K.V.S. Matriculation Hr. Sec. School, Thoothukudi.

Second Mid Term Exam – November 2023

PHYSICS (Lesson – 6,7,8)

Time: 1.30 Hours Marks: 35 Std: XI-A Name:

I. Choose the correct answer : **[7 × 1 = 7]**

1) If a person moves from Chennai to Trichy, his weight
   a) increases b) decreases c) remains same d) None of these
2) The gravitational potential energy of the Moon with respect to Earth is
   a) always positive b) always negative c) positive or negative d) always zero
3) If a wire is stretched to double of its original length, then the strain in the wire is
   a) 1 b) 2 c) 3 d) 4
4) Which of the following is not a scalar?
   a) viscosity b) surface tension c) pressure d) stress
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) In a isochoric process, we have
   a) W = 0 b) Q = 0 c) Δu = 0 d) ΔT = 0
7) If the radius of Earth is 'R' at what height acceleration due to gravity becomes zero?
   a) R b) $\frac{R}{4}$ c) 2R d) $\frac{R}{2}$

II) Answer any three questions. Question 10 is compulsory: **[3 × 2 = 6]**

8) Define gravitational potential energy.
9) Define weight.
10) State Newton's Universal law of gravitation.
11) Define Poisson's ratio.
12) State Stefan-Boltzmann law.

III) Answer any four questions. Question 18 is compulsory: **[4 × 3 = 12]**

13) Derive and expression for energy of satellite.
14) Derive the expression for gravitational potential energy.
15) What is Reynold's number? Give its significance.
16) Explain the different types of modulus of elasticity.
17) Derive Mayer's relation for an ideal gas.
18) A metallic cube of side 100 cm is subjected to a uniform force acting normal to the whole surface of the cube.The pressure is 10^6 pascal. If the volume change by 1.5×10^{-5} m^3, calculate the bulk modulus of the material.

IV) Answer all the questions in detail: **[2 × 5 = 10]**

19) Derive an expression for escape speed.

(OR)

Explain in detail Newton's law of cooling.

20) State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and streamlined flow of Liquid.

(OR)

Derive Poiseuille's formula for the volume of a liquid flowing per second through a pipe under streamlined.

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