibrator 60mm long with clamping works at 5 and 8Hz and Pen holder to take fibertip type of</p>	06 No

	pen.	
37	Glass slab 4×8×1cm	24 No
38	Single ray projector with accessories: Light source for experiments on optics, connecting line 1.5m long with 4mm plug dimension 120mm×70mm dia., magnetic holder for single ray projector 12V, 60VA (230V, 50Hz), Halogen lamp 12V, 35W	04 sets
39	Multiple ray projectors, magnetic with accessories: Light source for optics. Lamp 12V, 55W connecting line 1.5 meter long with 4mm Plug. Dimension 150 × 200 × 50mm ³ Transformer 12V, 60 VA(230,50Hz) Halogen Lamp 12V, 55W.	04 sets
40	White board: Metal Board with Enameled Surface scratch and Acid resistant mounted on stand dimension 900 × 1200 mm ² .	04 No
41	Optics kit for white board: Plan mirror (plastic) 200×35×35mm ³ . Convex, concave mirror f=±100mm 200×35×35mm ³ . Plano Concave lens (Acrylic glass), f= 400mm, 200×40×35mm ³ . Plan parallel Plate (Acrylic glass) 200×100×35mm ³ . Semicircular body, f=200mm dia. 200×35mm ² (Acrylic glass) Right angled prism 200×200×35mm ² (acrylic glass) Cubide (Plastic) 100×20× 35mm ³ Cylinder (plastic), dia. 5×35mm ² Cylinder(plastic) dia. 6×35mm ²	12 No
42	String: 10mm-20mm thick, cotton made.	100 meter
43	Thermometer: 0-100 Degree C, -10 degree to -110 degree (Tube thermometer graduated) demonstration thermometer -20 to -110 degree C ⁰ .	72 No (12 No eachran ge)
44	Heat equivalent apparatus: Consist of a shaft with ball bearing at both ends, an integrated counter for measuring the number of revolutions and an attached table clamp. 1 basic unit, 1 Aluminum calorimeter, 1 temperature sensor, 1 pair of adopter cables with 4mm safety plugs / 2mm plugs, 1 fraction belt, 1 bucket of 5 liter, 1 counter weight, cord of length 1.80m and temperature calibration	12 sets

	table.	
45	<p>Optical bench complete with all standard accessories:</p> <p>Optical bench:</p> <p>Optics Track (1.2 m) rugged aluminum track. The metric tape makes position measurements easy.</p> <p>Accessories:</p> <p>Light Source has a lighted crossed arrow target with metric scale for focusing images through lenses or using with the concave mirror. Acts as a point light source, 1, 3, or 5 parallel rays, or red-green-blue rays.</p> <p>Lenses: 4 - 50 mm diameter. Lens's focal lengths +100, +200, +250, -150 mm mounted in protective holders. Concave/Convex Mirror: 50 mm diameter plastic mirror with reflective surface on both sides.</p> <p>Includes "half-screen" upon which the image is focused.</p> <p>Adjustable Lens Holder: from 19 mm to 75 mm in diameter.</p> <p>Storage Box: Everything fits neatly into the protective storage box, with the exception of the 1.2 meter Optics Track.</p> <p>1 transparent screen, 1 white screen.</p> <p>1 pin hole aperture d=1mm</p> <p>1 pin hole aperture d=6mm</p>	<p>12 No</p> <p>12 sets</p>
46	<p>Electrical calorimeter (1200ml) with accessories:</p> <p>Consist of a double walled, heat insulating plastic container with insulating vessel inside made of reflecting glass with heating coil and stirrer</p> <p>Accessories:</p> <p>Aluminum shot 100g, copper shot 200g, glass shot 100g, granules for filling calorimeter.</p>	<p>12 no</p> <p>06 bottles of each type</p>
47	<p>Precision hair Hygrometer:</p> <p>Consist of a round plastic housing with a human hair</p> <p>Measuring range: 0%----100% relative humidity</p> <p>Temperature range: 35c-+65% °C</p> <p>Reading accuracy: ±5%</p>	12 No

