SGD-G2-11-18

1118 Warning:- Please write your Roll No. in the space provided and sign. Roll No----------

(Inter Part – I) (Session 2015-17 to 2017-19) Sig. of Student ----------

Physics (Objective) **(Group II)** **Paper (I)**

Time Allowed:- 20 minutes **PAPER CODE 2474** Maximum 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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) If the temperature of a gas is constant then $<\frac{1}{2}mv^2>$ of the molecules of gas will be

(A) Constant (B) Zero (C) Increased (D) Decreased

2) For diatomic gas r = 1.4 and $C_v = \frac{5R}{2}$ (R is gas constant) then C_p will be

(A) $\frac{2}{5}R$ (B) $\frac{7}{2}R$ (C) $\frac{9}{2}R$ (D) $\frac{11}{2}R$

3) How many seconds are there in one year

(A) $3.156\times10^6 s$ (B) $3.1536\times10^8 s$ (C) $3.1536\times10^{10} s$ (D) $3.1536\times10^7 s$

4) Zero Error belongs to

(A) Personal Error (B) Random Error (C) Systematic Error (D) Collective Error

5) $\hat{i}\cdot(\hat{j}\times\hat{k})$ is equal to

(A) 1 (B) Zero (C) -1 (D) $\hat{i}$

6) Which is correct formula

(A) $\vec{\tau} = rF$ (B) $\vec{\tau} = rF\sin\theta$ (C) $\vec{\tau} = \vec{r}\times\vec{F}$ (D) $\vec{\tau} = rF\cos\theta\ \hat{n}$

7) A mass of 5000 gm moves with an acceleration of 10 ms^{-2}, force acting on it is

(A) 5 N (B) 500 N (C) 50 N (D) 5000 N

8) A body has P.E = mgh when it is at height "h" from the ground. At the point at a distance "x" below from the top its P.E. will be

(A) mgx (B) mgh (C) mg(x+h) (D) mg(h-x)

9) One degree is equal to

(A) $\frac{2\pi}{260}rad.$ (B) $\frac{2\pi}{180}rad.$ (C) $\frac{\pi}{180}rad.$ (D) $\frac{\pi}{360}rad.$

10) The Apparent weight of object of mass ''m'' when the lift is moving upward with acceleration equal to "g" (acceleration due to gravity) is given as

(A) mg (B) 2 mg (C) Zero (D) $\frac{1}{2}mg$

11) The dimensions of potential energy per unit volume are same as that of

(A) Work (B) Pressure (C) Speed (D) Density

12) The potential energy of a spring mass vibrating system at its mean position is

(A) Maximum (B) Minimum (C) Equal to K.E. (D) Zero

13) The speed of sound in air at $0\,^{\circ}C$ is $332\,ms^{-1}$. Then speed of sound at $40\,^{\circ}C$ will be

(A) 372 ms^{-1} (B) 356.4 ms^{-1} (C) 346.4 ms^{-1} (D) 332 ms^{-1}

14) If a stretched string vibrate in three loops. Then relation between its length and wave length of stationary wave is

(A) $l = \frac{3\lambda}{2}$ (B) $l = 3\lambda$ (C) $l = \frac{2\lambda}{3}$ (D) $\lambda = 3l$

15) X-ray diffraction has been very useful in determining the structure of

(A) Haemoglobin (B) Stars (C) Galaxies (D) Stones

16) The angle between ray of light and wave front is

(A) 0^o (B) 90^o (C) 180^o (D) 120^o

17) When an object is placed within the focal point of a convex lens then its image will be

(A) Real (B) Inverted (C) Virtual (D) Of same size

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Physics (Subjective) **Group (II)** (Session 2015-17 to 2017-19) **Paper (I)**

Time Allowed: 2.40 hours **Section ---------- I** (Inter Part - I) Maximum Marks: 68

2. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) The period of simple pendulum is measured by a stop watch. What type of errors are possible in the time period?

(ii) The length and width of a rectangular plate are measured to be 15.3 cm and 12.80 cm respectively. Find the area of the Plate.

(iii) Check the correctness of equation $E = mc^2$. (iv) Define random error and systematic error.

(v) Can a vector have a component greater than the Vector's magnitude.

(vi) Name the two different conditions that could make $\vec{A}_1 \times \vec{A}_2 = 0$

(vii) Can the magnitude of a vector have a negative value.

(viii) How is distance calculated from Velocity-Time graph. (ix) Differentiate between uniform and variable velocity.

(x) Can the velocity of an object reverse direction when acceleration is constant? If so, give an example.

(xi) Why fog droplets appear to be suspended in air?

(xii) Define terminal velocity. Give its mathematical expression.

3. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) A girl drops a cup from a certain height, which breaks into pieces. What energy changes are involved?

(ii) How energy is obtained from "biomass". (iii) Define Watt.

(iv) Prove that $a = r\alpha$ (v) Show that orbital angular momentum $L_o = mvr$

(vi) When mud flies off the tyre of a moving bicycle, in what direction does it fly?

(vii) Define frequency. Give its units.

(viii) Does frequency depends on amplitude of Harmonic Oscillator? Explain.

(ix) Does the acceleration of a simple harmonic oscillator remain constant during its motion? Is the acceleration ever be zero?

(x) Define Transverse Waves, give its two examples.

(xi) What features do longitudinal waves have in common with transverse waves?

(xii) Why does sound travel faster in solids than in gases?

4. Answer briefly any Six parts from the followings:- **6 × 2 = 12**

(i) What do you mean by coherent sources? Explain a common method for producing two coherent sources.

(ii) An oil film spreading over a wet footpath shows colours. Explain how does it happen?

(iii) How would you manage to get more order of spectra using a diffraction grating?

(iv) Why would it be advantageous to use the blue light with a compound microscope?

(v) Describe with the help of diagram, have a convex lens can be used as magnifying glass?

(vi) Write four postulates of Kinetic theory of gases.

(vii) What is a refrigerator? Draw its block diagram. (viii) Write two statements of carnot's theorem.

(ix) What is a tripple point cell? Also define thermodynamic scale.

Note: Attempt any three questions. **Section ---------- II** **(8 × 3 = 24)**

5. (a) State and Prove Law of Conservation of linear momentum.

(b) Find the angle between the two vectors. $\vec{A} = 5\hat{i} + \hat{j}$ and $\vec{B} = 2\hat{i} + 4\hat{j}$

6. (a) Define centripetal acceleration, centripetal force and drive an expression for centripetal force.

(b) How large a force is required to accelerate an electron of mass $9.1 \times 10^{-31} kg$ from rest to a speed of $2.0 \times 10^{7} ms^{-1}$ through a distance of 5.0 cm.

7. (a) State Stoke's law. Prove that the terminal velocity of water droplet in falling through air is directly proportional to squar of its radius.

(b) A mechanical engineer develops an engine, working between 327 $^{\circ}C$ and 27 $^{\circ}C$. and claims to have an efficiency of 52 %. Does he Claim Correctly? Explain.

8. (a) What are Stationary Waves. Prove that frequencies of stationary waves are quantised in strings

(b) A block of mass 4 Kg is dropped from a height of 0.8 m on to a spring of spring constant 1980 Nm^{-1}. Find the maximum distance through which the spring will be compressed.

9. (a) What is Michelson's interferrometer? Explain its construction and working.

(b) An astronomical telescope having magnifying power of 5 consists of two lenses 24 cm apart. Find focal length of the lenses.