

Govt. Gen. Degree College, Dantan-II  
Physics Items 2019-20

SEMESTER-III		
SI No	Name of the Experiment	Specifications
1	To determine the Coefficient of Thermal Conductivity of Cu by Searle's Apparatus	Searle's Thermal Conductivity Apparatus, Thermometers (1/10°C) - 4 nos, Constant Level Tank, Steam generator with Heating Arrangement, <b>Digital Balance</b> , Spring balance, Rubber Tubing, Measuring Flask
2	To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method	POWER SUPPLY 0-30V, 20A DC Input Voltage : 220V, ±5%, 50Hz AC, Output Voltage : 0-30V Voltage Resolution : 0.1V, Voltage Display : 2½ Digit LED Output Current : 0-20 Amp, Current Resolution : 0.1 Amp Current Display : 2½ Digit LED METAL CONDUCTIVITY ROD Cu/Al Dimension : 420 x25.4mm (Length x Diameter) Current Connection : 4mm socket Temperature Point : 10 Nos., equal spacing 35mm Calorimeter Socket : 20 x 20mm (Length x Diameter) CLAMP Material : Aluminium alloy, Rod : Aluminium, length=160mm Object type : Square & round shape, Object size : Up-to 13mm dia Object can be held both vertically and horizontally. LABJACK Material : Aluminium, Top Plate Size : 160x130mm Static Loading : 10kg, Vertical Elevation : 65 to 260mm
3	To study the variation of Thermo-emf of a Thermocouple with Difference of Temperature of its Two Junctions	Compact PCB Board with inbuilt Power supply DC Voltage : 2V & 4V/100mA DC Voltmeter : 20V & 200mV (Switch Select), Ammeter : 0-200mA Resistance : 1Ω-10000Ω & 1KΩ -10KΩ, Thermometer : 10-100°C - 2nos Sensitive Galvanometer 30-0-30, Stand for Thermocouple with base plate. Copper-Iron Thermocouple & Potentiometer : 10 wire Water containing Beaker : 250ml 2Nos Heating Arrangement
4	To calibrate a thermocouple to measure temperature in a specified Range using (1) Null Method, (2) Direct measurement using Op-Amp difference amplifier and to determine Neutral Temperature	P.T.-100 Sensor, Reference thermometer, Glass Beaker 250 ml, Inbuilt-RTD Apparatus with panel meter 1, to measure temperature, Immersion rod, Multimeter, Connecting leads Red & Black 50cm (pair), DC Supply : +12V & -12V Fixed, DC Supply : 0-1V Variable -2nos, Voltmeter : 0-1V (Moving Coil) -2nos, Voltmeter : 0-10V (Moving Coil), Resistor : 1KΩ-2nos, 10KΩ-2nos, OpAmp-IC741, Interconnection: 2mm patch cord, Front panel built with high class insulated sheet, Circuit & Symbol diagram printed on front panel, Mains Power : 230V/50Hz

5	To design a NOT gate using a transistor.	Data Switch : 0-5V-2nos, LED Indication : LED (RED)-2nos Transistor : BC547, Resistor : 10K-2nos, DC Supply : 5V
6	To design a combinational logic system for a specified Truth Table	<p>Double sided PCB with Basic logic gate IC's, NOT (7404), OR (7432), AND (7408), NOR (7402), NAND (7400), EX - OR (7486).            Universal gates NAND and NOR., Basic Flip-Flops RS (using NOR), JK (7476), D (7474), MS-JK (7476), D (7474), and T (using JK)., Binary counter synchronous (74191), Ripple counter (7490)            Four Bit ring counter using (7476), Decade/BCD counter using (7490), Universal shift register (74194), Nine Bit parity generator/checker (74280) Multiplexer (74153) &amp; De-multiplexer (74138), BCD to seven segment decoder (7447)            Four Bit comparator (7485), 20 Pin ZIF socket, Power supply +5V, GND, Binary to Gray, Gray to binary, Binary to BCD, BCD to Binary, BCD to Excess 3, Excess 3 to BCD.            