	Diameter: 100mm	
48	<p>Torsion apparatus:</p> <p>Searle horizontal pattern. Two cast iron feet and grub securing screws separated by two support rods approx. 700mm long, wheel 165mm dia. moving in ball bearings, mounted on front foot, other end supported with clamping block through rear foot with two aluminum scales graduated with 30-0-30 in single degree mounted on pillar support, two pointers with clamp for attaching to specimen, one each Brass and Steel rods 5mm diameter, chord and hook for carrying masses and two spanners for clamping block nuts.</p>	12 No
49	<p>Differential pulley:</p> <p>One piece aluminum with diameter of 38.5 mm & 63.5mm mounted in a metal frame with hook.</p>	24 No
50	<p>Differential wheel and axle;</p> <p>compound wheel and axle with cast aluminum alloy block</p> <p>Comprising wheel 100mm diameter and axle 50mm & 25mm diameter mounted on adjustable steel cones and steel frame, wood back board with four holes for wall mounting, complete 5m nylon cord and steel hook.</p>	24 No
51	<p>Maxwell's needle with accessories:</p> <p>Hollow metal cylinder 200mm long pointer and chuck to accommodate wires up to 20swg with each hollow and solid cylinders 50mm long tripod, stand with rod 1.2m long, base with leveling screws, clamp with arms 180mm long with chuck complete with three wires 1.5m long. one Brass 26swg and one each steel 26 and 20swg.</p>	12 No
52	<p>Friction measuring apparatus with Accessories:</p> <p>Demonstration apparatus with moveable friction surface for measuring static and dynamic friction. The track can be made inclined. Dynamometer, 3 rails for holding static bodies, three 100gm weight.</p> <p>Accessories:</p> <p>Precision dynamometer (1N range), (2N range), (10N range)</p>	12 No. 24 No (8 each type)
53	<p>Experiment set pulleys, block and tackle:</p> <p>Complete set of equipment consisting of a stable base plate, retort stand rods, pulley blocks, block and tackle, a set of pulleys of various diameters on an axle, weight holders, slotted weights with base plate 810×200mm, pulleys 50mm diameter, stand rods 810mm×12.5mm, slotted weights 2×10g, 2×20g, 2×50g, 4×100g, 4×200g, 1×500g, holders, 1×10g, 1×20g, 5×50g.</p>	12 sets
54	<p>Reciprocating motion motor:</p>	12 sets

	A field coil motor connected to a rotatory to linear converter mechanism showing cross sectional view. Both motor and gearbox are fully sectioned to show the method of operation. Lead from motor and gear box together taken to three 4mm sockets for connection to a 12 volts DC or AC supply mounted on plastic base complete with instructional booklet.	
55	<p>Cantilevers beam apparatus:</p> <p>To show the distribution of point load and uniform load.</p> <p>Consists of a well-seasoned wooden beam of L type shape, with horizontal graduated horizontal arm 75cm and vertical arm of 20cm, with a spring balance of 10 kg capacity to make the horizontal leg horizontal under any load. Complete with one sliding slotted set weight set 100 gm to 1 kg.</p>	12 No
56	<p>Compound lever (Brace version):</p> <p>Wooden structure consisting of Front and rear legs, leaver arm, base beam, handle, arms, lever arm, beam sides, brace, feet, hex bolt, washer, fasteners.</p>	12 No
57	<p>Roof truss (warren girder) :</p> <p>For demonstration to students.</p> <ul style="list-style-type: none"> - Bar cross-section: 10x3mm, stainless steel - bar lengths: 270mm, 186,5mm - tensile force: max. 600N - bars: 13, of which 7 with strain gauge measuring points Node discs: 8 <p>All strain gauge connections are housed together in the strain gauge box.</p>	12 No
58	<p>Forces in a Jib crane apparatus with complete accessories:</p> <p>Bench mounted. The unit consists of a metallic rod which provides the support locations for jib and tie. Load is applied via a hanger on the junction of jib and tie. To measure the deformation in jib and tie, dial gauges are connected to both elements.</p>	12 No
59	<p>Simple screw jack for demonstration to students:</p> <p>220 mm diameter turntable fitted with a 30 mm x 6 mm pitch screw is supported in a heavy cast iron base. Stand on a firm bench and a cord and weight hanger are wound round the rim of the turntable and hung over the pulley. The pulley runs on ball bearings to reduce friction to a minimum. To be provided with instructional manual</p>	8 No
60	<p>Inclined plane:</p> <p>Metal base and inclined surface plane hinged with scales</p>	12 No

