

K-1-X

Roll No.....

Total No. of Questions : 26]

[Total No. of Printed Pages : 4

XIKDRO/N19

25501-X

PHYSICS

Time : 3 Hours]

[Maximum Marks : 70

Section-A

(Very-Very Short Answer Type Questions)

1 each

1. Evaluate :

$$\int_0^1 x \cdot dx$$

2. What is the number of significant digits in 0.005 m^2 ?

3. What is longitudinal strain ?

4. Define free oscillations.

5. At what position, the velocity of a particle executing S.H.M. is maximum ?

Section-B

(Very Short Answer Type Questions)

2 each

6. Define the following :

(i) Astronomical unit (AU)

(ii) One Angstrom (\AA) = m

- 7/ Convert 5 joule into erg using dimensional analysis.
- 8/ Using Calculus method, derive $v = u + a.t$.
9. Define limiting force of friction and state laws of friction.
10. What is gravitational force ? State Newton's law of gravitation.

Section-C

(Short Answer Type Questions)

3 each

11. Differentiate x^n by ab-initio method.
12. Show that the mechanical energy ($= K.E + P.E$) of a falling body remains constant.
13. What is relation between power and energy ?
Show that $1 \text{ kWh} = 3.6 \times 10^6 \text{ J}$.
14. State and prove the principle of conservation of angular momentum.
15. Define radius of gyration and derive a relation for it.
16. Derive relation between surface tension and surface energy.
17. Define :
 - (i) Coefficient of linear expansion
 - (ii) Coefficient of superficial expansion
 - (iii) Coefficient of volume expansion.

18. ✓ State and explain Zeroth law of Thermodynamics.
19. ✓ What is reversible and irreversibile process ? Give example.
20. ✓ Give postulates of kinetic theory of an Ideal gas.
21. ✓ Define degrees of freedom. Find degrees of freedom for diatomic gas.
22. ✓ Distinguish between transverse and longitudinal waves.

Section-D

(Value-Based Questions)

23. ✓ Suppose there existed a planet that went around the sun twice as fast as the earth. What would be its orbital size as compared to that of the earth ?

Section-E

(Long Answer Type Questions)

5 each

24. State Parallelogram law of vector addition. Find the magnitude of the resultant vector of two vectors \vec{P} and \vec{Q} inclined at an angle ' θ ' with each other. <https://www.jkboseonline.com>

Or

Define Projectile. Derive an expression for range of a projectile fired at an angle ' θ ' with horizontal.

25. State and explain Newton's second law of motion.

Or

Define Centripetal force. Derive an expression for it.

26. What is Doppler's effect ? Write down expression for apparent frequency when source is in motion and listener is at rest.

Or

Find the relation for ~~time~~ period of a simple pendulum executing S.H.M.

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