

890-G1-11-18

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 I)

Paper (I)

Time Allowed:- 20 minutes

PAPER CODE 2473

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) Average Translational KE of a gas molecule is

- (A) $\frac{3}{2}KT$ (B) $\frac{2}{3}KT$ (C) $\frac{1}{2}KT$ (D) KT

2) A heat engine operates between temperatures 400 K and 1000 K, its efficiency is equal to
(A) 50 % (B) 60 % (C) 70 % (D) 70 %

3) The percentage error in measuring mass and speed is 2% and 3% respectively. The maximum percentage uncertainty (error) in the measurement of Kinetic Energy is
(A) 5 % (B) 11 % (C) 8 % (D) 7 %

4) In $5.47 \times 19.89 = 108.7983$; answer should be written as
(A) 108.8 (B) 108.9 (C) 109 (D) 108.79

5) A force for 100 N makes an angle of 60° with Y-axis, its horizontal component is
(A) 50 N (B) 60 N (C) 70.7 N (D) 86.6 N

6) The direction of torque is
(A) Along the position vector \vec{r} (B) Perpendicular to both \vec{r} and \vec{F} (C) Along the direction of force \vec{F} (D) Opposite to the direction of \vec{r}

7) The maximum range of a projectile is 100 km. Take $g = 10 \text{ ms}^{-2}$ The initial velocity of the projectile will be
(A) 1000 kms^{-1} (B) 1 kms^{-1} (C) 10 kms^{-1} (D) 100 kms^{-1}

8) Dimensions of power is
(A) $[ML^2T^{-2}]$ (B) $[ML^2T^{-1}]$ (C) $[ML^2T^{-1}]$ (D) $[ML^2T^{-3}]$

9) $\omega = 60 \text{ rev min}^{-1}$ is equal to
(A) $\pi \text{ rad s}^{-1}$ (B) $2\pi \text{ rad s}^{-1}$ (C) $\frac{1}{\pi} \text{ rad s}^{-1}$ (D) $\frac{2}{\pi} \text{ rad s}^{-1}$

10) Height of geostationary satellite from the earth's surface is
(A) 42300 km (B) 900 km (C) 36000 km (D) 400 km

11) Let A = Area of crosssection of pipe v = speed of fluid then ' Av ' is called
(A) Volume flow rate (B) Energy flow rate (C) Mass flow rate (D) Pressure flow rate

12) Maximum velocity in SHM is
(A) $x_0 \omega^2$ (B) $x_0 \omega$ (C) $x \omega$ (D) $x_0^2 \omega$

13) Stars moving away from earth shows
(A) Blue Shift (B) Red Shift (C) Yellow Shift (D) Green Shift

14) Sound waves are
(A) Electromagnetic waves (B) Transverse waves (C) Compressional waves (D) Matter waves

15) Angle between a ray and wavefront is
(A) 180° (B) 0° (C) 90° (D) 45°

16) When Newton's Rings are seen through the transmitted light, then the central spot is
(A) Dark (B) Blue (C) Bright (D) Red

17) In newer Optical fiber systems, repeaters are placed at
(A) 300 km (B) 100 m (C) 30 km (D) 100 km

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1118 Warning:- Please, do not write anything on this question paper except your Roll No.

Physics (Subjective) Group (I) (Session 2015-17 to 2017-19) (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) How many years are there in a nano second? (ii) Define radian and steradian and give their units.
- (iii) Discuss two frontiers of Science. (iv) Find the dimensions of 'G' using equation $F = G \frac{m_1 m_2}{r^2}$
- (v) Explain how a vector can be subtracted from the other vector?
- (vi) A force of 10N makes an angle of 60° with x-axis. Find its x and y - components.
- (vii) Prove that dot product is commutative.
- (viii) Define average and instantaneous velocity. Also give their units.
- (ix) Calculate the distance covered by a free falling body during first second of its motion.
- (x) Show that range of projectile is maximum when it is thrown at an angle of 45° with horizontal.
- (xi) Explain how the lift is produced in an aeroplane? (xii) Why fog droplets appear to be suspended in air?

3. Answer briefly any Eight parts from the followings:-

8 × 2 = 16

- (i) In which case is more work done? When a 50 Kg bag of books is lifted through 50 cm, or when a 50 Kg crate is pushed through 2 m across the floor with force of 50 N.
- (ii) What sort of energy is in the following.
(a) Compressed spring (b) Water in high dam (c) A moving car.
- (iii) Prove that $\vec{F} \cdot \vec{V} = \text{Power}$
- (iv) Explain how many minimum number of geo-stationary satellites are required for global coverage of T.V transmission.
- (v) Find the rotational kinetic energy of disc. (vi) Why the microwaves are used in satellite communication.
- (vii) If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?
- (viii) What happens to the period of simple pendulum if its length is doubled. What happens if the suspended mass is doubled?
- (ix) State the Hook's Law, write it in mathematical form. (x) How are beats useful in tuning musical instrument?
- (xi) Explain the term node and anti-node. (xii) How Doppler's effect is applied to a radar system?

4. Answer briefly any Six parts from the followings:-

6 × 2 = 12

- (i) Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light.
- (ii) State Huygen's principle. (iii) Define wavefronts and ray of light.
- (iv) Explain the difference b/w angular magnification and resolving power.
- (v) How the Power is lost in optical fibre through dispersion? Explain.
- (vi) A thermos flask containing milk as system is shaken rapidly. Does the temperature of the milk rise?
- (vii) Does entropy of a system increases or decreases due to friction? Explain.
- (viii) Specific heat of gas at constant pressure is greater than specific heat at constant volume. Why?
- (ix) Write down the two strokes of a petrol engine.

Note: Attempt any three questions. Section ----- II

(8 × 3 = 24)

- 5. (a) Add two vectors by using their rectangular components. Determine the magnitude and direction of the resultant.
- (b) A truck weighing 2500 Kg and moving with a velocity of 21 ms⁻¹ collides with a stationary car weighing 1000 kg. The truck and the car move together after the impact. Calculate their common velocity
- 6. (a) Define gravitational field and conservative field. Prove that work done is independent of path followed in gravitational field by gravitational force.
- (b) Calculate the angular momentum of a star of mass 2 × 10³⁰ Kg and radius 7 × 10⁵ Km. If it completes one complete rotation about its axis once in 20 days.
- 7. (a) What is carnot engine? Discuss carnot cycle and calculate its efficiency.
- (b) What gauge pressure is required in the city main for a stream from a fire hose connected to mains to reach a vertical height of 15 m.
- 8. (a) Describe Newton's formula for the speed of sound in air and explain how it was corrected by Laplace?
- (b) A 100.0 g body hung on a spring elongates the spring by 4.0 cm. When a certain object is hung on the spring and set vibrating, its period is 0.568 second. What is the mass of the object pulling the spring?
- 9. (a) Describe diffraction of X-rays by crystals and derive Bragg's equation and what are the uses of X-rays diffraction
- (b) Calculate the critical angle and angle of entry for an optical fibre having core of refractive index 1.50 and cladding of refractive index 1.48.

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