A–1–C

Roll No .....

Total No. of Questions : 26] [Total No. of Printed Pages : 4

XIARKDD20

2701–C

PHYSICS

Time : 3 Hours] **[Maximum Marks : 70**

(A-1-C) Roll No.....

Total No. of Questions : 26 Total No. of Printed Pages : 4

XIARKDD20

2701-C

PHYSICS

Time : 3 Hours Maximum Marks : 70

(Very Very Short Answer Type Questions)

1. Integrate :

$$\int_{x=\infty}^{x=R} \frac{GMm}{x^2} dx$$

2. Write the dimensions of :

(a) Torque

(b) Impulse

3. Density of a substance is p=M/V , where M = (20 ± 0.2) kg and V = (10 ± 0.1) m^3. Calculate percentage error in 'p'.

4. On what factors does the efficiency of heat engine depend ?

5. Does the moment of inertia of a body changes with the speed of rotation ?

(Very Short Answer Type Questions)

6. State and explain Newton's Third Law of Motion.

OR

Friction is a necessarily as well as evil. Explain.

7. Two bodies of masses 1 kg and 2 kg are located at points (1, 2) and (-1, 3) respectively. Calculate the co-ordinates of the centre of mass.

8. State Pascal law. Give its one practical application.

9. Define isothermal process and adiabatic process.

10. The velocity of a particle executing SHM is maximum at a particular instant. What can be said about the acceleration at that instant ?

(Short Answer Type Questions)

11. The frequency v of vibration of a stretched string depends upon

(i) its length l

(ii) its mass per unit length m and

(iii) the tension T in the string.

Obtain an expression for frequency v by using method of ddimensions.

OR

Convert 1 joule of energy into erg.

12. Differentiate x by ab-initio method.

13. A projectile is fired with a velocity v making an angle with the horizontal. Derive expression for its time of flight and maximum height.

14. A particle moves along x-axis from x = 0 to x = 5 m under the influence of force F = 5 - 4x + 3x2. Find work done in this process.

15. Prove that power is the dot product of force and velocity

16. Define torque and angular momentum and derive a relation between them.

17. Discuss the variations of 'g with depth. What happens to 'g at the centre of earth.

18. Derive an expression for orbital velocity of a satellite.

19. State Zeroth Law of Thermodynamics. How does this law gives the definition of temperature ?

20. Define degrees of freedom. Calculate the degree of freedom of monoatomic, diatomic and triatomic gas molecules.

21. Discuss the kinetic interpretation of temperature. Hence define absolute zero of temperature.

22. Distinguish between transverse and longitudinal waves.

(Value Based Questions)

23. A man arrived at Delhi Railway Station and wanted to go to his relative's house 10 km away from the station. He hired a taxi to reach the destination. The driver follow a long path 25 km to reach the destination in 1 hour and charged from the man for 25 km :

(1) Comment on the behaviour of taxi driver.

(ii) Calculate the average speed of the taxi.

(iii) Calculate the average velocity of the taxi.

(Long Answer Type Questions)

24. Why are curved road banked ? Obtain an expression for angle of banking of a curved road.

OR

State and prove the principle of conservation of linear momentum. Give examples

25. Derive an expression for excess pressure

(i) inside a liquid drop

(ii) inside a soap bubble.

OR

State Bernoulli's theorem in different forms. Name its two applications.

26. Define plane progressive wave. Derive expressions for the displacement of a plane progressive wave in different forms.

OR

What is Simple Pendulum ? Show that motion of the pendulum is SHM and hence deduce an expression for its time period.