BACHELOR OF ARCHITECTURE (BARCH)

Term-End Examination

December, 2013

BAR-024 : THEORY OF STRUCTURES - III

Time : 3 hours *Maximum Marks : 70*

Note : *Question No. **1** which is **compulsory**. Attempt **any four** question from the remaining questions. Use of calculator (scientific) is **permitted**.*

1. Choose the most appropriate answer from the given options in questions (a) to (g). **7x2=14**

(a) The slope of Bending Moment Diagram, $\left(\frac{dM}{dx}\right)$ is equal to :

(i) Rate of loading

(ii) Deflection

(iii) Shear force

(iv) Slope

(b) Bending stress is directly proportional to :

(i) Shear Force

(ii) Locational Parameter 'y' from Neutral Axis

(iii) Moment of Inertia about neutral axis

(iv) Section modulus

(c) A pin jointed plane frame having 'm' members and 'j' joints, is said to be a redundant frame if :

(i) $m = 2j - 3$

(ii) $m \geq 2j - 3$

(iii) $m < 2j - 3$

(iv) $m > 2j - 3$

(d) Slenderness ratio of a column depends upon :

(i) Material of the column

(ii) Modulus of elasticity

(iii) Geometrical properties

(iv) Load on the column

(e) Maximum Shear stress will occur in a diamond shape cross section :

(i) at neutral axis

(ii) at extreme fibre

(iii) in compression zone

(iv) in tension zone

(f) For RCC beam, deflection including the effects of temperature, creep and shrinkage occuring after erection of partitions and the application of finishes should not normally exceeds :

(i) Span/350

(ii) Span/400

(iii) Span/180

(iv) Span/250

(g) Member of a rigid frame may be subjected to :

(i) Axial force

(ii) Axial force, B.M.

(iii) Axial force, B.M., Shear Force

(iv) Axial force, Shear Force, B.M, Torsional moment

2. A pin jointed truss is loaded as shown in Figure 1. Determine forces in all the members of the truss. **14**

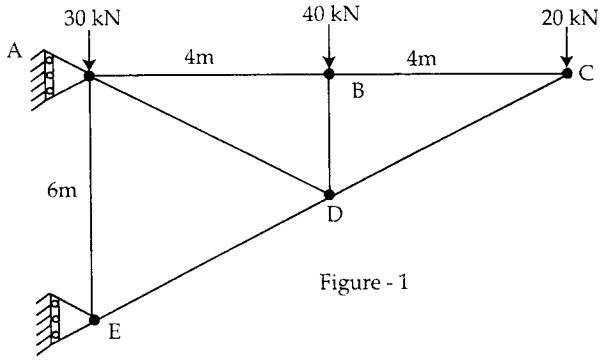

Figure - 1

3. A simply supported beam of span 16 m is loaded as shown in figure - 2. Draw B.M.D. and S.F.D. for the beam. **14**

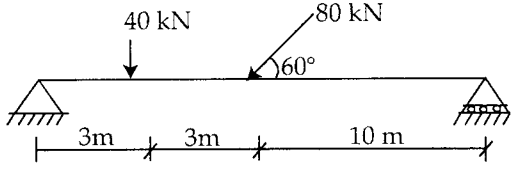

Figure - 2

4. (a) Write assumptions of Euler's theory. **6**

(b) Find buckling load of a column shown in Figure 3. **8**

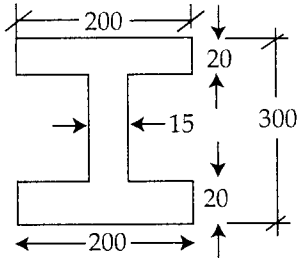

Figure - 3

Height of column = 7.5m, both end hinged $E = 2 \times 10^5$ N/mm^2.

5. Derive an expression for calculating maximum deflection for a simply supported beam of span 'l' subjected to a uniformly distributed load 'w' kN/m on entire span. **14**

6. (a) Calculate Moment of Inertia of I - Section, shown in Figure 4. **8**

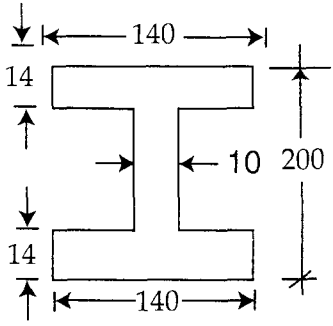

Figure - 4

All dimensions are in mm.

(b) Write assumptions taken in the theory of pure bending. **6**

7. Write short notes on **any two** of the following topics : **$2 \times 7 = 14$**

(a) Uses and advantages of composite sections.

(b) Variation of shear stress in a circular section.

(c) Limitations of Euler's formula.