

Sign & Stamp of Supdt:

Roll No.

C No. 62

Name:

VERSION: A

Time Allowed: 20 Minutes

SECTION-A

Marks:18

- The result of $3.21\text{m} \times 1.4\text{m}$ to the correct number of significant figures in the following is:
A. 4.494 m^2 B. 4.49 m^2 C. 4.5 m^2 D. 4.50 m^2
- The horizontal and vertical components of a vector are 8 units and 6 units respectively. The magnitude of the vector is:
A. 2 units B. 10 units C. 14 units D. 48 units
- Two vectors A and B are such that $|A \times B| = AB/2$. The angle between the two vectors is:
A. 0° B. 30° C. 60° D. 90°
- The product of perpendicular component of applied force and distance from the axis to the point of application of force is called: 126234
A. moment arm B. torque C. couple D. couple arm
- If the displacement-time graph of a body is a straight line inclined to time axis, the body is:
A. moving with uniform velocity B. moving with uniform acceleration C. moving with variable velocity D. stationary
- The physical quantity that remains constant in all types of collisions is:
A. velocity B. total kinetic energy C. total linear momentum D. speed
- The maximum range of projectile is 400m. The maximum height reached by the projectile is:
A. 100m B. 200m C. 400m D. 800m
- A body is moving on a rough surface with velocity V. The work done by the force of friction is:
A. Positive B. Negative C. Zero D. infinite
- The correct mathematical expression of power in the following is:
A. $P = Fd$ B. $P = F \cdot V$ C. $P = F \times V$ D. $P = F/V$
- The escape velocity for one rocket of mass 1000 kg is 11 km/s on earth's surface. The escape velocity for another rocket of mass 500kg will be:
A. $11/2 \text{ kms}^{-1}$ B. $11/4 \text{ kms}^{-1}$ C. 11 kms^{-1} D. 22 kms^{-1}
- The centripetal force acting on a body changes:
A. magnitude of velocity B. direction of velocity C. magnitude of linear momentum D. kinetic energy
- A body is rotating in xy plane with constant angular velocity about Z-axis. The net torque acting on the body is:
A. directed along Z-axis B. perpendicular to xy plane C. parallel to xy plane D. zero
- The moment of inertia of a rotating rigid body does not depend on: 126234
A. total mass of body B. distribution of mass about an axis C. size of body D. angular velocity of body
- If the ratio of the radii of two steel balls A and B falling in a viscous medium is 3:5 respectively, the ratio of their terminal velocities ($v_A : v_B$) will be:
A. 5:3 B. 3:5 C. 9:25 D. 25:9
- The quantity that does not depend on the instantaneous displacement during simple harmonic motion is:
A. kinetic energy B. potential energy C. total energy D. instantaneous velocity
- The speed of sound in air is 300 ms^{-1} at pressure P. When the pressure is increased to 4P, the speed will be.
A. 300 ms^{-1} B. 600 ms^{-1} C. 1200 ms^{-1} D. 1600 ms^{-1}
- Among the following colours, the fringes in Young double slit experiment will be wider for:
A. violet B. red C. green D. yellow
- A gas absorbs 150J of heat and does 50J of work. The internal energy of the gas increases by:
A. 150J B. 100J C. 50J D. 75J

Write Roll No. in the boxes and shade the appropriate circle.

0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Shade the correct answers for each question below

1.	(A)	(B)	(C)	(D)
2.	(A)	(B)	(C)	(D)
3.	(A)	(B)	(C)	(D)
4.	(A)	(B)	(C)	(D)
5.	(A)	(B)	(C)	(D)
6.	(A)	(B)	(C)	(D)
7.	(A)	(B)	(C)	(D)
8.	(A)	(B)	(C)	(D)
9.	(A)	(B)	(C)	(D)
10.	(A)	(B)	(C)	(D)
11.	(A)	(B)	(C)	(D)
12.	(A)	(B)	(C)	(D)
13.	(A)	(B)	(C)	(D)
14.	(A)	(B)	(C)	(D)
15.	(A)	(B)	(C)	(D)
16.	(A)	(B)	(C)	(D)
17.	(A)	(B)	(C)	(D)
18.	(A)	(B)	(C)	(D)
19.	(A)	(B)	(C)	(D)
20.	(A)	(B)	(C)	(D)

Physics (Part - I)

10

Section "B"

Marks: 40

Note: Attempt any TEN questions. All questions carry equal marks.

- Q.1. The length and width of a rectangular plate are (6.2 ± 0.1) cm and (3.0 ± 0.2) cm. Calculate the area of the plate and determine percentage uncertainty in the area. 1+1+1+1
- Q.2. Show that the equation $\tau = \frac{dL}{dt}$ is correct using the principle of dimensional homogeneity. (τ =torque, L =angular momentum). 1+1+1+1
- Q.3. If **A** and **B** are two non-zero vectors, explain how can their:
(a) scalar product be zero. (b) vector product be maximum. 2+2
- Q.4. Write four steps to add any two vectors by head-to tail rule. 1+1+1+1
- Q.5. Distinguish between positive and negative work with one example in each case. 1+1+1+1
- Q.6. Define escape velocity. State two factors on which the escape velocity of a planet depends. Does the mass of the projected body affect escape velocity? 1+2+1
- Q.7. Differentiate between streamline (laminar) flow and turbulent flow. List two conditions for turbulent flow to occur. 1+1+2
- Q.8. State the equation of continuity. Write its mathematical form. Name the quantity that remains constant during the flow of an incompressible fluid. 2+1+1
- Q.9. A sound wave of frequency 512 Hz has wavelength 0.6m. Calculate:- 2+2
(a) time period of wave. (b) speed of wave.
- Q.10. Prove that the speed of sound in gas is directly proportional to the square root of temperature of the gas. 1+1+1+1
- Q.11. Show that frequency of third harmonic in case of transverse stationary waves in a string of length L fixed between two points is $3V/2L$. (V =speed of waves) 1+1+1+1
- Q.12. Explain why white light incident on soap bubbles on the surface of water has coloured streaks. 1+1+1+1
- Q.13. Define diffraction of light. Briefly explain through an example that diffraction is the evidence of wave nature of light. 1+2+1

Section "C"

Marks: 25

Note: Attempt any THREE questions. All questions carry equal marks.

- Q.14. a). For a perfectly one dimensional elastic collision between two bodies, prove that their relative speed of approach is equal to their relative speed of recession. 1+1+1+1+1
b). Define the following terms: 1+1+1+1
(i) average acceleration (ii) instantaneous acceleration
(iii) uniform acceleration (iv) variable acceleration
- Q.15. a). What force provides the centripetal force required to keep an artificial satellite in its circular orbit around earth? Explain Why it does not fall to the surface of earth. State two applications of artificial satellites. 1+2+2
b). A fan rotating with angular velocity of 360 rev/min comes to rest in 20s when switched off. Calculate the average angular acceleration of the fan. 1+1+1+1
- Q.16. a). Derive the formula for the time period of a simple pendulum in terms of its length (L), assuming small angular displacement. 1+1+1+1+1
b). Define free and forced oscillation with one example of each. 1+1+1+1
- Q.17. a). What is Carnot engine and Carnot cycle? Name the four processes that complete the Carnot cycle. State the two factors on which the efficiency of Carnot engine depends. 1+1+2+1
b). If the temperature of heat source and heat sink is 1000K and 300K respectively for a Carnot engine, calculate its efficiency. 4