

11thARF(S/Z)JD-2026**1523-B**
PHYSICS**Time : 3 Hours]****[Maximum Marks : 70****Note:- “Attempt any 60 marks out of 70 marks”.****SECTION-A****(Objective Type Questions)**

(1 mark each)

1. (i) If a vehicle moves at 60 km/hr for half an hour and 40 km/hr for next half hour, average speed is :
- (a) 50 km/hr (b) 45 km/hr
- (c) 52 km/hr (d) 48 km/hr
- (ii) If a body's velocity changes direction but not magnitude, the motion is :
- (a) rectilinear (b) uniform linear
- (c) uniform circular (d) projectile

- (iii) The number of significant figures in 40.0634 is :
- (a) 3 (b) 4
- (c) 5 (d) 6
- (iv) If no external force acts on a system of particles, its total linear momentum will-
- (a) be zero (b) increase gradually
- (c) decrease gradually (d) remain constant
- (v) Which of the following forces is an example of conservative forces?
- (a) air resistance (b) viscous force
- (c) gravitational force (d) none of these
- (vi) A body in rotational motion possesses rotational kinetic energy given by :
- (a) $KE = \frac{1}{2} I \omega^2$ (b) $KE = \frac{1}{2} I^2 \omega^2$
- (c) $KE = 2 I^2 \omega$ (d) $KE = \frac{1}{2} I^2 \omega$

(Very short Answer Type Questions)

(2 marks each)

2. Explain the need for the measurement. ✓
3. Explain the principle of homogeneity of dimensions. ✓
4. What is the dot product of two vectors? Give one example. ✓
5. To lift a mass of 30 kg to a height of 15 m, calculate the work done against gravity.
6. Explain the concept of torque and angular momentum. ✓
7. The gravitational force between two blocks is F . What would happen if the mass of both the blocks as well as distance between them is doubled?

(vii) The formula for Kepler's third law is :

(a) $T^3 \propto a^2$

(b) $T^3 \propto a^3$

(c) $T^2 \propto a^2$

(d). $T^2 \propto a^3$

(viii) Which of these materials is unaffected by an applied elastic force?

(a) copper

(b) quartz

(c) steel

(d) rubber

(ix) Which of the following variables is a thermodynamic state variable?

(a) work

(b) heat

(c) , internal energy

(d) none of these

(x) How many particles are present in one mole of any substance?

(a) 6.022×10^{23}

(b) 6.022×10^{22}

(c) 6.022×10^{21}

(d) 6.022×10^{24}

8. Define isothermal and adiabatic processes and give examples of each. ✓
9. Calculate the root mean square speed of oxygen (O_2) molecules at 273 K. ✓
10. Define periodic motion. Give two examples which have both periodic and simple harmonic motion. ✓

SECTION-C

(Short Answer Type Questions)

(3 marks each)

11. ✓ State and explain Newton's third Law of Motion. ✓
12. ✓ Explain static friction and kinetic friction. Can the value of kinetic friction be greater than static friction? Explain.

13. What is meant by a collision? Discuss two types of collision.
14. Briefly explain equilibrium of a rigid body.
15. Explain how g varies with altitude.
16. State and explain the first law of thermodynamics and discuss its applications.
17. Describe the total degree of freedom for monatomic, diatomic, and triatomic molecules. <https://www.jkboseonline.com>
18. State and prove pascal's law and discuss hydraulic brakes on its basis.
19. A simple harmonic oscillator is represented by the equation :
 $y = 0.40 \sin (440t + 0.61)$. y is in metres and t is in seconds.
Find the value of amplitude, angular frequency, frequency of oscillation and time period of oscillation.

SECTION-D**(Long Answer Type Questions)**

(5 marks each)

20. Find (a) time of flight, (b) maximum height, (c) horizontal range of a projectile projected with speed v making an angle θ with horizontal direction from ground.

OR

Define uniform acceleration and variable acceleration. Deduce the equations of uniformly accelerated motion in one dimension by graphical method. ✓

21. Explain the three modes of heat transfer with illustrations. Also state and explain Stefan's law.

OR

State Bernoulli's theorem and discuss its physical significance

Give two applications of Bernoulli's theorem. ✓

22. Define S.H.M. Derive the equations for K.E. and P.E. for a particle in SHM and show that the total mechanical energy is conserved.

OR

What are standing waves? Why are they called stationary waves? Explain how overtones are produced in a closed organ pipe. ✓

Roll No.....

Total No. of Questions : 22]

[Total No. of Printed Pages : 8

11thARF(S/Z)JD-2026

1523-A PHYSICS

Time : 3 Hours]

[Maximum Marks : 70

Note:- “Attempt any 60 Marks out of 70 Marks”.

SECTION-A

(Objective Type Questions)

(1 mark each)

1. (i) The number of significant figures in 6638 is :

(a) 1

(b) 2

(c) 3

(d) 4

(ii) If $X = 10 - 3t + 6t^2$, what is acceleration?

(a) 3 m/s^2

(b) 6 m/s^2

(c) 12 m/s^2

(d) 0 m/s^2

- (iii) The area under velocity-time graph represents :
- (a) acceleration (b) force
(c) displacement (d) work
- (iv) An impulse is the change in :
- (a) velocity (b) kinetic energy
(c) momentum (d) displacement
- (v) The work done by a conservative force moving a particle around a closed path is :
- (a) always positive (b) always negative
(c) zero (d) depends on the path
- (vi) Radius of gyration is denoted by :
- (a) R (b) G
(c) K (d) I
- (vii) Which law describes the orbits of planets around the sun?
- (a) Newton's law (b) Faraday's law
(c) Kepler's law (d) Kirchhoff's law

(viii) Which of the following is defined by Hooke's law?

- (a) Modulus of elasticity (b) Stress
- (c) Strain (d) Elastic limit

(ix) In a cyclic process :

- (a) the net work done is always positive
- (b) the change in internal energy is zero
- (c) the net heat transfer is zero
- (d) the process is always reversible

(x) The mean free path of a gas is directly proportional to :

- (a) pressure
- (b) temperature
- (c) the square of the molecular diameter
- (d) number density

SECTION-B

(Very short Answer Type Questions)

(2 marks each)

2. What are the advantages of S.I.?
3. What is meant by dimensions of a physical quantity and dimensional equation?
4. Explain rectangular components of a vector with illustration.
5. An elevator weighing 600 kg is to be lifted up at a constant velocity of 0.5 m/s. What should be the minimum horse power of the motor to be used?
6. Explain the concept of torque and angular momentum.
7. The gravitational force between two blocks is F . What would happen if the mass of both the blocks as well as distance between them is doubled?

8. Define isothermal and adiabatic processes and give examples of each.
9. Calculate the root mean square speed of oxygen (O_2) molecules at 273 K.
10. Define periodic motion. Give two examples which have both periodic and simple harmonic motion.

SECTION-C

(Short Answer Type Questions)

(3 marks each)

11. State and explain Newton's Second Law of Motion. Hence deduce relation $F = ma$.
12. Explain static friction and kinetic friction. Can the value of kinetic friction be greater than static friction? Explain.

13. What is meant by a collision? Discuss two types of collision.
14. Briefly explain equilibrium of a rigid body.
15. Explain how g varies with altitude.
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