

CITY COLLEGE

Semester-I Online Practical Examination (CBCS) 2020-21

Physics Honours

Paper: CC-2: Mechanics

Time: 1 hr. 30 min.

Full Marks: 30

Answer any five questions:-

1. a) What do you mean by vernier constant?

b) In a straight vernier, 20 vernier scale division is equal to 19 main scale division and 1 smallest scale division of the main scale is 0.5 mm. Find out the vernier constant of the instrument.

c) If we measure the length of a rod by this instrument and get main scale reading 10.1 cm and vernier scale reading 8 then what will be the length of the rod? (Write in tabular form)

2+2+2

2. a) What do you mean by the least count of a screw gauge?

b) In a screw gauge, the screw moves linearly by 1 mm, when the cylindrical cap of the screw having 100 equal divisions at its edge, is revolved to perform one complete rotation. Find out the least count of the screw gauge.

c) The diameter of a rod is measured by the above mentioned screw gauge. The linear scale reading is found to be 1 mm and circular scale reading is 80. Calculate the radius of the rod. (Write in tabular form)

2+2+2

3. a) Define Young's modulus. What is its unit in SI system?

b) Write down the working formula to find the Young's modulus of the material of a beam by the method of flexure. Write the meaning of all the symbols used.

c) Will the value of Y change if the breadth of the beam is increased? Justify your answer.

1+1+2+2

4. a) A beam of breadth 1.27 cm and depth 0.647 cm is placed horizontally on two knife edges placed at a distance of 100 cm. By drawing the Load-depression curve from the following data calculate the Young's modulus of the material of the beam.

Load (Kg)	0.5	1.0	1.5	2.0	2.5	3.0
Depression (cm)	0.38	0.76	1.14	1.52	1.90	2.30

Graph 3, Calculation 3.

5. a) Define Moment of inertia and radius of gyration. What is the unit of M.I in SI system?

b) A rectangular bar of mass 360 gm, length 13.7 cm and breadth 1.98 cm is placed horizontally. Calculate the moment of inertia of the body about the vertical axis passing through its centre of gravity and perpendicular to its length.

3+1+2

6. The time for 30 oscillations of a cradle is 66 sec. A cylindrical rod of mass 450 gm, length 10.5 cm and radius 1.2 cm is placed horizontally on the cradle. The rod oscillates about a vertical axis passing through its centre of gravity and perpendicular to its length. Now the time for 30 oscillations is 76 sec. Find the moment of inertia of a rectangular bar if the time for 30 oscillations of the cradle with the rectangular bar is 87 sec. Write down the working formula, explaining the meaning of the symbols used.

Formula 3 Calculation 3.

7. a) What do you mean by the rigidity modulus of a material. What is its unit in SI system.

b) A cylinder of mass 2.5 kg and diameter 7.14 cm is suspended from the lower end of a vertical thin wire of 100 cm length. The upper end of the wire is rigidly fixed. The cylinder is capable of oscillating about the suspension wire as axis, which coincides with the axis of the cylinder. The time for 30 oscillations is 59 sec. If the diameter of the wire is 0.12 cm, calculate the rigidity modulus of the material of the wire. Write down the working formula, explaining the meaning of the symbols used.

1+1+4

Answer scripts must be emailed to sem1hcityphysics@gmail.com within 15 minutes of the end of the examination.