

1121 warning:- Please write your Roll No. in the space provided and sign. Roll No.-----
(Inter Part – I) (Session 2017-19 to 2020-22) Sig. of Student -----

Physics (Objective)

(Group I)

54241-21

Paper (I)

Time Allowed:- 20 minutes

PAPER CODE 2471

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) Dimension of Moment arm is
(A) [M] (B) [T] (C) [MT] (D) [L]
- 2) Measurement taken by vernier calliper with least count 0.01 cm is recorded as 0.45 cm.
Its percentage uncertainty is
(A) 0.45 % (B) 0.1 % (C) 0.2 % (D) 2 %
- 3) If $\vec{A} \times \vec{B}$ points along +ve z-axis, then vector \vec{A} and \vec{B} must lie,
(A) yz- plane (B) xz-plane (C) xy-plane (D) zz-plane
- 4) In unit vectors $(\hat{i} \times \hat{j}) \times \hat{k}$ is equal to
(A) Null vector (B) \hat{i} (C) \hat{j} (D) 1
- 5) If the angle of projection is greater than 45° , then the
(A) Height attained is more but range is less (B) Height attained is less but range is more (C) Range and height attained is less (D) Both height attained and range are more
- 6) A ball is thrown with an initial speed of 30 ms^{-1} in a direction 30° above the Horizontal.
Its vertical component velocity is
(A) 25.98 ms^{-1} (B) 30 ms^{-1} (C) 10 ms^{-1} (D) 15 ms^{-1}
- 7) In work-Energy principle work done on a body is equal to
(A) Kinetic energy (B) Potential energy (C) Change in Kinetic energy (D) Change in Energy
- 8) A body of mass 10 kg in free falling lift has weight
(A) 10 N (B) 98 N (C) zero N (D) 980 N
- 9) In one Revolution, the angular displacement covered is
(A) 60° (B) 360° (C) 90° (D) 180°
- 10) Stoke's Law holds for bodies when they have
(A) Spherical shape (B) Curved shape (C) Rectangular shape (D) Oblong shape
- 11) A simple pendulum is completing 20 vibration in 5 second; its frequency is
(A) 4 Hz (B) 20 Hz (C) 200 Hz (D) 100 Hz
- 12) The product of frequency and time period is
(A) 2 (B) 3 (C) 1 (D) 4
- 13) On loading the prong of a tuning fork with wax, its frequency,
(A) Decreases (B) Increases (C) May increases or decreases (D) Remaining constant
- 14) A Diffraction grating has 3000 lines per centimeter, its grating element is
(A) $3.33 \times 10^{-4} \text{ cm}$ (B) 3.33 m (C) $333 \times 10^{-4} \text{ cm}$ (D) 3.33 cm
- 15) A Telescope with objective of focal length 40 cm and eyepiece of focal length 5 cm, when focused for infinity has length equal to
(A) 35 cm (B) 8 cm (C) 45 cm (D) 200 cm
- 16) The sum of all Energies of molecules is known as
(A) Elastic potential energy (B) Kinetic energy (C) Internal energy (D) Potential energy
- 17) If the Temperature of the source increases, the Efficiency of a carnot engine,
(A) Decreases (B) Increases (C) Remains constant (D) First increases then decreases

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Physics (Subjective) Group (I) (Session 2017-19 to 2020-22) (Inter Part - I) Paper (I)

Time Allowed: 2.40 hours Section ----- I

Maximum Marks: 68

$8 \times 2 = 16$

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

- (i) Write dimensions of (a) Pressure (b) Density
- (ii) Does a dimensional analysis give any information on constant of proportionality that may appear in an algebraic expression. Explain.
- (iii) What do you mean by precision and accuracy. (iv) What do you mean by dimension of a physical quantity.
- (v) The vector sum of three vectors gives zero resultant. What can be orientation of vectors.
- (vi) Can you add zero to a null vector. (vii) Define Scalar product of two vectors.
- (viii) Define impulse and show how it is related to linear momentum.
- (ix) At what point or points in its path does a projectile have its minimum speed, its maximum speed.
- (x) Define time of flight of a projectile, give its units. (xi) Define two Dimensional motion.
- (xii) Explain how Swing is produced in a fast moving cricket ball.

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

$8 \times 2 = 16$

- (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 2m across the floor with a force of 50 N.
- (ii) Define escape velocity and calculate its value.
- (iii) Explain the situations in which the work is positive, negative or zero.
- (iv) Show that orbital angular momentum $L_o = mvr$
- (v) State the law of conservation of angular momentum. Explain its importance.
- (vi) A hoop starts rolling without slipping down from the top of an inclined plane. What is its speed at the bottom.
- (vii) Does the acceleration of a simple harmonic oscillator remain constant during its motion? Is the acceleration ever zero? Explain.
- (viii) If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?
- (ix) Define free and forced oscillations. (x) How are beats useful in tuning musical instruments?
- (xi) On what factors does the speed of sound in a medium depend?
- (xii) What is the frequency and the wavelength of third harmonic in a closed organ pipe?

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

$6 \times 2 = 12$

- (i) State Huygen's principle. (ii) Can visible light produce interference fringes? Explain.
- (iii) Define magnifying power and resolving power of lens.
- (iv) Write the conditions for Interference. (v) What is meant by normal adjustment of telescope.
- (vi) Prove the relation $W = P\Delta V$
- (vii) Starting from the relation of pressure of a gas prove that absolute temperature of an ideal gas is directly proportional to the average translational K.E of gas molecules.
- (viii) Is it possible to construct a heat engine that will not expel heat into the atmosphere.
- (ix) Derive Boyles law on basis of Kinetic molecular theory of gases.

Note: Attempt any three questions.

Section ----- II

$(8 \times 3 = 24)$

5. (a) Explain the addition of vectors by rectangular components method.
- (b) A ball is thrown horizontally from a height of 10 m with velocity of 21 ms^{-1} . How far off it hit the ground and at what velocity?
6. (a) Define gravitational potential energy. Derive an expression for the absolute potential energy on the surface of the earth.
- (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 = 50 m/s.
7. (a) Define rotational K.E. Also derive the relations for the velocities of disc and hoop moving down an inclined plane to the bottom.
- (b) How large must a heating duct be if air moving 3 ms^{-1} along it can replenish the air in a room of 300 m^3 volume every 15 min? Assume the air's density remains constant.
8. (a) What is simple pendulum? Show that the motion of simple pendulum is simple harmonic motion. Also find relation for its time period and frequency.
- (b) Estimate the average speed of nitrogen molecules in air under standard conditions of pressure and temperature.
9. (a) What is compound microscope? Describe its working. Also find relation for its magnifying power.
- (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° .