	for angles, length and height. angle of inclination between 0-45,adjustable pulley, roller weight pan and cord	
61	<p>Simple harmonic module/apparatus:</p> <p>Consist of a black metal disc, 200mm dia supported vertically on a clear plastic base fitted with feet. A white marker 13mmdia may be made to follow a circular orbit about the central of the disc. A similar marker move in a slot along the diameter of the disc in phase with the peripheral marker performing SHM when the peripheral marker caused to rotate at uniform speed .The disc is marked with cords and radial lines to assist in locating the relative marker positions.</p>	12 sets
62	<p>Steel yard:</p> <p>Capacity 20 Kg with suspension rings and load hook, notchedarm, with sliding mass and two scales dividing 0 to 5×005kg and 5 to 20×0.1Kg</p>	06 No
63	<p>Worm and wheel apparatus:</p> <p>Wall-mounted, to study a way of connecting 2 shafts at right angles. Gear sets for 1, 2, 3 and 4 start worm and wheel units; interchangeable to fit on a rigid steel back plate. Two load hangers and weights set.</p>	12 sets
64	<p>Derrick Crane:</p> <p>Bench-top, for analysis of internal forces in a pin-jointed framework. Deflection measured by individually calibrated leaf-spring balances. Movement measured by digital Vernier. Load hanger, loading weights, link and digital caliper.</p>	12 sets
65	<p>Gearing elements to illustrate simple mechanical belt and gear wheel drives:</p> <p>Gearing elements consisting of base plate, belt pulley(35mm diameter), belt pulley (70mm dia.) gear wheel (20 teeth), gear wheel (40 teeth), crank handle, drive belt sets.</p>	04 sets
66	<p>Reaction of beam apparatus:</p> <p>.Bench mounted. This apparatus is designed for simple experiments and demonstrations on simply supported beams. Two spring balances act as supports and enable reactions to be read directly. Three movable load hangers allow loads to be put in a number of positions.Lever can be investigated by suspending the beam from the free standing frame, and holding down the end with a spring balance.</p>	08 No

67	Bell crank lever:- <ol style="list-style-type: none"> (1) Strong table unit for demonstrating the application of moment to a crank lever. (2) Pressure gauge 50N. (3) Metal crank mounted in ball bearings. (4) Mechanical advantage min. 1:1 max. 2:1 (5) Fine compensation device for adjusting the crank so that the forces always act vertically. (6) Crank length vertical: 200mm, horizontal: 400mm. Set of weights: up to 20N along with 6 weights with carrier. 	08 No
68	Compression balance: For demonstration to students:	08 No
69	Fractional horse power motor and Accessories: max 746 watts(single phase induction)with prony brake and revolution counter. With related accessories required for operational characteristics.	06 No
70	Crank and connection rod apparatus:	06 No
71	Fly wheel with slotted weight: Cast metal made, approx. 200mm dia×40mm thick mounted on a balanced horizontal shaft in metal bracket 280×180mm ² drilled for wall mounting.	06 No
72	Analog DC Volt meter: (Bench top) Measuring. ranges 3.0 v, 15 v, 300 v. Scale division 0.1v, 1v, 10 v.	12 (04each range)
73	Analog AC Volt meter: (Bench top) Measuring. ranges 15 v, 150 v. Scale division 0.5 v, 5 v	12 (4 each range)
74	Connecting Copper wires with insulation cotton:	100

