Roll No. : _____

Objective
Paper Code
6478

Intermediate Part First - 103
PHYSICS (Objective) **GROUP - II**
Time: 20 Minutes   Marks: 17

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Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions given in objective type question paper and leave other circles blank.coa

FBD-G2-22

S.#	Questions	A	B	C	D
1	Dimensions of angular velocity are:	$[LT^{-1}]$	$[T^{-1}]$	$[L^{-1}T^{-1}]$	$[MLT^{-1}]$
2	Bernoulli's equation gives the dimensions of:	Pressure	Energy	Flow rate	Velocity
3	If the initial phase is $\frac{\pi}{2}$ rad, the instantaneous displacement in SHM will be:	$X_0 \sin \omega t$	$X_0 \cos \omega t$	$-X_0 \sin \omega t$	Zero
4	Human ear can recognize beats having maximum frequency equal to:	40Hz	30Hz	5Hz	10Hz
5	If 10 waves occupy 15cm, what is the wavelength?	0.6m	6cm	1.5cm	15m
6	When a red light is replaced with blue light in Young's experiment, fringe spacing:	Increases	Decreases	Remains same	Becomes infinite
7	If the focal lengths of objective and eye-piece are doubled, the length of telescope becomes:	Double	Half	Three times	Four times
8	When ice melts, entropy ____ .	Increases	Decreases	Remains unchanged	Becomes more negative
9	The relation $-W = +\Delta U$, represents the process:	Isothermal expansion	Adiabatic expansion	Isothermal expansion	Adiabatic compression
10	Which is a base quantity?	Area	Charge	Electric current	Force
11	A measurement of a needle diameter, $D = 4.5 \pm 0.01$ mm has percentage uncertainty:	45 %	0.4 %	0.5 %	0.2 %
12	$|\hat{i} + \hat{j} + \hat{k}|$ is equal to:	$3\sqrt{2}$	$2\sqrt{3}$	$\sqrt{3}$	1
13	For what angle between velocity and magnetic field, the force on a charge particle will be maximum?	90°	45°	0°	180°
14	The dragless ballistic trajectory for spherical earth should be:	Parabolic	Elliptical	Hyperbolic	spherical
15	Horizontal acceleration of projectile motion is:	G	g	$0ms^{-2}$	$12ms^{-2}$
16	With increasing attitude, the absolute gravitational potential energy of an object:	Increases	Decreases	Becomes more negative	Remains constant
17	For uniform circular motion, tangential acceleration equals:	Centripetal acceleration	Centrifugal acceleration	Angular acceleration	Zero

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PHYSICS   (Subjective)   GROUP - II
Time: 02:40 Hours   Marks: 68

SECTION – I

2. Write short answers to any EIGHT parts.   FBD-G2-22   16
- (i) Write the dimensions of (a) pressure (b) density.
- (ii) Write that the famous Einstein equation $E = mc^2$ is dimensionally constant.
- (iii) Illustrate with an example, how uncertainty is calculated in addition of quantities?
- (iv) What is systematic error? How can it be reduced?
- (v) Define impulse and show how it is related to linear momentum.
- (vi) At what point or points in its path does a projectile have its minimum speed, its maximum speed?
- (vii) Why the kinetic energy is not conserved in inelastic collision?
- (viii) What happens to the velocities of the body in an elastic collision when a light body collides with a massive body at rest?
- (ix) Is it possible to construct a heat engine that will not expel heat into the atmosphere? Explain in brief.
- (x) What happens to the temperature of the room, when an air conditioner is left running on the table in the middle of the room?
- (xi) Discuss in brief the power stroke for a petrol engine.
- (xii) Differentiate between reversible and irreversible process.

3. Write short answers to any EIGHT parts.   16
- (i) Define torque. Write its unit and dimensions.
- (ii) The vector sum of three vectors give zero resultant. What can be the orientation of the vectors?
- (iii) State the conditions of equilibrium.
- (iv) State work energy principle.
- (v) What is Salter's duck? How it is used to produce energy from waves?
- (vi) A boy uses a catapult to throw a stone which accidentally smashes a green house window. List the possible energy changes.
- (vii) State law of conservation of angular momentum. Write its one application.
- (viii) Explain the difference between tangential velocity and angular velocity. If one of these is given for a wheel of known radius, how will you find the other?
- (ix) What is "INTELSAT"? Write the capacity of "INTELSAT-VI".
- (x) What is the difference between diffraction and polarization?
- (xi) Define thin film. Give its two examples.
- (xii) Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?

4. Write short answers to any SIX parts.   12
- (i) Why fog droplets appear to be suspended in air?
- (ii) Show that in SHM the acceleration is zero when velocity is greatest and the velocity is zero when the acceleration is the greatest.
- (iii) Write the two characteristics of simple harmonic motion.
- (iv) What is meant by damped oscillations?
- (v) What are the factors common in transverse and longitudinal waves?
- (vi) How beats are useful in turning musical instruments?
- (vii) What is the frequency of fundamental note for an organ pipe of length 50cm, open at both ends? (speed of sound = 340m/s)
- (viii) An astronomical telescope having magnifying power of 5 consist of two thin lenses 24cm apart. Find the focal lengths of the lenses.
- (ix) What is meant by total internal reflection? Explain by a ray diagram.

SECTION – II   Attempt any THREE questions. Each question carries 08 marks.

5. (a) Show that work done in earth's gravitational field is independent of the path followed.   05

(b) Find work done when the point of application of force $3\hat{i} + 2\hat{j}$ moves in straight line from the point $(2, -1)$ to the point $(6, 4)$.   03

FBD-G2-22

6. (a) What is the difference in real and apparent weight? Discuss the change in apparent weight with up and down accelerated motion.   05

   (b) A truck weight 2500kg and moving with a velocity of 21ms⁻¹ collides with a stationary car weighing 1000kg. The truck and the car move together after the impact. Calculate their common velocity.   03

7. (a) State and explain Torricelli's theorem.   05

   (b) A church organ consists of pipes, each open at one end of different lengths. The minimum length is 30mm and longest is 4m. calculate the frequency range of the fundamental notes. (speed of sound = 340ms⁻¹)   03

8. (a) Discuss the diffraction of light through diffraction grating and prove that $d \sin \theta = n\lambda$ 05

   (b) A 100.0gm body hung on a spring elongates a spring by 4.0cm. When a certain object is hung on the spring and set vibrating, its period is 0.568s. What is the mass of the object pulling the spring?   03

9. (a) Write the principle, construction and working of astronomical telescope. Also find its magnifying power.   05

   (b) A reversible engine works between two temperatures whose difference is 100°C. If it absorbs 746J of heat from the source and rejects 546J to the sink, calculate the temperature of the source and the sink.   03

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