

### Experiment No.1 (Compound pendulum)

1. Define moment of inertia & tell its unit in CGS & SI System.
2. Define compound pendulum and bar pendulum.
3. Define radius of gyration and what is its unit?
4. State theorem of parallel axis and perpendicular axis.
5. When is the time period of bar pendulum is minimum & maximum?
6. What would be the time period of bar pendulum at centre of gravity (or at 10th hole)?
7. Show the four points for which time period is same in your graph of 'l' and T.
8. Define point of suspension and oscillation & what do you mean by they are interchangeable?
9. Define length of pendulum.
10. Why the amplitude of oscillation must be small for bar pendulum.
11. What would be the result, if same experiment is performed in space?
12. What would be the result, if same experiment is performed in moon?
13. What type of oscillation is this, free, damped or forced?
14. What is nature of graph between  $lT^2$  and  $l^2$ ?
15. Distinguish between simple pendulum and compound pendulum.
16. What is SHM? What is angular harmonic motion?
17. Prove PQ in figure (3) gives twice of radius of gyration.
18. Prove that in figure (4),  $\sqrt{OD}$  represents radius of gyration.
19. How is the restoring torque developed in bar pendulum?
20. How much is the least count of stop watch that you have given?
21. What happens to g when you move up or down the earth's surface?

### Experiment No.2 (Torsion pendulum)

1. How many types of modulus of elasticity are there?
2. Define torsion pendulum.
3. Differentiate between young's modulus, bulk modulus and shear modulus of elasticity & give their units.
4. What is the effect of temperature on rigidity?
5. Why this called torsion pendulum?



6. What would be the result, if the same experiment is performed in space and moon?
7. Distinguish between compound and torsion pendulum.
8. A circular disc and a circular ring of same mass and radius slide down on an inclined plane, which will reach the bottom first?
9. Define inertia and moment of inertia. How do they resemble to the linear & rotational motion?
10. How is restoring torque developed in torsion pendulum?
11. What is the effect of amplitude of oscillation on time period of torsion pendulum?
12. In which type of material young's bulk and modulus of rigidity are determined. Explain in detail.
13. What would be the shape of given material, if young's modulus of elasticity is to be determined?
14. What would be the shape of given material, if bulk modulus of elasticity is to be determined?
15. Why the material is taken in the form of wire? Is it possible to perform same experiment in other shape of material?

### *Experiment No.3 (Newton's ring)*

1. Define Newton's ring.
2. Why are Newton's rings circular?
3. How are Newton's rings formed?
4. Define interference. What are the essential conditions for interference?
5. Why is central spot dark in your experiment?
6. What would be your observation in transmitted light?
7. What type of the source has been used here?
8. Differentiate between monochromatic and chromatic source of light.
9. What is the value of wavelength of sodium light?
10. Explain the process to determine least count of microscope.
11. What will happen if the glass plate of the combination is replaced by plane mirror & biconvex lens?
12. Why should you use a convex lens of the large radius of curvature?
13. Why do the fringes get closer and thinner as we move from the center?
14. Define coherent source.
15. Differentiate between interference and diffraction.



16. What would be your observation if sodium light source is replaced by white light source?
17. What is the nature of graph between  $D_n^2$  &  $n$ ?
18. What is the nature of graph between  $D_n^2 - D_m^2$  and  $(n-m)$ ?
19. Differentiate between the constructive & destructive interference.

#### **Experiment No.4 (Spectrometer)**

1. Explain the different parts of spectrometer.
2. What do you mean by refracting faces of prism?
3. Define angle of prism.
4. Define angle of minimum deviation.
5. How does the angle of deviation change with the angle of incidence?
6. For which colour the deviation is maximum and minimum?
7. What do you mean by angular dispersion?
8. Explain the cause of dispersion.
9. Define dispersive power.
10. What do you mean by refractive index?
11. Explain the procedure to determine V.C. of spectrometer.
12. Explain procedure to measure angle of minimum deviation.
13. Explain the procedure to find angle of prism.
14. What is the advantage of keeping the prism in minimum deviation position?
15. Write the Cauchy relation between refractive index and wavelength of light. Explain the meaning of each symbol on it.

#### **Experiment No.5 (Carey – Foster bridge)**

1. What is Carey-foster bridge?
2. What do you measure with it?
3. What are Kirchoff's rule?
4. Write wheat stone bridge principle with circuit diagram.
5. What are the advantages of Carey-foster bridge over meter bridge?
6. Why is Carey-foster bridge so sensitive?
7. What is the role of galvanometer in your experiment?



8. What electrical parameter does galvanometer measure? or What are the uses of galvanometer?
9. Define resistivity. Derive a relation between resistivity and resistance.
10. What is the difference between resistivity (specific resistance) and resistance per unit length?
11. Why should the resistances P and Q be equal?
12. Can you test the uniformity of the wire with this experiment?
13. Can you predict the material of which the wire is made?
14. Differentiate between meter bridge and Carey-foster bridge?
15. What is the effect of temperature on resistance and resistivity of conductor?
16. Does the resistivity of a substance vary when its length or area of cross-section changes?
17. When is wheat stone bridge said to be balanced?
18. What is the null point due to flowing of no current in the circuit or flowing of equal and opposite currents in the circuit?

