



## Model Paper Physics Subjective

Intermediate Part – I (11<sup>th</sup> Class) Examination Session 2012-2013 and onward

Total marks: 83

Time: 3:10 hours

### SECTION ----- II

2. Write answers of any EIGHT questions. (8 x 2 = 16)
- Define dimension. Check the correctness of the equation  $v=f\lambda$  by the principle of Homogeneity of dimensions.
  - Briefly explain the two drawbacks to use the period of simple pendulum as a time standard.
  - Assess the total uncertainty in the final result of a timing experiment with the help of an example.
  - Determine the dimensions of pressure and density.
  - Under what condition would a vector have components that are equal in magnitude.
  - Justify the statement “A body cannot rotate about its centre of gravity under the action of its own weight”.
  - If  $\vec{A} \cdot \vec{B} = 0$ , Can it be concluded that  $\vec{A}$  and  $\vec{B}$  are perpendicular to each other? Support your answer with a proof.
  - Why fog droplets appear to be suspended in air?
  - Discuss the sign of acceleration due to gravity for a cricket ball thrown upward, for its upward and downward motion.
  - Can the velocity of an object reverse the direction when acceleration is constant? Justify with an example.
  - It is advisable to fasten the seat belts during a fast drive. Why is it?
  - Explain how would a bouncing ball behave in each of an elastic and inelastic collision with floor of room.
3. Write answers of any EIGHT questions. (8 x 2 = 16)
- When a rocket enters the atmosphere, why does its nose cone become very hot? Where does this heat energy come from?
  - State the work energy principle. Express it in equation.
  - While calculating the Absolute Gravitational potential energy, why is the distance between infinity and surface of earth is divided into very small steps.
  - What is meant by moment of Inertia? Give its significance.
  - How is artificial gravity created in an Artificial satellites.
  - Centripetal force and centrifugal reaction are equal in magnitude but opposite in direction. Why these forces do not balance each other.
  - What happens to the period of simple pendulum if
    - its length is doubled
    - its suspended mass is doubled.
  - Show that in SHM, the acceleration is zero when velocity is greatest and the velocity is zero when the acceleration is greatest?
  - Why can we not realize an Ideal simple pendulum.
  - What features do longitudinal waves have in common with transverse waves.
  - Why does sound travel faster in solids than in gases?
  - Justify the statement “Velocity of sound in a gas is independent of pressure of the gas”
4. Write answers of any SIX questions. (6 x 2 = 12)
- Define coherent sources of light. How two light beams can be made coherent.
  - How is the distance between interference fringes is affected by the separation between the slits of Young’s double slit experiment?
  - How would you distinguish between unpolarized light and plane polarized light.
  - Name and explain any two of major components of a fiber optic communication system.
  - How the resolving power of a compound microscope can be increased.
  - What happens to the temperature of the room, when an air conditioner is left running on a table in the middle of the room.
  - What is meant by tripple point of water. What is the value of Absolute temperature of tripple point of water.
  - Can the efficiency of a carnot engine be 100%? Justify your answer with proof.
  - Normal Human body temperature is  $98.6^{\circ}F$ . Convert it into  $C^{\circ}$  and K.

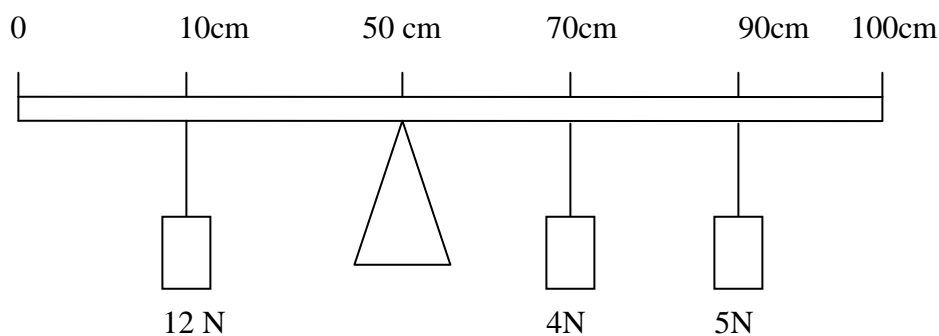
P.T.O.

**SECTION II (Essay Type)****Note:- Attempt any three questions.****( 8 x 3 = 24 )**

5. (a) Define Rectangular components of a vector. How two vectors can be added by Rectangular component method. 1+4
- (b) A ball is thrown with a speed of  $30 \text{ m sec}^{-1}$  in a direction  $30^\circ$  above the horizontal. Determine the height to which it rises. 3
- 6.(a) What are geostationary orbits. Derive an expression for orbital radius of a Geostationary orbit 1+4
- (b) How large a force is required to accelerate an electron ( $m=9.1 \times 10^{-31} \text{ kg}$ ) from rest to a speed of  $2 \times 10^7 \text{ msec}^{-1}$  through a distance of 5.0 cm. 3
7. (a) What is the limitation of Newton's formula for speed of sound in air. How did Laplace correct it. 1+4
- (b) A simple pendulum is 50cm long. What will be its frequency of vibration at a place where  $g=9.8 \text{ m sec}^{-2}$  3
- 8.(a) Explain the principle, construction and Magnifying power of a compound microscope with the help of a ray diagram . 1+2+2
- (b) A light is incident normally on a grating which has 2500 lines/cm. compute the wavelength of a spectral line for which the deviation in 2<sup>nd</sup> order is  $15^\circ$  . 3
- 9.(a) Explain the carnot cycle and calculate the efficiency of a carnot heat engine. 2+3 = 5
- (b) Water flows through a hose whose internal diameter is 1cm at a speed of  $1 \text{ m sec}^{-1}$ . What should be the diameter of the nozzle if the water is to emerge at  $21 \text{ m sec}^{-1}$ . 3