De-Morgan's theorem I &amp; II, Boolean equation.            To provide logic 0 &amp; 1 inputs with LED indication 16 switches are provided. To observe the output logic states 16 LEDs are provided.            Preset and clear signals for Flip-Flops, counter etc., Manual clock for Flip-Flops, counter etc.</p>
7	To convert a Boolean expression into logic circuit and design it using logic gate ICs	
8	Half Adder, Full Adder and 4-bit binary Adder	
9	Half Subtractor, Full Subtractor, Adder-Subtractor using Full Adder I	
10	To build Flip-Flop (RS, Clocked RS, D-type and JK) circuits using NAND gate	
11	To design an astable multivibrator of given specification using 555 Timer	<p>DC Supply : 5V, IC : NE555, Led Indicator : 2nos            Resistor : 100K<math>\Omega</math>-2nos, 10K<math>\Omega</math>-2nos, 1K<math>\Omega</math>, Capacitor : 1<math>\mu</math>F, 0.1<math>\mu</math>F-2nos, 0.01<math>\mu</math>F-2nos, 10<math>\mu</math>F, Variable Resistor : 5K<math>\Omega</math></p>
12	To design a monostable multivibrator of given specifications using 555 Timer	
<b>SEMESTER-IV</b>		
13	Photo-electric effect: photocurrent versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light	<p>OPTICAL BENCH – BLACK ALUMINIUM WITH LUX METER            Material : Aluminium alloy, section, Scale : 0-100cm , Least count : 1mm, DC POWER SUPPLY AC/DC            Output : 2,3,4,5,6,8,10 &amp; 12V AC Full wave rectified unsmooth &amp; unregulated DC            Overload : Resettable thermal trip, Input : 230V A, 50Hz            POLARIZER/ANALIZER            Angle: Adjustable (0-90<math>^\circ</math>), Aperture: 20mm dia, Frame: 130mm dia, to avoid scattering of lights, Rod: 10mm dia            LAMP HOUSING Lamp: 12v, 21v, Lens: Spherical condenser, to avoid scattering of lights, Connection: 4 mm plug lead, Mounting rod: 10mm dia, Housing: Aluminium, Heat ventilation arrangement            CONVEX LENS IN HOLDER            Focal length: 100mm, Diameter of Lens: 50mm, Frame Diameter: 130mm to avoid scattering of light, Rod of Diameter: 10mm            DIGITAL MULTIMETER            Resistance: 200<math>\Omega</math>, 2000<math>\Omega</math>, 20k<math>\Omega</math>, 200k<math>\Omega</math> &amp; 2000k<math>\Omega</math> W. Testing: Diode &amp; Transistor Battery: 9V            PHOTO RESISTOR LDR IN MOUNT            Photo resistor: CDS (cadmium Sulphide), Aperture: 10mm, clear            Mounting rod: 10mm dia, Connection: 4mm safety terminals            Working voltage: 0-16V DC            ADJUSTABLE SLIT SELF CENTERING            Slit width: 0-2 mm, Height: 6 mm, Frame diameter: 120mm to avoid scattering of light, Mounting rod: 10mm dia</p>

14	To determine work function of material of filament of directly heated vacuum diode	DC Supply :0-250V,Vacuum diode,DC Voltmeter : 0-6 & 0-150V (Moving Coil), DC Ammeter: 0-600mA & 0-30mA (Moving coil),Vacuum Diode : EZ80, Variable Pot:2nos
