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 :**

$$\int_0^1 x.dx$$

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 (Å) = ... m

7. Convert 5 joule into erg using dimensional analysis.

8. Using Calculus method, derive $v = u + at$.

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 kWh = 3.6×10^6 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 irreverisible 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.

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.