**SECTION III (PRACTICAL)****Note:- Give answers to any Four Questions.****4 x 2 = 8**

- 10.(a) (i) How does the electronic timer measure time of free fall accurately.
- (ii) A student measured the diameter of cylinder as 2.45 cm by a vernier calliper having least count +0.01 cm. But later on he observes a zero error in the instrument and finds zero of the vernier scale lies to the right of the zero of principal scale and 4<sup>th</sup> division of vernier scale faces any division of the principal scale. Find the correct value of diameter of cylinder.
- (iii) The wire of sonometer is stretched with a load of 4kg wt including the hanger and resonant length of wire is found to be 11cm by using a tuning fork having frequency 512 Hz. If diameter of the wire is doubled, find the resonant frequency of this wire for the same resonating length and same load.
- (iv) Find clockwise torque from diagram.



- (v) How does the angle of deviation vary with the angle of incidence in case of prism.
- (vi) Does the critical angle of a transparent material varies with the colour of light.
- (vii) What are the sources of error during the experimental determination of mechanical equivalent of Heat by electrical method.
- (viii) Design a table of observations/calculations to prove the law of length by using the vibrations in the string of sonometer.

10.(b)

Write down the brief procedure to show experimentally that time period of simple pendulum is independent of amplitude .

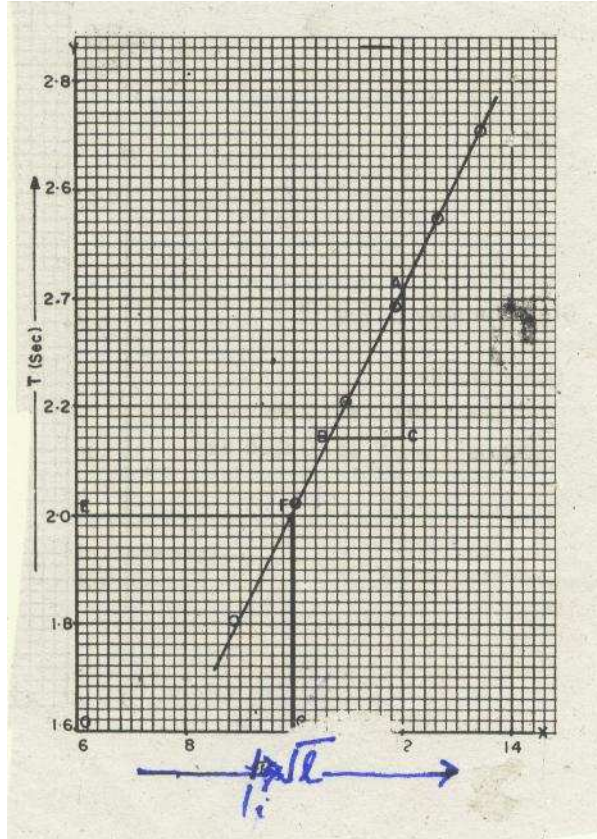
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OR

Write down the Brief procedure to determine experimentally the focal length of a convex lens by displacement method.

10.(c)

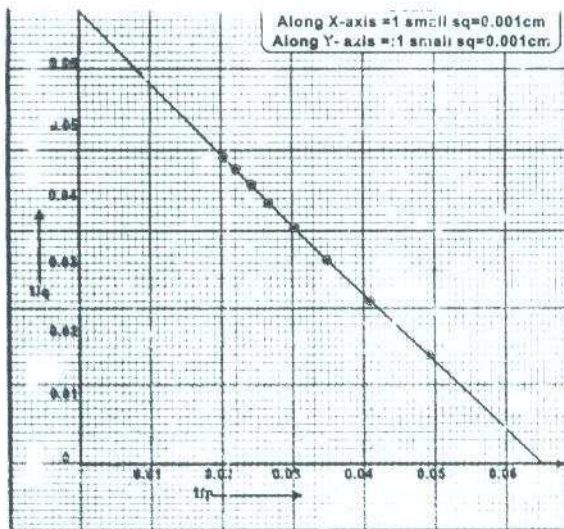
Answer the following Question on the basis of graph drawn below.



- (i) What can you conclude from the graph 1
- (ii) Find the value of “g” from the graph 2
- (iii) Measure the length of second’s pendulum from the graph 1

OR

Answer the following Question on the basis of graph drawn below.



- (i) What is value of “P” corresponding to  $1/q = 0.05 \text{ cm}^{-1}$  2
- (ii) Using a set of values of  $1/p$  and  $1/q$  from evaluate focal length. 2