

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Summer 2018 - 19 Examination**

**Semester: 4**  
**Subject Code: 03104253**  
**Subject Name: Structural Analysis - II**

**Date: 03/05/2019**  
**Time: 02:00pm to 04:30pm**  
**Total Marks: 60**

**Instructions:**

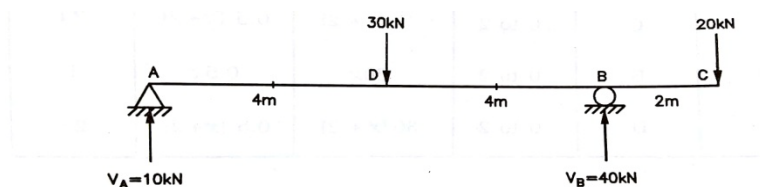
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1 Objective Type Questions - (All are compulsory) (Each of one mark)****(15)**

1. In plastic analysis, the shape factor for a circular section  
 (A) 1.5 (B) 1.6 (C) 1.7 (D) 1.75
2. The point of contra flexure is the point where  
 (a) B.M. changes sign (b) B.M. is maximum (c) B.M. is minimum (d) S.F. is zero
3. As per IS Code 1343-2012 the minimum grade of concrete to be used for pre-tensioned structural elements  
 (A) 20 (B) 30 (C) 35 (D) 40
4. The fixed end moment for a fixed beam with a uniformly distributed load  $w$ /unit length, is  
 (a)  $wl/4$  (b)  $wl^2/2$  (c)  $wl^2/8$  (d)  $wl^2/12$
5. The load per unit deflection, is called  
 (a) stiffness (b) flexibility (c) proof resilience (d) none of the above
6. In plastic analysis, the shape factor for rectangular section, is \_\_\_\_\_
7. Define the term Carry over factor.
8. Bending moment at any section in a conjugate beam gives \_\_\_\_\_ in the actual beam.
9. In slope deflection method the displacement considered are due to \_\_\_\_\_
10. Number of unknown internal forces in each member of a rigid jointed plane frame is \_\_\_\_\_
11. The deformation of a spring produced by a unit load is called \_\_\_\_\_
12. As per Castigliano's first theorem, the partial derivatives of total strain energy with respect to load will give \_\_\_\_\_.
13. A beam which is inbuilt in at its support is called \_\_\_\_\_
14. By applying the static equations *i.e.*  $\sum H = 0$ ,  $\sum V = 0$  and  $\sum M = 0$ , to a determinate structure, we may determine \_\_\_\_\_
15. Write any two disadvantages of slope deflection method.

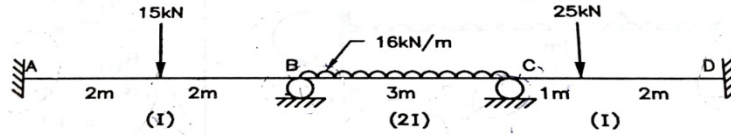
**Q.2 Answer the following questions. (Attempt any three)****(15)**

- A) A fixed beam AB of span 6 m carries two point loads of 20 kN each at distance 1.5 m from each end. Draw S.F. and B.M. diagrams for the beam.
- B) Distinguish between RCC and prestressed concrete.
- C) Determine the deflection at the free end C of a beam ABC as shown in figure.  
 Take  $E = 2 \times 10^5 \text{ N/mm}^2$  and  $I = 2 \times 10^8 \text{ mm}^4$ .



- D) Find the shape factor for a beam of rectangular section .

Q.3 A) Analyze the beam shown in figure by slope-deflection method and draw SFD & BMD. (7)

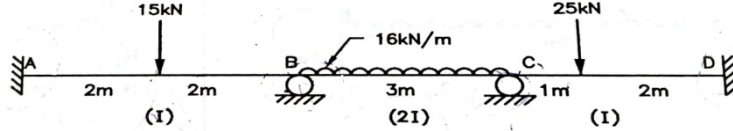


B) A beam 230 mm X 450 mm is prestressed by a force of 500 kN by steel cables located at an eccentricity of 75 mm below centroid axis. Estimate the loss of prestress due to creep of concrete using following data. (8)

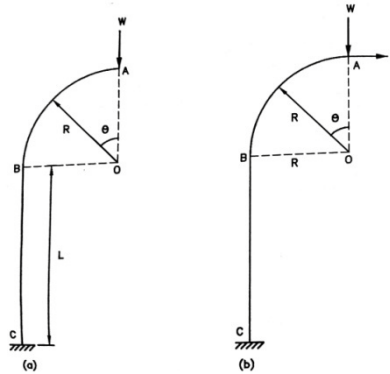
$f_{ck} = 45 \text{ N/mm}^2$   
 cable 8 nos – 8mm dia. Each  
 creep coefficient = 1.6 ( at 28 days of transfer)

OR

B) Analyze the beam shown in figure by moment distribution method and draw SFD and BMD. (8)

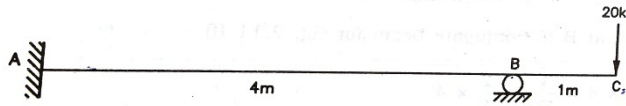


Q.4 A) Find the vertical and horizontal deflection at A for the lamp post loaded as shown in figure. Take  $EI = \text{constant}$ . (7)



OR

A) Analyze the beam shown in figure using consistent deformation method and draw SFD and BMD. (7)



B) A two span continuous beam is loaded as shown in figure. Design the beam using plastic method. Take  $f_y = 250 \text{ N/mm}^2$  (8)