		yards
75	<p>Resistance box plug type (Manganin coil):</p> <p>Thick rectangular brass block, resistance coils are made from doubled silk covered Manganin wire. Accuracy $\pm 0.05\%$.</p> <p>Having resistance 0.1ohms to 500 ohms and 1 ohm to 10000 ohms.</p>	12 No (06 each type)
76	Specific gravity bottle,25cc:	48 No
77	Specific gravity bottle,50cc:	48 No
78	<p>Friction measuring apparatus along with accessories:</p> <p>Demonstration apparatus with moveable friction surface for measuring static and dynamic friction. The track can be made inclined, 3 rails for holding static bodies, three 100gm weight.</p> <p>Accessories:</p> <p>Precision dynamometer yellow(1N range),red(2N range), green(10N range),three 100 g weights, aluminum block with a Teflon coated surface and two hooks,wooden blocks with plastic coated surfaces and hook.approx $120 \times 60 \times 60 \text{mm}^3$ & $120 \times 60 \times 30 \text{mm}^3$</p>	12 No 4 each
79	<p>Ampere meter:</p> <p>AC measuring range 1.00 A, 5 A. Scale division 0.02 A, 0.1 A. Internal resistance rectifier.</p> <p>DC measuring range 50 mA, 500 mA, 5.0 A. Scale divisions 1mA, 10 mA, and 0.1 mA.</p> <p>Internal resistance 10 Ω.</p>	12 (06 each AC&DC)
80	<p>Viscometer (Standard Size)with Accessories:</p> <p>Falling sphere viscometer with 6 spheres and 1 ball gauge measuring range 0.5mPaS To $7 \times 10^4 \text{mPaS}$.</p> <p>Accessories:</p> <p>2 sphere of Borosilicate glass,2 spheres of Ni-iron and 2 spheres of steel, thermometer 0-100C,test certificate with accurate values for spheres constant K and density ,silicon tubing(2x) immersion/circulation thermostat</p>	12 12 sets
81	<p>Photo Electric cell for determining planks constant with Accessories:</p> <p>Basic apparatus with photo cell, volt meter, Nano ammeter and power supply, 5 LEDs in casing with connector leads one plug in supply 12V AC, wave length 472 nm, 505 nm, 525nm, 588 nm, 611nm,</p>	12 No

	Accessories for photo electric cell: Set of 15 experimental leads, 75cm	12 sets
82	Rheostat: Slide contact Resistors in safe housing with built in earth sockets maximum voltage 600V, Terminals 4mm safety socket	12 No
83	Electric Lamp: <ul style="list-style-type: none"> ➤ 160 Watts Mercury, 6V ➤ 28 Watts Sodium, 6V ➤ LaSmp housing, Sockets, Cable with 4mm plug 	06 lamps each & 06 housing with 6meter cable
84	DC power supply (non-programmable): Output voltage 0-20 Volt, output current 0-10 Amp, Power 200 Watt, LED Display,	06 No
85	Galvanometer DC: Range \pm 35 Micro Amp, scale division 1 Micro Amp, Internal resistance 1000 ohm	12 No
86	Diode: Si-Cut-off Voltage 1000 Volt and 1300V, Maximum current 1 Amp & Ge, Cutt-off Voltage 90V, Maximum current 50mA,	48 NO (12 NO each type)
87	Zener diode: ZPD 3.3 (Maximum Power dissipation 0.5 Watt), ZPD 9.1 (Maximum Power 0.5 Watt). ZPD. (6.2 Maximum Power 0.5 Watt). ZPY. 5.6 (Maximum Power 1.3 Watt) ZPY 8.2 (Maximum Power 1.3 watt) ZPD. 18 (Maximum Power 0.5 Watt).	144 No (24 No each type)
88	Capacitors : (electrolytic or Mylar) <ul style="list-style-type: none"> ➤ 1nf, 630v ➤ 2.2nf, 160V ➤ 10nf, 100V ➤ 100pf, 160V ➤ 470pf, 160V ➤ 0.22micro farad, 250V ➤ 4.7micro farad, 36V ➤ 1micro farad, 100V ➤ 2.2micro farad, 63V ➤ 0.47micro farad, 100V 	240 No (24 No each type)
89	Inductors: <ul style="list-style-type: none"> ➤ coil with 250 turns ➤ coil with 500 turns ➤ stands for fields coil and tubes 	48 No (24 No each)

