

[Total No. of Questions: 09]

[Total No. of Pages: 03]

Uni. Roll No. ....

Program: B.Tech.

Semester: 5<sup>th</sup>

Name of Subject: Structural Engineering

Subject Code: PCCE-113

Paper ID: 16390

**Time Allowed: 02 Hours**

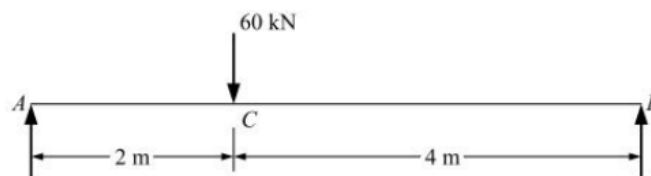
**Max. Marks: 60**

**NOTE:**

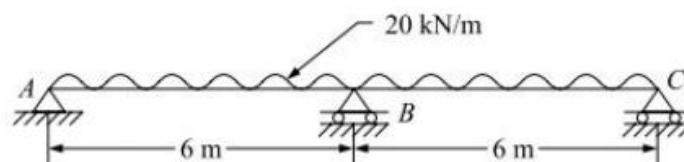
15-01-2022(E)

- 1) Each question is of 10 marks.
- 2) Attempt any six questions out of nine.
- 3) Any missing data may be assumed appropriately.
- 4) Use of Non programmable calculator, IS 456, IS 800, IS 875 is allowed.

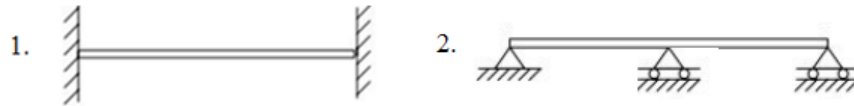
- Q1. Determine the deflection under the concentrated load and the maximum deflection in the beam shown in figure below using any suitable method.



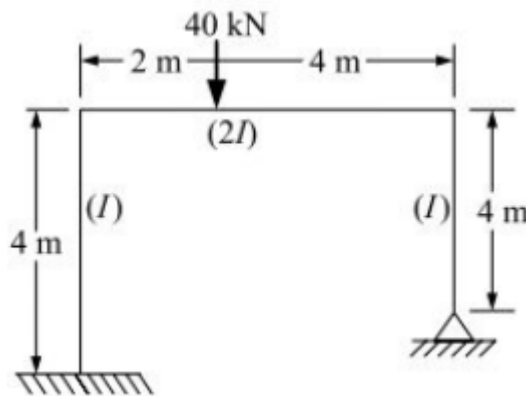
- Q2. Determine the reaction components in the beam shown in figure below. Assume flexural rigidity to be same throughout.



- Q3. a) Tabulate the differences between statically determinate and statically indeterminate structures. Also give examples. (5)
- b) What do you mean by *basic determinate structure (or released structure)*? Draw all possible released structures for the following beams. (5)



- Q4. Determine the reaction components of the frame shown below.



- Q5. Design an R.C.C. simply supported beam of span 4.2 m to carry a superimposed load of 6000 N/m. Use M 20 concrete and Fe 415 steel.
- Q6. Design an R.C.C. slab having an effective span of 3.5 m. Design load is 4000 N/m<sup>2</sup>. Use M 20 concrete and Fe 415 steel.
- Q7. Design a square column subjected to an ultimate axial load of 1500 kN. Consider concrete of grade M25 and steel of grade 415.
- Q8. Design a square footing of uniform thickness for an axially loaded column of 450 mm × 450 mm in size. The safe bearing capacity of soil is 170 kN/m<sup>2</sup>. Load on column is 1200 kN. Use M 20 concrete and Fe 415 steel.

Q9. a) What are the factors on which the fire resistance of concrete structural elements depends upon? Also discuss the guidelines as per IS 456 for fire resistance of reinforced concrete members.

(5)

b) List the factors influencing the durability of concrete. Also summarize the requirements for durability for concrete members as per IS 456.

(5)

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