

SEM 1 PHSA CC2 PRACTICAL -2022

F.M : 30

Answer **any one** question from the following

(Symbols bear usual meaning)

1.a) Write down the expression of moment of inertia of a bar pendulum about its point of suspension in terms of radius of gyration (K) and distance (r) between point of suspension and its centre of gravity .

2

b) Write down the equation of motion of the said bar pendulum with necessary diagram and hence find the expression of its time period T

2+2+2

c) What will be the nature of the graph if T^2r is plotted along y axis and r^2 along x axis and why it is so? Draw the nature of the graph.

2+2+4

d) How can you find 'g' and radius of gyration (K) from this graph?

4+4

e) What is length of equivalent simple pendulum? How can you estimate length of equivalent pendulum of the above bar pendulum?

2+4

2. a) If the period of oscillation about the vertical axis, of the cradle alone $=T_0$, of the cradle and the body of known moment of inertia $=T_1$ and of the cradle and the body of unknown moment of inertia $=T_2$, Derive the necessary formula for determining the moment of inertia of the unknown body.

6

b) Make the necessary table (blank) for determination of above said periods of oscillation. What would you do to get accurate value of the time periods?

4+2

c) If the known body is a rectangular bar write down the expressions of moment of inertia (I_1) about the vertical axis passing through its centre of gravity and perpendicular to its length. Explain each symbol.

2

d) If the unknown body is a cylinder write down the expressions of moment of inertia (I_2) about the vertical axis passing through its centre of gravity and perpendicular to its length. Explain each symbol.

2

- e) What is rigidity modulus? Derive an expression for the rigidity modulus using above said data for determining the rigidity modulus of the material of the suspension wire of the cradle. 6
- f) Make a table for determining the radius of the suspension wire. Why it is to be measured so accurately? 6+2
3. a) Write down the working formula for determination of Young's modulus of the material of a beam by the method of flexure explaining each term. 2
- b) Make a table for determination of breadth and depth of the bar 4
- c) Make a table for recording of load depression data using travelling microscope 6
- d) Draw the nature of the load depression graph. 2
- e) What is neutral surface of the bent beam? 4
- f) What are geometrical moment of inertia and flexural rigidity? 4+4
- g) Now the length of the beam is doubled. 'Y' will increase or decrease or will remain same? Justify your answer. 4