Roll No. of Candidate : _____

PHYSICS   Intermediate Part-I , Class 11th (1st A 323- I)   Paper: I   Group – I

Time: 20 Minutes   **OBJECTIVE**   **Code : 6471**   **Marks: 17**

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1. 1 - Dimension ratio of angular momentum to linear momentum is

    (A) $[M^0 L^1 T^0]$ (B) $[M^1 L^1 T^1]$ (C) $[ML^2 T^{-1}]$ (D) $[M^{-1}L^{-1}T^{-1}]$

   2 - Time taken by light from moon to earth is

    (A) 1 min 10 sec   (B) 1 min 20 sec   (C) 1 min 30 sec   (D) 1 min 40 sec

   3 - The angle of $\vec{A} = A_x\hat{i} - A_y\hat{j}$ with x-axis will be in between

    (A) $0^0 \to 90^0$ (B) $90^0 \to 180^0$ (C) $180^0 \to 270^0$ (D) $270^0 \to 360^0$

   4 - $ABSin\theta\hat{n} \times ABSin\theta\hat{n}$ is

    (A) $A^2B^2Sin^2\theta$ (B) A^2B^2 (C) $A^2B^2\hat{n}$ (D) 0

   5 - The correct relation between height H and total time of flight T of a projectile is

    (A) $H = \frac{gT^2}{8}$ (B) $H = \frac{8T^2}{g}$ (C) $H = \frac{8g}{T^2}$ (D) $H = \frac{8}{gT^2}$

   6 - An athlete runs with a speed of $12ms^{-1}$, the longest jump he can undertake is $(g = 10ms^{-2})$

    (A) 12.2 m   (B) 16.2 m   (C) 14.4 m   (D) 24.4 m

   7 - Two electrons brought closer together the P.E. of the system will/will be

    (A) zero   (B) decrease   (C) increase   (D) infinity

   8 - The largest satellite system is managed by countries

    (A) 126   (B) 136   (C) 120   (D) 3

   9 - If a body is moving counter clockwise then angular displacement is

    (A) minimum   (B) zero   (C) negative   (D) positive

   10 - The velocity of rain drop attains constant value because of

    (A) surface tension   (B) up thrust of air   (C) viscous force exerted by air   (D) air currents

   11 - The time period of seconds hand of a watch is

    (A) 1 sec   (B) 1 min   (C) 1 hr   (D) 12 hrs

   12 - Types of waves used in sonar are

    (A) sound waves   (B) light waves   (C) heat waves   (D) water waves

   13 - Speed of sound in helium gas at S.T.P. is

    (A) 258 m/sec   (B) 332 m/sec   (C) 972 m/sec   (D) 1286 m/sec

   14 - The fringe spacing increases if we use

    (A) red light   (B) blue light   (C) yellow light   (D) green light

   15 - In a compound microscope magnification produced by objective and eye piece is 5 cm and 10 cm respectively. Total magnification is

    (A) 5   (B) 15   (C) 10   (D) 50

   16 - The concept of entropy was introduced by Clausius in

    (A) 1656   (B) 1856   (C) 1756   (D) 1956

   17 - Average translational K.E. of molecules in a gas at temperature 27^0C is

    (A) $8314 \times 10^3 J$ (B) $1.38 \times 10^{-23} J$ (C) $6.21 \times 10^{-21} J$ (D) $8.314 \times 10^{-3} J$

215-(I)-1st A 323-48000

PHYSICS   Intermediate Part-I , Class 11th (1stA 323)   Paper : I Group – I

Time: 2:40 Hours   **SUBJECTIVE**   ③   Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

