

## PHYSICS THEORY

2007

Time: 3 Hours

Max.Marks.75

**Note:** Attempt **six** questions in all, selecting **three** questions from **Section A**, **two** questions from **Section B** and **one** question from **Section A**.

## SECTION "A"

1. (a) Derive the equation  $S = v_1t + \frac{1}{2}at^2$  (05)
- (b) Write two points of difference between the following: (04)
  - (i) Mass and weight
  - (ii) Heat and temperature
- (c) A force of 100 N rotates a body about its axis. If the arm of force is 2.5cm, find the magnitude of torque. (03)
- (d) The value of  $G = 6.67 \times 10^{-11}$  \_\_\_\_\_. Fill in the blank. (01)
2. (a) Define potential energy and kinetic energy and derive the relation  $K.E, \frac{1}{2}MV^2$ . (05)
- (b) State the following laws (04)
  - (i) Law of Gravitation
  - (ii) Law of conservation of Momentum
  - (iii) Pascal's law
  - (iv) Law of heat exchange
- (c) Write S.I units of the following: (03)
  - (i) Pressure
  - (ii) Stress
  - (iii) Work
  - (iv) Momentum
  - (v) Volume
  - (vi) Latent heat
- (d) Why is it difficult to drive a motor cycle on an oily road? Give the scientific reasons (01)
3. (a) What is machine? Define its mechanical advantage. Draw the diagram of an inclined plane and wheel and axle and write the formulae for their mechanical advantage (04)
- (b) Define the following: (04)
  - (i) Plasma physics
  - (ii) Addition of factors
  - (iii) Retardation
  - (iv) Specific heat
- (c) A roller tied to string is dragged on a floor making an angle of  $60^\circ$  with the floor. If tension in the string is 20N, find the force by which the roller is dragged. ( $\cos 60^\circ = 0.5$  and  $\sin 60^\circ = 0.866$ ) (03)
- (d) The distance covered per second by a moving body in a particular direction is called \_\_\_\_\_. (Fill in the blank) (01)
4. (a) Define friction. Write its two advantages and two disadvantages. (05)
- (b) Define centripetal force. Centripetal acceleration and write their formulae and units. (04)
- (c) Find the amount of heat required to raise the temperature of 100gm of water from  $10^\circ\text{C}$  to  $60^\circ\text{C}$  (Sp. Heat of water =  $4200 \text{ J/Kg}^\circ\text{C}$ ) (03)
- (d) Why has a person to bend down while carrying a load on his back? (Give scientific reasons) (01)
5. (a) Write the effect or pressure on the boiling point of a liquid and melting point of a solid. Explain one of these with help of an example. (05)
- (b) Write two contribution of each of the following: (04)

- (i) Al-beruni (ii) Ibnul Haitham  
 (c) State Hooke's Law and find the formula of young's Modulus with the help of this law. (03)  
 (d) Zero error is a kind of \_\_\_\_\_ error. (Fill in the blank) (01)

### SECTION "B"

6. (a) Write four points on the similarities between Magnetism and Static Electricity. (04)  
 (b) Define the following: (04)  
 (i) Focal length (ii) Ampere (iii) Spectrum (d) Fuse  
 (c) An object is placed at a distance of 15cm from a concave mirror of focal length 10cm, find the position and nature of the image formed. (03)  
 (d) Joule/Coulomb is the unit of \_\_\_\_\_. (Fill in the blank) (01)
7. (a) Define a Critical Angle and Total Internal Reflection. Write two necessary conditions for Total Internal Reflection. (04)  
 (b) Write two points of difference between the following (04)  
 (i) Direct current and alternating current  
 (ii) Real image and a virtual image  
 (c) Find the potential difference the two ends of a conductor if its resistance is 5 ohms and a current of 500 mill amperes is passing through it. (03)  
 (d) The direction of magnetic lines of force change if an iron-piece is placed in its field. (Give scientific reasons) (01)
8. (a) What is an Electric Motor? Write the factors on which the speed of electric motor depends? (04)  
 (b) Name two main defects of human eye. Show the defects and corrective devices with the help of ray diagrams. (04)  
 (c) With the help of ray diagram show working of a simple Microscope (Magnifying glass) and write the formula for its magnification. (03)  
 (d) The wavelength of red light is \_\_\_\_\_ than the wavelength of violet light. (Fill in the blank) (01)

### SECTION "C"

9. (a) Define wavelength and frequency and derive the relation  $f = v / \lambda$ , where  $v$  is the wave velocity (04)  
 (b) Define the following: (04)  
 (i) Pitch (ii) Periodic motion (iii) Rectification (iv) Half life of an element  
 (c) Fill the length of a simple pendulum whose time period is 2 seconds (03)  
 (d) The charge on an electron is \_\_\_\_\_ coulomb. (Fill in the blank with correct answer) (01)
10. (a) Name four radio isotopes and write their uses in the field of medicines (04)  
 (b) Write two point of differences between the following: (04)

- (i) P-type substances and N-type substances
- (ii) Fission Reaction and Fusion reaction
- (c) Write three characteristics of Alpha rays. (03)
- (d) The sound of a thunder in the sky is heard later than the lighting although they are produced at the same time. (Give Scientific reasons) (01)

**(THE END)**

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