#### ***Experiment No.6 (Diffraction)***

1. What do you mean by diffraction of light? What are the conditions for diffraction?
2. Differentiate between interference and diffraction.
3. What is diffraction grating?
4. How much should be the width of transparency and opacity in grating?
5. How many types of grating do you know?
6. Radio wave can be received inside a room but light cannot. Explain why?
7. What type of diffraction is in your experiment?
8. What is grating element?
9. Explain how a grating produces dispersion? Compare its action with a prism.
10. Why did you take distance between bright spots in case of grating (but distance between dark spots in case of hair in your experiment)?
11. How much is the wavelength of light used in your experiment?
12. What does the word LASER stand for?
13. How is laser produced?
14. Explain the characteristics of laser light.
15. Define, induced absorption, spontaneous emission, stimulated emission, population inversion, pumping and metastable state.



16. What is the role of He and Ne in He-Ne laser?
17. Point out some difference between laser and normal light.
18. Write some uses of laser light.
19. Can diffraction be observed for transverse wave? What about for longitudinal wave? Matter wave? Electromagnetic wave?

### **Experiment No. 7 (Capacitor)**

1. Define capacitor and capacitance. What is the unit of capacitance.
2. What do you mean charging and discharging of capacitor?
3. Upon what factors does the capacity of a capacitor depend?
4. Define dielectric constant and permittivity. What is the relation between them.
5. A capacitor is used in (i) an A.C. circuit (ii) a.d.c. circuit. What will be the difference in its behavior?
6. What is the resistance offered by a capacitor (or write a formula for capacitive reactance)?
7. Define time constant in terms of charging and discharging. (i) for charge (ii) for current.
8. Define half life.
9. Write charging and discharging equation, separately for (i)  $q$  & (ii)  $I$ .
10. What is displacement current? What is its physical significance.
11. State Maxwell law of induction.
12. Does the capacitance increase or decrease with the presence of dielectric?
13. When a capacitor is charged through a resistor, it shows maximum current first then the current decreases continuously, Explain why?
14. How much time is required to growth current from zero to maximum value in RC circuit?
15. Sketch the graph between current and time for both charging and discharging.
16. If you are given three capacitors having capacitance  $C_1$ ,  $C_2$  and  $C_3$  respectively. How will you combine them in order to (i) increase and (ii) decrease the capacitance?
17. How many time constants must elapse in order to (i) build up charge to 63% (ii) decrease charge to 37% of the peak charge.
18. Write the formulae for capacitance of (i) a parallel plate capacitor (ii) isolated spherical capacitor (iii) spherical capacitor (iv) cylindrical capacitor.



### **Experiment No.8 (L.C.R.)**

1. Write meaning and units of L,C,R.
2. Can we name this as C.L.R. or R.L.C. instead of L.C.R.?
3. What is resonance?
4. What is quality factor?
5. Define free damped and forced oscillation.
6. Define natural frequency and resonance frequency.
7. What is the phase difference between voltage and current at resonance?
8. What is impedance of circuit? Write formula for it.
9. What is the relation between quality factor for inductance and capacitance at resonance?
10. What do you mean by upper and lower cut-off frequency?
11. What is band width?
12. What do you mean by sharpness of resonance?
13. What is the relation between band width and sharpness of resonance?
14. What is the relation between quality factor and sharpness of resonance?
15. Write the formula for capacitive and inductive reactance and write their unit.
16. Capacitor blocks d.c., why? What does it do for a.c.?
17. The circuit is capacitive below resonance frequency and inductive above resonance frequency. Explain why?
18. Explain the dependence of quality factor on resistance.
19. Write the formulae for (i) inductive reactance & (ii) capacitive reactance.

### **Experiment No.9 (Sonometer)**

1. What do you mean by A.C.? Differentiate it with D.C.
2. What is the frequency of A.C. and D.C. in your lab?
3. How does the wire begin to vibrate in the experiment?
4. Can we use iron wire instead of brass or copper?
5. What type of vibration is this?
6. What do you mean by natural and resonant frequency?
7. What is resonance?
8. Describe different parts of sonometer.
9. What are the laws of transverse vibration of string?



10. Write working formula for frequency.
11. Does the frequency depend upon diameter of wire?
12. Does the current become zero in A.C.?
13. What type of transformer is used in your experiment?
14. Differentiate between free, forced and damped vibrations?

#### ***Experiment No.10 (Polarimeter)***

1. What is polarization of light?
2. What is Nicol prism and how it is constructed?
3. What is half wave plate?
4. What are dextrorotatory and laevorotatory substances?
5. Define specific rotation.
6. Differentiate between longitudinal and transverse wave.
7. Can longitudinal wave be polarized?
8. Describe the action of Nicol prism as a polarizer and analyser.
9. Can the two waves having different plane of polarization interfere?
10. What are extraordinary and ordinary rays?
11. What is plane polarized light?
12. What are positive plate & negative plate?

#### ***Experiment No.11 (Resonance tube)***

1. What is resonance?
2. What types of waves are produced in air column during resonance?
3. What do you mean by end correction?
4. What is the role of water in this experiment?
5. How many nodes and antinodes are formed in the position of first resonance?
6. What type of organ pipe is in your experiment?
7. What is the 1st resonance produced at a distance of  $\frac{\lambda}{4}$ ?
8. Write the factors affecting the velocity of sound in gases.
9. What type of wave is a sound wave (longitudinal or transverse)?
10. Write working formula for velocity of sound in your experiment.