

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 II )

40-42-21

Paper (I)

Time Allowed:- 20 minutes

PAPER CODE 2472

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) For total assessment of uncertainty in the Final result obtained by multiplication, we added  
(A) Absolute uncertainties (B) Fractional uncertainties (C) Percentage uncertainties (D) Errors
- 2) Which of the following pair has same dimension  
(A) Work and Power (B) Work and Torque (C) Momentum and Energy (D) Power and Pressure
- 3) The self dot product of vector  $\vec{A}$  is  
(A) 0 (B)  $2A$  (C)  $A$  (D)  $A^2$
- 4) If a Force of 5N is applied parallel to moment arm of 5m, then Torque is equal to  
(A) Zero Nm (B) 5 Nm (C) 10 Nm (D) 25 Nm
- 5) The force due to water Flow is  
(A)  $F = mv$  (B)  $F = \frac{mv}{t}$  (C)  $F = \frac{mv}{t}$  (D)  $F = \frac{mv}{v}$
- 6) For a rocket, the change in momentum per second of ejecting gases is equal to  
(A) Acceleration of the rocket (B) Thrust acting on rocket (C) Velocity of the rocket (D) Momentum of the rocket
- 7) The escape velocity is maximum for  
(A) Moon (B) Mercury (C) Earth (D) Jupiter
- 8) Rotational K.E of disc is  
(A)  $\frac{1}{4}mv^2$  (B)  $\frac{1}{2}mv^2$  (C)  $\frac{1}{2}mr^2$  (D)  $\frac{1}{4}mr^2$
- 9) Choose the quantity which play the same role in angular motion as mass in linear motion.  
(A) Angular Acceleration (B) Torque (C) Moment of Inertia (D) Angular Momentum
- 10) The device used to measure speed of liquid Flow is  
(A) Monometer (B) Venturi-meter (C) Hydro meter (D) Baro meter
- 11) Potential energy of oscillating mass spring system at any instant is  
(A)  $\frac{1}{2}Kx^2$  (B)  $Kx^2$  (C)  $mgh$  (D)  $\frac{1}{2}Kx^2$
- 12) Speed of sound in Aluminium at  $20^\circ\text{C}$  is  
(A)  $5100\text{ ms}^{-1}$  (B)  $3600\text{ ms}^{-1}$  (C)  $5130\text{ ms}^{-1}$  (D)  $5500\text{ ms}^{-1}$
- 13) Beats detectable easily upto Frequency between two sounds is  
(A) 32 Hz (B) 2 Hz (C) 10 Hz (D) 6 Hz
- 14) The centre of Newton's rings is dark due to  
(A) Diffraction (B) Destructive Interference (C) Constructive Interference (D) Polarization
- 15) The Final Image formed by simple microscope is  
(A) Real and erect (B) Virtual and Inverted (C) Real and Inverted (D) Virtual and erect
- 16) For an Ideal gas, the internal energy is directly proportional to  
(A) Temperature (B) Pressure (C) Volume (D) Mass
- 17) Cloud formation in atmosphere is an example of  
(A) Isobaric process (B) Isochoric process (C) Adiabatic process (D) Isothermal process

1189- 1121 ALP -- 15000 (1)



Time Allowed: 2.40 hours

Section ----- I

(Inter Part - I) Maximum Marks: 68

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

80-42-21  $8 \times 2 = 16$ 

- (i) What are the uses of dimensions? (ii) Distinguish between precision and Accuracy.
- (iii) What are the dimensions of gravitational constant G in formula  $F = G \frac{m_1 m_2}{r_2^2}$
- (iv) Does a dimensional analysis give any information on constant of proportionality that may appear in algebraic expression? Explain. (v) Define terms (a) unit vector (b) Position vector
- (vi) The vector sum of three vectors gives a zero resultant. What can be the orientation of the vectors?
- (vii) Can you add zero to a null vector? (viii) Define impulse and show that how it related to linear momentum?
- (ix) Define terms (a) projectile motion (b) Height of the projectile.
- (x) In case of elastic and inelastic collision explain how would a bouncing ball behave?
- (xi) For what value of the angle of projection, the range of projectile is half of its maximum possible value?
- (xii) Explain what do you understand by the term viscosity.

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

 $8 \times 2 = 16$ 

- (i) A force of 400 N is required to overcome road friction and air resistance in propelling an automobile at  $22.22 \text{ ms}^{-1}$ . What power (KW) must the engine develop?
- (ii) A girl drop a cup from a certain height, which breaks into pieces. What energy changes are involved?
- (iii) Give two names of conservative forces and two names of non-conservative forces.
- (iv) A 1000 kg car travelling with a speed of  $40 \text{ ms}^{-1}$  round a curve of radius 100 m. Find the necessary centripetal force.
- (v) Explain the difference between tangential velocity and angular velocity.
- (vi) Why does a diver change his body positions before and after diving in the pool?
- (vii) What happens to the period of a simple pendulum if its length is doubled? What happens if the suspended mass is doubled?
- (viii) Does the acceleration of a simple harmonic oscillator remain constant during its motion? Is the acceleration ever zero? Explain.
- (ix) What is simple pendulum? Write down its formula for time period.
- (x) Explain why sound travels faster in warm air than in cold air.
- (xi) Find the frequencies produce in organ pipe when it is closed at one end.
- (xii) Define transverse and longitudinal waves.

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

 $6 \times 2 = 12$ 

- (i) Under what conditions two or more sources of light behave as coherent sources?
- (ii) How would you manage to get more orders of diffraction using a diffraction grating?
- (iii) What is Huygen's principle? Explain.
- (iv) What do you mean by normal adjustment of an astronomical telescope?
- (v) What is spectrometer? Write down some of its uses.
- (vi) Why is the average velocity of the molecules in a gas zero but the average of the square of velocities is not zero?
- (vii) Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?
- (viii) Derive Charles' Law from Kinetic theory of gases. (ix) Prove that  $W = P\Delta V$

Note: Attempt any three questions.

Section ----- II

 $(8 \times 3 = 24)$ 

5. (a) Define elastic collision. Show that for an elastic collision in one dimension speed of approach is equal to speed of separation.
- (b) Given that  $\vec{A} = 2\hat{i} + 3\hat{j}$   $\vec{B} = 3\hat{i} - 4\hat{j}$  Find the magnitude and angle of  $\vec{C} = \vec{A} + \vec{B}$
6. (a) Prove that the P.E. of a body on the surface of Earth is  $U_g = -\frac{GMm}{R}$
- (b) Find the temperature at which the velocity of sound in air is two times its velocity at  $10^\circ \text{C}$ .
7. (a) Derive the relation for centripetal force.
- (b) A water hose with an internal diameter of 20 mm at the outlet discharges 30 kg of water in 60 s. Calculate the water speed at the outlet. Assume that the density of water is  $1000 \text{ kg m}^{-3}$  and its flow is steady.
8. (a) State first law of Thermodynamics. Explain adiabatic and Iso Thermal Processes.
- (b) A simple pendulum is 50.0 cm long. What will be it's frequency of vibration at the place where  $g = 9.8 \text{ ms}^{-2}$ .
9. (a) Define interference of light wave. Derive relation for positions of mth order maxima and minima in young's Double-slit experiment.
- (b) An astronomical telescope having magnifying power of 5 consists of two thin lenses 24 cm apart. Find the focal lengths of the lenses.