15	To setup the Millikan oil drop apparatus and determine the charge of an electron	Millikan's Apparatus Input Voltage : AC 240V, 60Hz,Output Power : 5W.Plate Voltage : 0~500V DC, USB Facility . Plate Distance : 5±0.2mm.Total Magnification : 30X,Linear field of vision : =3mm. Scale division : 2±0.01mmObjective lens : 100 lines/mm. Operating temperature : -10~40°C.Relative Humidity : Not less than 85% (at 40°C)Dimensions : 320mmx220mmx190mm.Atomizer,Bottle material : Glass Sprayer : Throat double pipe sprayer Digital Stopwatch,Display : 6 Digit, Accuracy : 0.01sec, Digit size : 5mm, Mode : Start, Stop & Reset
16	To design a Wien bridge oscillator for given frequency using an op-amp.	DC Supply: +5V,BJT:CL100S,Resistor : 4.7K $\Omega$ ,100K $\Omega$ ,6.8K $\Omega$ ,3.3K $\Omega$ ,680 $\Omega$ ,10K $\Omega$ Capacitor:0.01 $\mu$ F,0.047 $\mu$ F,0.2 $\mu$ F,Front panel built with high class insulated sheet,Circuit & Symbol diagram printed on front panel,Mains Power :230V/50Hz <b>Cathode Ray Oscilloscope-20 MHz Dual channel</b>
17	To design a digital to analog converter (DAC) of given specification	R2R, Ladder Diagram, DAC,Resistor:1k $\Omega$ -6nos,Data switch :8nos,DC Supply : +12V(Variable) LED :8nos
<b>SEMESTER-V</b>		
18	To determine the ionization potential of mercury	DC Power Supply : 0-3 VDC/50mA ,AC Power Supply : 6.3V 0 to 25V 500mA, DC Voltmeter: 0- 30V (Moving Coil),DC Ammeter : 0-30mA (Moving Coil)

19	<p>Study of Electron spin resonance determine magnetic field as a function of the resonance frequency</p>	<p><b>ESR BASIC SET</b>  Basic unit, Dimensions : 165x105x135 mm<sup>3</sup> approx., Weight : 1.25 kg approx.  Magnetic coils, Windings : 500 each, Magnetic field : 0 - 3.37 mT,  Connectors : Coaxial power connectors, Dimensions : 20 mm x 74 mm diam. approx., Weight : 0.2 kg approx. Control console  Probe input : 4-pin Lemo socket, Coil connectors : Sawtooth current source, 0- 250mA, 50ms, pair of co-axial connectors,  Magnetic output : Proportional to coil current, 0-1 V, BNC Signal output : Resonance signal, 0-1 V, BNC socket  Frequency range : 45 to 75 MHz approx. (ESR) 10 to 15 MHz, approx. (NMR) Dimensions : 170x105x45 mm<sup>3</sup> approx., Weight : 0.5 kg approx. ESR/NMR Basic Set includes a basic unit, pair of coils, control, panel &amp; Plug-in power supply, 12 V AC  <b>ESR SUPPLEMENTARY SET</b> A ESR probe-head with radio frequency coil., B A sample of DPPH (2,2-diphenyl-1-picrylhydrazyl). C An empty control sample tube for comparison., D Two mounting rings., E Two mounting cylinders  <b>NMR SUPPLEMENTARY SET</b>  Connections : Four-pin lemo plug, Magnetic Field : approx. 300 mT  A NMR probe-head with radio frequency coil.  B A permanent magnet giving a highly uniform field. C. A sample of glycerine., D A sample of polystyrene.  E A sample of Teflon., F An empty control sample tube for comparison., G Two mounting discs  <b>HF PATCH CORD</b>, Impedance : 50 Ohm, Connector : BNC to BNC, Length : 1m, Shielded patch cords for low-loss, low-capacitance transmission of high-frequency signals; equipped at either end with a BNC plug.  <b>DIGITAL STORAGE OSCILLOSCOPE</b></p>
