

Lab equipment list, Dept. of Physics, University of Gour Banga

A. For Computer laboratory

Item	Brand	Number
Computer	Dell	25
UPS		25
Printer-scanner-xerox		4

B. For General Laboratory

List of experiments

Apparatus for each experiment should be complete in all respects. All the necessary components/accessories should be accompanied.

1. Study of temperature dependence of resistivity for a given semiconductor using FOUR PROBE SETUP and determine its energy band gap (for Ge).
2. Determination of Saturation Magnetization, Retentivity and Coercivity of given Ferromagnetic samples Using HYSTERESIS LOOP TRACER.
3. (i) Determination of Hall Coefficient of a given semiconductor sample using variable DC magnetic field.
(ii) Study of the variation of Hall Coefficient of a given extrinsic semiconductor as a function of temperature using Temperature dependence Hall – effect setup.
(iii) Study of magnetoresistance.
4. Determination of the specific charge of an electron by the SOLENOIDAL LENS METHOD / MODIFIED THOMPSON'S METHOD.
5. Study of LISSAJOUS FIGURES and calibrate an Audio Frequency Oscillator by PHASE CHANGE AND DIRECT METHOD.

6. Determination of the velocity of ultrasonic wave in a given liquid for a given frequency using MULTI FREQUENCY ULTRASONIC INTERFEROMETER /LIQUID GRATING METHOD.
7. Determination of the Lande g factor for the DPPH sample using ELECTRON SPIN RESONANCE SETUP.
8. Study of absorption spectrum of Iodine vapor using OPTICAL SPECTROMETER and determine its (i) Dissociation energy and (ii) Anharmonicity constant.
9. Determination of the thickness of a given transparent plate with the help of JAMIN'S INTERFEROMETER.
10. Determination of the refractive index of a given transparent thin film using MICHELSON INTERFEROMETER.
11. Determination of the average wavelength and the difference between the wavelength of its two components of sodium light used as source employing MICHELSON INTERFEROMETER.
12. Study of atomic spectroscopy using ZEEMAN EFFECT.
13. Study of Polarization of light using LASER BEAM.
14. Determination of AC Conductivity and Dielectric Constants of Composites Materials by LCR Bridge.
15. Study of photoconductivity of semiconductors.
16. Study of power and I-V characteristics of a solar cell .

C. For Electronics laboratory

List of experiments

Apparatus for each experiment should be complete in all respects. All the necessary components/accessories should be accompanied.

Specification of CRO: Minimum 2mV measurement option, Freq: 20MHz or more

Specification of Function Generator: Audio frequency

Regulated power supply: As required

1. To design and study an amplifier with an Op-amp.
2. To design and study an oscillator with an Op-amp.
3. To design and study a voltage follower circuit with an Op-amp

Two setups are needed for the above three OPAMP experiments.

4. Construct a sawtooth wave generator using UJT for different frequencies. Determine V_P , V_V and η , symbols having the usual meanings. For a fixed C , vary R (5 values) and Draw the TR graph. Plot the theoretical TR graph on the same graph paper. Obtain two such sets.

5. Construct a sawtooth wave generator using UJT for different frequencies. Determine V_P , V_V and η , symbols having the usual meanings. For a fixed R , vary C (5 values) and Draw the TC graph. Plot the theoretical TC graph on the same graph paper. Obtain two such sets.

6. Design an astable multivibrator with two transistors for a fixed given frequency (1.0 KHz). Assume $V_{c(sat)}=0.2$ volt, $I_{c(sat)}=5$ mA, $h_{FE(min)}=100$ and $V_{BE(sat)}=0.6$ volt. Compare the experimentally obtained frequencies with the required theoretical values. Using this multivibrator design a VCO and draw its transfer characteristics. From this plot calculate the VCO sensitivity.

7. Design the following RC active filters: (a) Low Pass, having cut off frequency 10 KHz. (b) Band Pass, having Centre frequency 2.8 KHz and bandwidth 3.2 KHz. Draw separate frequency response curves and compare the theoretical and experimental results.

8. Design the following RC active filters:

(a) High Pass, having cut off frequency 5 KHz.

(b) Band Stop, having Centre frequency 3.4 KHz and bandwidth 3.0 KHz.

Draw separate frequency response curves and compare the theoretical and experimental results.

9. Design the following using NAND gates only:

(a) SR FlipFlop with the provision of clock (enable input). Study the output for different combinations of S and R.

(b) Convert the above to clocked D FlipFlop.

(c) Design a clocked JK FlipFlop and study the results of different combinations of J, K and clock.

Note the drawback of the experimental circuit, if any and suggest a suitable circuit to remove the drawback with proper explanation.

10. Design a transistor CE amplifier of midband gain 50 and study its performance in

the following way:

(a) Test the linearity of inputoutput variations of a voltage signal of suitable fixed frequency and show it graphically.

(b) For fixed amplitude of input ac signal within the linear region, study the frequency response with an external bypass capacitor at the output.

Plot the gain frequency graph and determine the bandwidth of the amplifier.

11. (a) Study the performance of AM modulator circuit by considering three different values of modulating signal amplitude and frequency. Determine modulation index in each case.

(b) Study the performance of AM demodulator circuit by considering three different values of modulating signal amplitude and frequency. Write down your observations clearly.

12. Study the performance of Passive T type Low Pass and High Pass filters considering three different values of load. Draw separate frequency response curves for Low Pass and High Pass filters.

List of Furnitures/Accessories for Physics Laboratory

Item	Specification (if any)	Qty.
Computer Table	Standard	25
Plastic chair	Without handle	25
Wooden Table	4.5ft(L),3ft(W),3ft(H)	25
Stool (wooden)	2ft(H)	30
Black Curtain	as per window size	04
Almirah (steel)	standard size	03
Scientific Calculator	(CASIO 991 MS)	2
Sand paper		30 pages
Meter scale (Wooden)		2
Prism		5
Magnifying glass		5
Tester cum screwdriver		2
Digital Multimeter	MICROTECH	5
Wire stripper		4
Needle-nose pliers		2
Screwdrivers set		2
Soldering iron and solder ("rosin core")	25 watt	2
Soldering gun	More than 25 watt	1

Hand drill		1
Spool of 22-gauge, solid copper wire	Red Colored	1
Spool of 22-gauge, solid copper wire	Black Colored	1
Spool of 22-gauge, solid copper wire	Blue Colored	1
Spool of 22-gauge, solid copper wire	Yellow Colored	1
Jumper wires(two kind)		30 (each)
Solderless breadboard		25
Extension cord		2
Component box	Medium size, plastic	20
Resistance (carbon)	10 Ohm, 100 Ohm,1K, 10K, 50K,100K,1M, 100 M	50 For each type
Capacitor	1pF, 10pF, 0.1μF, 1μF, 10μF	20 each
IC	741	50
IC	NE555, ICM7555	20 Each
Seven segment display		2