V11P

Virudhunagar District

Common Second Mid Term Test - 2024

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Standard 11

PHYSICS

Time: 1.30 Hrs.

Marks: 50

Instructions:

I. Answer all the questions.

II. Write the option code and the corresponding answer.

Part - I

Choose the correct answer: 10×1=10

1) The young's modulus of elasticity of a perfect rigid body is

    a) 0   b) 1   c) 0.5   d) infinite

2) When the temperature of a metallic wire is increased, the young's modulus of the wire will

    a) remains same   b) decreases

    c) increases maximum   d) increases minimum

3) The wettability of a surface by a liquid depends primarily on

    a) viscosity   b) surface tension

    c) density   d) angle of contact between the surface and the liquid

4) Water flowing in a pipe of diameter 4 cm with a velocity 3 m/s. If water flows through the pipe of diameter 2 cm, its velocity is

    a) 3 m/s   b) 6 m/s   c) 12 m/s   d) 8 m/s

5) When a cycle tyre suddenly bursts the air inside the tyre expands. This process is

    a) isothermal   b) adiabatic   c) isobaric   d) isochoric

6) The efficiency of a heat engine working between the breezing point and boiling point of water is

    a) 6.25%   b) 20%   c) 26.8%   d) 12.5%

7) The temperature of a metal piece is increased from 27°C to 32°C. The amount of energy of thermal radiations emitted becomes

    a) doubled   b) 4 times the initial

    c) 8 times the initial   d) 16 times the initial

8) A sample of ideal gas is at equilibrium. Which of the following quantity is zero,

    a) rms speed   b) average speed

    c) average velocity   d) most probable speed

9) Which of the following shows the correct relationship between the pressure and density of an ideal gas at constant temperature?
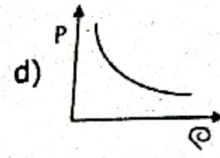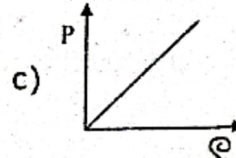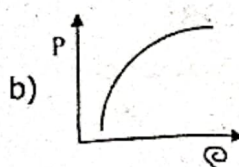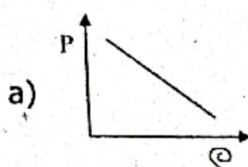
10) If 'd' is the direction of a gas molecule, then mean free path depends on

a) d　　　　b) d^2　　　　c) d^{-2}　　　　d) d^{-3}

Part - II

Answer any five of the following questions:　　　　**5×2=10**

(Answer to the question no. 17 is compulsory)

11) State Hooke's law in elasticity.

12) What is capillary action? Mention any one use of it.

13) State Stefan - Boltzmann law.

14) What is a cyclic process?

15) Define the term Degrees of freedom.

16) State the law of equipartition of energy.

17) What rises to a height of 2 cm in a capillary tube of radius 'r'. How much height water raises in a capillary tube of radius one third of the previous tube?

Part - III

Answer any five of the following questions:　　　　**5×3=15**

(Question no. 24 is compulsory)

18) Explain any two types of modulus of elasticity.

19) Derive Poiseuille's formula for the volume of liquid flowing per second through a pipe under stream lined flow.

20) State Boyle's law and Charle's law using it obtain an ideal gas equation.

21) Write down the postulates of kinetic theory of gases.

22) Derive the equation for work done in an isothermal process.

23) Write the application of viscosity of liquid.

24) A carnot engine has efficiency 45% when it takes heat from a source at 327°C. To have the efficiency 60%, what must be the temperature of source for the same sink temperature?

Part - IV

Answer the following questions in detail:　　　　**3×5=15**

25) a) State and prove Bernoulli's theorem.

(OR)

b) Derive an equation for mean free path of a gas.

26) a) Derive the expression for pressure exerted by the gas on the walls of the container.　　**(OR)**

b) Derive the expression for the terminal velocity of a sphere moving in a high viscous liquid.

27) a) Derive the working of Carnot's Heat engine.

(OR)

b) Derive Mayer's relation for an ideal gas.