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20	Study of Zeeman effect:with external magnetic field;Hyperfinesplitting	<p>Zeeman Effect with TRANSVERSE&amp; longitudinal and 1mtr Bench.  POWER SUPPLY 0-30V DC, 10A Input Voltage : AC 220V <math>\pm</math>5%,  Output Voltage : 0-30V, Output Current : 0-10Amp, Voltage Display : 3½ Digit LED, Current Display : 3½ Digit LED ELECTROMAGNET  Coils : 400 turns., Coil Current : 10 Amp (Max.), Connection : 4mm safety socket.  U Core : 150x130mm(LxH), 40x40mm cross section., I Core : Length=150mm, 40x40mm cross section.Core material : Ferromagnetic., Supplied with 4 support legs with leveling knob.  OPTICAL BENCH  Material : Aluminium alloy, Type : Hexagonal section, Scale : 0-100cm, Least count : 1mm, Supplied with 4 fixed saddle.  CONVEX LENS IN HOLDER,Focal Length : 100mm, Diameter of Lens : 50 mm, Frame Diameter : 130 mm to avoids scattering of lights, Rod Diameter : 10 mm  TRANSVERSE SADDLE  Material : Aluminium, Locking : Spring loaded, Motion : X-Y axis, Holder : 10mm dia.  FABRY PEROT ETALON,Mirror optics : Lamda/20, Mirror gap : 3 mm, adjustable, Filter : 532nm, Green, Interference Filter, Clear view : 40mm dia, Rod : 10 mm dia  CCD CAMERA,Sensor : CMOS, Output : VGA, Connector : BNC, Power : 5V DC, Focus : Manual adjustment, Rod : 10 mm dia.  POLARIZER FILTER,Angle : Adjustable (0°-90°), Aperture : 21mm dia., Frame : 130mm dia., to avoids, scattering of lightsPolarization : Linearly polarized, Rod : 10 mm dia.  QUARTER WAVE PLATE,Angle : Adjustable (0°-90°), Aperture : 15mm dia., Frame : 130mm dia., to avoids, scattering of lights,Polarization : Circular polarized, Rod : 10mm dia.  <b>Note : LAPTOP-Optional</b></p>
21	To show the tunneling effectintunnel diode using I-V characteristics	<p>Inbuilt Fixed DC regulated power supply,DC Voltmeter : 0-600mV  DC Ammeter : 0-50mA,Tunnel Diode : IN 3717</p>
22	Measurement of Planck'sconstant using black body radiation and photo-detector	<p>Selector Switch : V-I and T-I experiment,Selector Switch at V-I position :-  Voltmeter &amp; current Display: 3½ digit, 7segment, Voltage Range : 0.000-2.000V, Current Range : 0-2000mA,Selector Switch at T-I position :-  Current Display : 3½ digit, 7segment LED,Current Range : 0-20mA  Temperature Display : 3½ digit, 7segment LED,Temperature Range : Room temperature to 60.0°C,Oven , Oven Connector : 5 Pin, DIN type LED Connector : 3 Pin, DIN type,Oven with Temperature Sensor  Heating Element : 20 ohm, Oven Connector : 5 Pin, DIN ,Ambient Temp. : 60° C, Temp. Sensor : Pt100,Output Pin : Heater pin 4 &amp; 5.,Temperature pin 1 &amp; 2</p>
23	To determine the Planck's constant using LEDs of atleast 4different colours	<p>DC Supply :0-5V/150mA,DC Voltmeter : 0-5V  DC Ammeter: 0-2000µA,LED : RED-630nm,YELLOW-578nm,BLUE-436nm, GREEN-546nm</p>

24	To measure the Magnetic susceptibility of Solids	<p>DIGITAL GAUSS METER:Range : 2 kG,  DIGITAL BALANCE- Capacity : 500g.Display :Digital,Power Supply- Voltage : 0-16V DC continuously variable &amp; stabilized,Voltage display : 3½ digit LED,Ripple : Less than 25mV,Overload : Current limiting protection  Current : 5 A continuously variable, 10% to full rating,Current display : 3½ digit LED,Working voltage : 230V AC, 50 Hz single phase  Power : 220 V, 50 Hz AC,Hall probe : InAs  ELECTROMAGNET  Coils : 400 turns.Coil Current : 4.5Amp (Max.)  material : Ferromagnetic.</p>
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