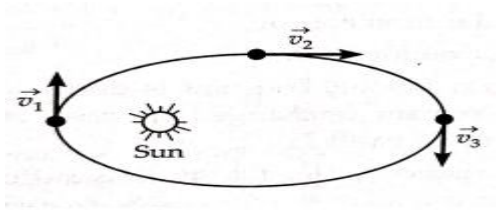
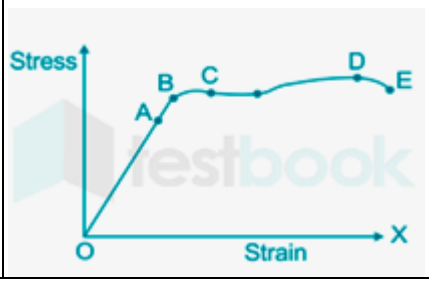
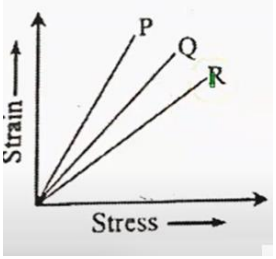
Suguna International School

Cyclic Test – 3

Class & Sec: XI A **Subject: Physics**

Date: 13.11.2025 **Marks: 25**

Ques. No.	Question	Marks
	SECTION – A	
1	If the mass of earth is 80 times that of moon and its diameter is double that of moon and g on earth is 9.8m/s^2, then the value of g on moon is (A) 0.98 m/s^2 (B)0.49m/s^2 (C) 9.8m/s^2 (D) 4.9 m/s^2	**1**
2	The force of gravitation is (A) repulsion (B) electrostatic (C) conservative (D) non conservative	**1**
3	Assuming earth to be a sphere of uniform density, the acceleration due to gravity at a depth 100 km below the surface of the earth's surface is (R = 6400 x 10^3 m) (A) 9.65 m/s^2 (B) 5.06 m/s^2 (C) 7.64 m/s^2 (D) 3.10 m/s^2	**1**
4	Figure shows the velocity of a planet revolving around the sun at three times of a year. Let V be the speed of the planet when its velocity is **V**, Which of the following is correct?  (A) $V_2 = 2V_1$ and $V_3 = 3\ V_1$ (B) $V_3 > V_2 > V_1$ (C) $V_2 = \frac{V_1+V_3}{2}$ (D) $V_1 > V_2 > V_3$	**1**
5	The relation between Young's modulus Y, bulk modulus K and modulus of elasticity η is (A) $\frac{1}{Y} = \frac{1}{K} = \frac{3}{\eta}$ (B) $\frac{3}{Y} = \frac{1}{\eta} + \frac{3}{K}$ (C) $\frac{1}{Y} = \frac{1}{3K} + \frac{3}{\eta}$ (D) $\frac{1}{\eta} = \frac{1}{3K} + \frac{3}{Y}$	**1**
6	In stress strain curve , point A, B and E corresponds to (A) fracture point, yield point and proportional limit respectively (B) proportional limit, yield point and fracture point respectively (C) yield point, proportional limit and fracture point respectively (D) proportional limit, fracture point and yield point respectively  	**1**

7	In the given diagram arrange the material in ascending order of elasticity (A) P,Q,R (B) R,P,Q (C) R,Q,P (D) All have same elasticity  	**1**
	SECTION – B	
8	(a) Define elastic limit (b) State Hooke's law	2
9	A steel wire of length 2m is stretched through 2.0 mm. The cross-sectional area of wire is 4.0 mm^2. Calculate elastic potential energy stored in wire in stretched condition. Young's modulus of steel is 2.0 x 10^{11} Nm^{-2}	2
	SECTION – C	
10	Explain the three moduli of elasticity with diagram and equations	**5**
11	Give expressions for (a) Escape speed (b) Orbital velocity (c) Gravitational potential and explain the terms in it **Or** Define escape speed and derive an expression for it.	5
	SECTION – D (Case Study Based Question)	
12	When the wire is under the action of tensile stress, its length increases but its diameter decreases. The strain produced in the direction of applied force is called longitudinal strain and that produced in the perpendicular direction is called lateral strain. Within the elastic limit, the ratio of lateral strain to the longitudinal strain is called Poisson's ratio. $\sigma = \frac{-\Delta D/D}{\Delta l/l}$ The negative sign shows that longitudinal and lateral strains are in opposite sense. Poisson's ratio is a ratio of two strains, it has no unit and dimension. For metals the value is between 0.28 and 0.30 **Answer the following questions** i) A long piece of rubber is wider than it is thick. When it is stretched in length by some amount, (a) its thickness decreases but its width increases (b) its thickness decreases but its widthremains constant (c) its thickness increases but its width decreases (d) both its thickness and width decreases ii) Minimum and maximum value of Poisson's ratio lies between (a) -∞ to +∞ (b) 0 to 1 (c) -∞ to 1 (d) 0 to 0.5 iii) If longitudinal strain of a wire is 0.03 and its Poisson's ratio is 0.5, then its lateral strain is (a) 0.003 (b) 0.0075 (c) 0.015 (d) 0.4 iv) A 3 cm long copper wire is stretched to increase its length by 0.3 cm. If the Poisson's ratio for copper is 0.26, the lateral strain produced in the wire is (a) 0.26 (b) 0.026 (c) -0.26 (d) -0.026	4