ysics (Objective) (Group I) Paper (I)

ne Allowed:- 20 minutes **PAPER CODE 2471** Maximum Marks:- 17

e:- You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will lt in zero mark in that question. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the wer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or e correcting fluid is not allowed.

Q. 1

1) The term 134.7 can be written in scientific notation as
(A) 1.347×10^{2} (B) 1.347×10^{3} (C) 1.347×10^{1} (D) 1.347×10^{4}

2) The quantity 0.00467 has significant figures
(A) 3 (B) 4 (C) 5 (D) 6

3) If the two components of a vector are equal in magnitude, the vector making angle with x-axis will be
(A) 30^{o} (B) 45^{o} (C) 60^{o} (D) 90^{o}

4) Two forces of magnitudes 10 N and 20 N act on a body in directions making angle of 30^{o}, The X-component of the resultant force will be
(A) 25.98 N (B) 30.98 N (C) 20.98 N (D) 17.98 N

5) If maximum height of the projectile is equal to the range then angle of projection of projectile will be
(A) 30^{o} (B) 60^{o} (C) 45^{o} (D) 76^{o}

6) If 50 kg crate is pushed through 2 m across the floor with a force of 50 N, the work done will be
(A) 245 J (B) 150 J (C) 200 J (D) 100 J

7) A body rotates with a constant angular velocity of 100 rad/sec about a vertical axis the required torque to sustain this motion will be
(A) Zero Nm (B) 100 Nm (C) 200 Nm (D) 300 Nm

8) Moment of inertia of 100 kg sphere having radius 50 cm will be
(A) 10 $Kg\,m^{2}$ (B) 5 $Kg\,m^{2}$ (C) 500 $Kg\,m^{2}$ (D) 2.5 $Kg\,m^{2}$

9) Laminar flow occurs at
(A) High speed (B) Low speed (C) Zero speed (D) Very high speed

10) High concentration of red blood cells increases the viscosity of blood from
(A) 2 – 3 times that of water (B) 3 – 5 times that of water (C) 5 – 7 times that of water (D) 7 – 9 times that of water

11) Distance covered by a body in one vibration is 20 cm. The amplitude of the vibration will be
(A) 10 cm (B) 5 cm (C) 15 cm (D) 20 cm

12) Speed of sound in Hydrogen is higher than in Oxygen by times
(A) 4 (B) 6 (C) 8 (D) 16

13) Sound waves can not pass through
(A) Liquid (B) Solids (C) Air (D) Vacuum

14) Which of the followings can not produce colours with white light?
(A) Diffraction (B) Interference (C) Polarization (D) Dispersion

15) The image formed by eyepiece of compound microscope is
(A) Real and magnified (B) Real and diminished (C) Virtual and enlarge (D) Virtual and diminished

16) The direction of flow of heat between two bodies in thermal contact is determined by
(A) Internal energies (B) Kinetic energies (C) Potential energies (D) Atmospheric pressure

17) A carnot engine has an efficiency of 50% when its sink temperature is 27 °C. The temperature of source is
(A) 300 °C (B) 327 °C (C) 373 °C (D) 273 °C

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1119 Warning:- Please, do not write anything on this question paper except your Roll No.

Physics (Subjective) **Group (I)** (Session 2015-17 to 2018-20) (Inter Part - I) **Paper (I)**

Time Allowed: 2.40 hours **Section ---------- I** Maximum Marks: 68

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

(i) Write any two points which should be kept in mind, while using units.

(ii) How many micro seconds in one year? **(iii)** Find the angle between $\vec{A} = 2\hat{i} - 2\hat{j}$ and $\vec{B} = 2\hat{i} + 2\hat{j}$

(iv) Can the magnitude of a vector ever be zero? Explain.

(v) What are the steps, taken to add vectors by rectangular components?

(vi) In which case more work is done, when a 50 kg crate is pushed through 10 m across a floor with a force of 30 N or same crate is lifted through 5 m height?

(vii) Derive work-energy principle. **(viii)** Explain, how the swing is produced in a fast moving tennis ball?

(ix) What you know about viscosity and what is its effect on drag force?

(x) What are the factors on which frequency of a spring-mass system depends?

(xi) What is the difference between free and driven harmonic oscillators? **(xii)** Explain phase and initial phase.

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

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

(ii) Define impulse and show how it is related to linear momentum?

(iii) What does the slope of velocity-time graph represent?

(iv) An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.

(v) Define angular velocity. How its direction is determined? **(vi)** Prove that 1 *radian* = 57.3°

(vii) When mud flies off the tyre of a moving bicycle. In what direction does it fly? Explain.

(viii) Show that angular momentum, $L_o = mvr$ **(ix)** What is difference between interference and beats

(x) What is the difference between constructive and distructive interference?

(xi) Explain why sound travels faster in warm air than in cold air?

(xii) How should a sound source move with respect to an observer so that the frequency of its sound does not change?

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

(i) Can visible light produce interference fringes? Explain.

(ii) Why the Polaroid sunglasses are better than ordinary sunglasses?

(iii) How coherent light beams can be produced? Explain. **(iv)** How the light signal is transmitted through the optical fibre?

(v) How can the resolving power of compound microscope be increased?

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

(vii) Is it possible to convert internal energy into mechanical energy? Explain with example.

(viii) What would be average speed of oxygen molecule in the air at.S.T.P.?

(ix) Differentiate between isothermal and adiabatic process.

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

5. (a) What is Carnot engine? Discuss carnot cycle, also derive expression of its efficiency.

(b) Suppose, we are told that the acceleration of a particle moving in a circle of radius r with uniform speed is proportional to some power of r, say r^n and some power of v, say v^m, determine the powers of r and v?

6. (a) What is isolated system? Also state and explain the law of conservation of linear momentum.

(b) Two particles are located at $\vec{r}_1 = 3\hat{i} + 7\hat{j}$ and $\vec{r}_2 = -2\hat{i} + 3\hat{j}$ respectively. Find both the magnitude of vector $(\vec{r}_2 - \vec{r}_1)$ and its orientation with respect to x-axis.

7. (a) Define Doppler effect. Discuss the case when source moves towards the stationary observer and when observer moves towards the stationary source.

(b) A brick of mass 2 kg is dropped from a rest position 5 m above the ground. What is its velocity at height of 3 m above the ground.

8. (a) What is meant by gravity free system. How gravity like earth is produced in a space ship? Explain.

(b) A simple pendulum is 80 cm long what will be its period and frequency at a place where $g = 9.8 ms^{-2}$

9. (a) What is magnifying glass? How is it used as a microscope? Derive the relation for its magnifying power?

(b) In a double slit experiment, the second order maximum occurs at $\theta = 0.25°$, The wavelength is 700 nm. Determine its slit separation?

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