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3119(N)

II

Total No. of Questions : **38**
Total No. of Printed Pages : **3**

Regd. No.

Part - III
PHYSICS - PAPER - I
(NEW)
(English Version)

Time : 3 Hours **Max. Marks : 85**

SECTION - A

I. Answer *all* the following questions. Each question carries *one* mark. **9x1=9**

1. Which of the following physical quantity has no dimensions ?
(1) Angular Velocity (2) Angular Acceleration
(3) Angular Displacement (4) Stress

2. Why gases cannot support the propagation of transverse wave ?
(1) Gases are incompressible (2) Gases have no shearing stress
(3) Density of gas is less (4) Gases can flow

3. Among the following, the material with the highest elasticity is :
(1) Copper (2) Aluminium (3) Brass (4) Steel

4. The value of an acceleration of a freely falling body is _____.

5. Hydraulic lift and hydraulic brakes are based on _____ law.

6. A monatomic gas molecule has _____ degrees of freedom.

7. When are the two vectors said to be equal vectors ?

8. State Kepler's law of areas.

9. Write the mathematical equation of Newton's Second Law.

SECTION - B

II. Answer *all* the following questions. Each question carries *two* marks. **14x2=28**

10. Write the physical quantities that are having Jm^{-1} and Jm^{-2} as their units.

11. The states of motion and rest are relative. Explain.

12. If $\vec{P} = 2i + 4j + 14k$ and $\vec{Q} = 4i + 4j + 10k$ find the magnitude of $\vec{P} + \vec{Q}$.

13. What is inertia ? What gives the measure of inertia ?

14. State the relation between the kinetic energy and momentum of a body.

15. We cannot open or close the door by applying force at the hinges. Why ?

16. What are the factors that make 'g' the least at the equator and maximum at the poles ?

17. State Hooke's law of elasticity.

18. Give the expression for the excess pressure in a soap bubble in air.

19. The roof of buildings is often painted white during summer. Why ?

20. What thermodynamic variables can be defined by (a) Zeroth law (b) First law ?

21. Define mean free path. https://www.apboardonline.com

22. What happens to the energy of a simple harmonic oscillator if its amplitude is doubled ?

23. What are beats ?

SECTION - C

III. Answer *any eight* of the following questions. Each question carries *four* marks. **8x4=32**

24. Explain the terms the average velocity and instantaneous velocity. When are they equal ? https://www.apboardonline.com

25. Show that the maximum height reached by a projectile launched at an angle of 45^{o} is one quarter of its range.

26. Mention the methods used to decrease friction.

27. Define vector product. Explain the properties of a vector product with two examples.

28. When 100 J of work is done on a fly wheel, its angular velocity is increased from 60 rpm to 180 rpm. What is the moment of inertia of the wheel ?

29. What is escape velocity ? Obtain an expression for it.

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30. Define Young's modulus, Bulk modulus and Shear modulus.

31. What is atmospheric pressure ? How is it determined using a barometer ?

32. In what way is the anomalous behaviour of water advantageous to aquatic animals ?

33. If the maximum intensity of radiation for a black body is found at 2.65 μm what is the temperature of the radiating body ?
(Wien's constant = 2.9×10^{-3} mK)

34. What is the ratio of r.m.s. speed of Oxygen and Hydrogen molecules at the same temperature ?

35. Explain the modes of vibrations of an air column in a closed pipe.

SECTION - D

IV. Answer *any two* of the following questions. Each question carries *eight* marks.

2x8=16

36. Define elastic and inelastic collisions. Derive expressions for the final velocities of bodies in one dimensional elastic collision, when one body collides with other body which is initially at rest.

37. Define two specific heat capacities of a gas and derive the relation between them on the basis of first law of thermodynamics.

38. (a) Define simple harmonic motion. Show that the motion of (point) projection of a particle performing uniform circular motion, on any diameter, is simple harmonic.

(b) A particle executes SHM such that, the maximum velocity during the oscillation is numerically equal to half of the maximum acceleration. What is the time period ?

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