

SECTION II

- 5- (a) What is projectile motion? Derive the relation for maximum height and range of projectile. 5
(b) Two forces of magnitude 10 N and 20 N act on a body in direction making angles 30° and 60° respectively with x-axis. Find the resultant force and direction. 3
- 6- (a) What is meant by centripetal force? Show by mathematical proof that $a_c = \frac{V^2}{r}$ 5
(b) A car of mass 800 kg travelling at 54 kmh^{-1} is brought to rest in 60 meters. Find the average retarding force on the car. What has happened to original kinetic energy? 3
(a) State and derive Bernoulli's relation for a liquid in motion. 5
(b) Calculate the entropy change when 1.0 kg ice at 0°C melts into water at 0°C . Latent heat of fusion of ice $L_f = 3.36 \times 10^5 \text{ Jkg}^{-1}$. 3
- 8- (a) Speed of sound in air at 0°C is determined by Newton's formula $V = \sqrt{\frac{P}{\rho}}$. Why this formula could not give accurate velocity? Derive the correct formula by using Laplace correction. 5
(b) What should be the length of a simple pendulum whose period is 1.0 second at a place where $g = 9.8 \text{ ms}^{-2}$. 3
- 9- (a) What is astronomical telescope? Draw its ray diagram and derive relation for its magnification. 5
(b) Light of wavelength 450 nm is incident on a diffraction grating on which 5000 lines/cm have been ruled. Calculate angles for first three orders of diffraction. 3

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 (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 of 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 cross-section 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

1167A- 1118 -- 18000 (2)

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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 neno second? (ii) Define radian and stradian 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 instentaneous 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 $\vec{F} \cdot \vec{V} = Power$
- (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 happen 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 2×10^{30} Kg and radius 7×10^5 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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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 $\langle \frac{1}{2} m v^2 \rangle$ 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) $3.156 \times 10^6 s$ (B) $3.1536 \times 10^8 s$ (C) $3.1536 \times 10^{10} s$ (D) $3.1536 \times 10^7 s$
- 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) $\frac{2\pi}{260} \text{ rad.}$ (B) $\frac{2\pi}{180} \text{ rad.}$ (C) $\frac{\pi}{180} \text{ rad.}$ (D) $\frac{\pi}{360} \text{ rad.}$
- 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° (B) 90° (C) 180° (D) 120°
- 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

1169A- 1118 -- 10000 (2)

سید حسن

SGD-G2-11-18

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

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, how 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 triple 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 derive an expression for centripetal force.
- (b) How large a force is required to accelerate an electron of mass $9.1 \times 10^{-31} \text{ kg}$ from rest to a speed of $2.0 \times 10^7 \text{ ms}^{-1}$ 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 square of its radius.
- (b) A mechanical engineer develops an engine, working between 327°C and 27°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 interferometer? 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.