SECTION – I   Guj-11-1-23

2. **Write short answers to any EIGHT questions.**   (2 x 8 = 16)
   i.   Define supplementary units.
   ii.   What are significant figures? How many are the significant figures in 0.04670 ?
   iii.   Does a dimensional analysis give any information on constant of proportionality? Explain.
   iv.   Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards.
   v.   Define position vector and give its formula.
   vi.   The vector sum of three vectors gives a zero resultant. What can be the orientation of the vectors?
   vii.   Is it possible to add a vector quantity to a scalar quantity?
   viii. What information can we get from velocity-time graphs?
   ix.   What is an isolated system? State law of conservation of linear momentum.
   x.   Motion with constant velocity is a special case of motion with constant acceleration, is this statement true? Discuss.
   xi.   An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.
   xii.   Explain the working of a carburetor of a motor car using Bernoulli's principle.

3. **Write short answers to any EIGHT questions.**   (2 x 8 = 16)
   i.   Show that power is a dot product of force and velocity.
   ii.   A boy uses a catapult to throw a stone which accidently smashes a greenhouse window. List the possible energy changes.
   iii.   An object has 1 J of potential energy. Explain what does it mean?
   iv.   Show that work done by centripetal force is zero.
   v.   When mud flies off the tyre of a moving bicycle, in what direction does it fly? Explain.
   vi.   Why does a diver change his body positions before and after diving the pool?
   vii.   Explain by graph that for a body executing SHM, its velocity leads displacement by 90°.
   viii. Does the acceleration of a simple harmonic oscillator remain constant during its motion? Is the acceleration ever zero?
   ix.   What happens to period of pendulum if its length is doubled? What happens if the suspended mass is doubled?
   x.   What is the effect of density on speed of sound?
   xi.   What features do longitudinal waves have in common with transverse waves?
   xii.   Open organ pipes are richer in harmonic than closed organ pipes. Explain

4. **Write short answers to any SIX questions.**   (2 x 6 = 12)
   i.   What are the conditions for detectable interference of light waves?
   ii.   An oil film spreading over a wet footpath shows colours. Explain how does it happen?
   iii.   Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
   iv.   Define resolving power and give formula for its calculation in case of diffraction grating.
   v.   One can buy a cheap microscope for use by the children. The images seen in such a microscope have coloured edges. Why is this so?

                                                                              (Turn Over)

vi. State 2nd law of Thermodynamics. Support your answer with a schematic diagram.

vii. How would you elaborate four steps of Carnot cycle? Support your answer with a diagram.

viii. Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?

ix. Give an example of a process in which no heat is transferred to or from the system but the temperature of the system changes.

SECTION – II

Note: Attempt any THREE (3) questions.

5. (a) Define the term torque. What are factors upon which torque depends. Calculate torque due to force acting on rigid body. **(5)**

   (b) A force (thrust) of 400 N is required to overcome road friction and air resistance in propelling an automobile at 80 Kmh^{-1}. What power (KW) must the engine develop? **(3)**

6. (a) Define projectile motion. Derive formulas for
      i) Horizontal range   ii) Height of projectile **(5)**

   (b) A 1000 Kg car is travelling with a speed of 144Kmh^{-1} around a curve of radius 100 m. Find the necessary centripetal force. **(3)**

7. (a) Define molar specific heat at constant volume and at constant pressure and prove that
      $C_p - C_v = R$ **(5)**

   (b) How large must a heating duct be if air moving 3.0 ms^{-1} along it can replenish the air in a room at 300 m^3 volume every 15 min? Assume the air's density remains constant **(3)**

8. (a) Discuss the motion of horizontal mass spring system. Also derive the expression for time period, displacement and velocity of the mass attached to the spring. **(5)**

   (b) An organ pipe has a length of 50 cm. Find the frequency of its fundamental note and the next harmonic when it is closed at one end. (speed of sound = 350 ms^{-1}) **(3)**

9. (a) Describe the construction of a simple microscope and derive an expression for its magnifying power. **(5)**

   (b) A light is incident normally on a grating which has 2500 lines per centimeter. Compute the wavelength of a spectral line for which the deviation in second order is 15.0°. **(3)**