		type) 24 No stands
90	<p>Polari-meter:</p> <p>With a lighting unit comprising four monochromatic LEDs with sample cylinder, angle scale on the cover wavelength of LED's 468nm, 525nm, 580nm, 630nm,</p>	12 No
91	<p>Laser beam apparatus :</p> <ul style="list-style-type: none"> ➤ 0.5mw He-Ne Laser ➤ optical bench ➤ screen <p>Metal bench ,guide rail with leveling plate form 500mm,laser diode driver and temperature controller, laser safety goggles.1000mw and 100mw diode laser with built in cooler, thermistor and photo diode, lens, collimator, optical rider, mounting plate, Nd:YAG crystal. Laser mirror 1 and 2.frequency module, passive Q switch. PIN photo diode on optical rider, cylindrical lens of $f = +15\text{mm}$, $+25\text{mm}$, $+45\text{mm}$, collimator lens of $f = +75\text{mm}$,focusing lens $f = +75\text{mm}$, filter holder with filters, polarization filter and transport case.</p> <p>Or</p> <p>Equivalent Specification.</p>	12 sets
92	<p>Basic experimental board power requirements 200VAC 50Hz. with standard accessories:</p> <p>For Ohm's law, parallel and series resistor circuits, potentiometer, voltage divider with and without load, discharge of a capacitor, Bridge and half wave rectifiers, characteristic curves For silicon and zenor diodes for lamp and LED curves. For LC parallel and series resonant circuits, for RLC series resonant circuit.</p>	12 sets
93	<p>Transistors:</p> <ul style="list-style-type: none"> ➤ NPN current gain40-250,power dissipation 5W ➤ NPN current gain420-800,power dissipation 0.5W ➤ PNP current gain40-250,power dissipation 5W ➤ PNP current gain420-800,power dissipation 0.5W 	96 No (24 No each type)
94	<p>Analogue Multimeter:</p> <p>Measuring range</p> <p>AC 0-750V & DC 0-600V</p> <p>AC current 0-10amp & DC 0-10amp,Internal resistance 10M ohms</p>	12 No
95	<p>Magnets Horseshoe:</p> <p>Horseshoe magnet Alnico magnet with screw, Poles marked red and green pole Area approx. $20 \times 10\text{mm}^2$. Distance between poles approx. 50mm length of shank approx. 70mm.</p>	12 No

96	<p>Parallel plate capacitor with Accessories:</p> <p>A fixed and a moveable plate on a guide rail having centimeter scale, plate separation can be finally adjusted and read off from display to an accuracy of 1/10mm plate spacing: 0-160mm,plate area 500cm² plates solid casting. Plates can be adjusted between 0 and 20mm via a sindle.</p> <p>Accessories:</p> <p>Plastic dielectric plate 300x300x2mm³ approx</p> <p>Plexiglass dielectric plate 300x300x2mm³ approx</p>	6 No 24 (4 each)
97	<p>Electric field meter (230V,50Hz.) with Accessories:</p> <p>Maximum output voltage: 10 VIV output can correspond to 100V/c,300V/cm,1000V/cm,10V,30V, 100V(with lx voltage measurement plate), 100V,300V,1000V(with 10 x voltage measurement plate), I capacitor measurement plate 250cm² set Plexiglas spacers, Drip cup basin.</p>	04 No
98	<p>Center of gravity apparatus:</p> <p>Comprises a rod mounted on a base with a suspension screw at the top and four laminas of clear acrylic - 1 each of circular, triangular, square and trapezoidal. Each lamina has suspension holes along their periphery.</p>	12 No