

Time: 1 hour

Full marks: 20

1. Answer any five from the following questions: (1×5=5)

a) State Hooke's law.

b) What are scalar and vector quantities?

c) What is elasticity?

d) Write the dimension of stress.

e) Find the expression of velocity for a particle executing SHM.

f) Write the condition for two vectors to be perpendicular to each other.

g) State Newton's law of Gravitation.

2. Answer any three from the following questions: (5×3=15)

a) Derive the relation  $Y = 3K(1 - 2\sigma)$  where  $Y$ ,  $K$  and  $\sigma$  are Young's Modulus, bulk modulus and Poisson's ratio respectively.

b) If vector  $\vec{A} = 3\hat{i} + 4\hat{j} - 5\hat{k}$  and  $\vec{B} = -\hat{i} + 2\hat{j} - 6\hat{k}$  find (i) scalar product (ii) vector product.

c) Find the work done in stretching a wire of length 'l'.