COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CE-217)   Strength of Materials

Course: B.Tech   Branch: Mechanical Engineering

Semester: Sem III

Year: 2014-2015   Max.Marks:60

Duration: 3 Hours   Time:-   10:00 AM to 01:00 PM   **Date: 30/11/2014**

Instructions: MIS No. ☐☐☐☐☐☐☐☐☐

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

Q1.
  A. The elastic bar of uniform c/s and held at both ends is axially loaded as shown in fig.1. Determine end reactions and plot axial force diagram.   5

  Refer fig. 1.

  B. A material has modulus of rigidity 40 GPa and bulk modulus 75 GPa. Find Young's modulus and Poisson's ratio.   5

Q2.
  A. Draw shear force diagram and bending moment diagram for the simply supported beam shown in fig. 2. Show all important points.
  Refer fig. 2.   5

  B. The diameter of a concrete flag post varies from varies from 200 mm at base to 100 mm at top. If the length of post is 8 m and horizontal load acting at top is 500 N. Find the section at which stress is maximum. Find the maximum stress also.   5

Q3.
  A. A wooden beam of size 300 mm X 300 mm has a concentric hole of 100 mm diameter. If it is used as a beam to resist a shear force of 10 kN. Draw shear stress distribution diagram.   5

  B. Show that hollow shaft is stronger and stiffer than the solid shaft of same material, length and weight.

Q4.

A. In a biaxial stress σ_x = 60 MPa (tensile) and σ_y = 20MPa (Compressive). Determine the plane on which normal stress and shear stresses are equal and corresponding magnitude of stresses.   5

B. The diameter of a city water supply pipe is 750 mm. It has withstand a water head of 60 m. Find the thickness of pipe, if the permissible stress is 20 N/mm^2. Take unit weight of water as 9810 N/m^3.   5
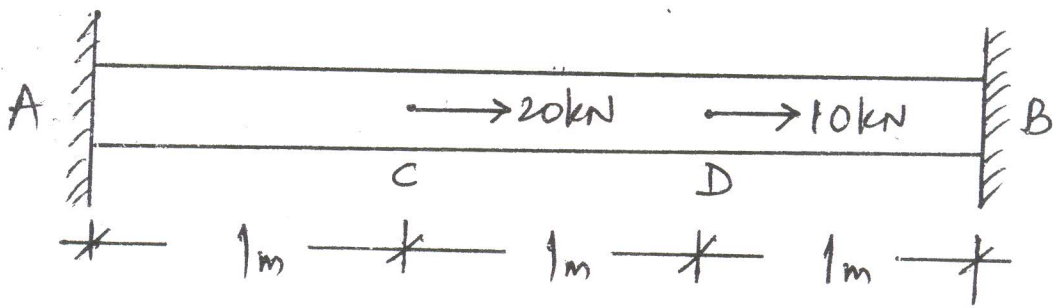
Q5.

A. A 2m long pin ended column of square c/s is to be made of wood. Determine size of the column to support 200 kN load safety. Assume E=12 GPa and factor of safety =3.   5

B. The diameter of a bar of 500 mm length varies uniformly from 60 mm at one end to 100 mm at the other end. Find the strain energy stored in the bar when an axial force of 75 kN acts. Take E = 200 GPa.   5
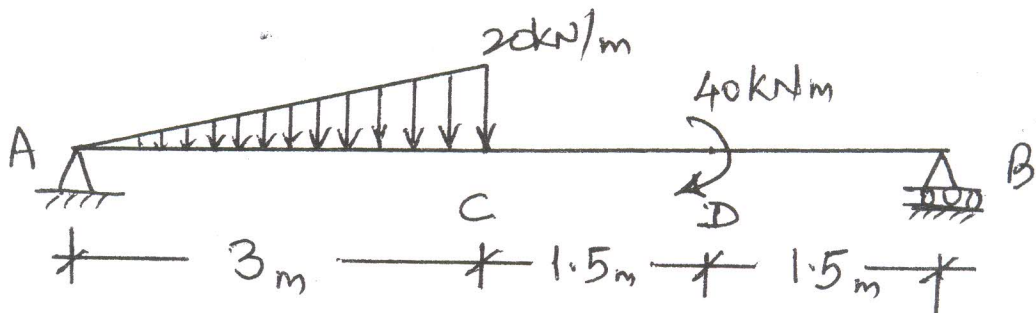
Q6.

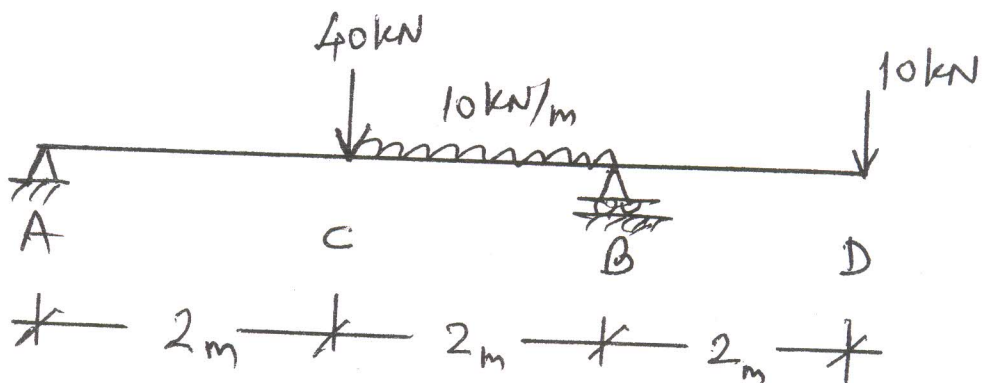Determine slope and deflection at the free end of a beam shown in fig.3.   10

Refer fig. 3.

A   →20kN   →10kN   B

C   D

1m   1m   1m

Q.1(a) Fig. No. ①

20kN/m

40kNm

A   C   D   B

3m   1.5m   1.5m

Q.2(a) Fig. no. ②

40kN

10kN/m

10kN

A   C   B   D

2m   2m   2m

Q. 6   Fig. No. ③