

Enrollment No: _____

Exam Seat No: _____

C. U. SHAH UNIVERSITY

Summer Examination-2020

Subject Name : Structural Analysis - III

Subject Code : 4TE05STA1

Branch: B.Tech (Civil)

Semester : 5

Date : 28/02/2020

Time : 10:30 To 01:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

- a) In analysis of truss the incorrect assumption is _____ 01
(A) All the joints are pinned joints
(B) External forces are acting at the joints only.
(C) Members are subjected to transvers loads.
(D) Self weight of the member is neglected
- b) If Q is load factor, S is shape factor and F is the factor of safety in elastic design then which one is correct from the followings? 01
(A) $Q = S+F$ (B) $Q = S-F$ (C) $Q = F-S$ (D) $Q = F \times S$
- c) A device generally used to enable the tendon to impart and maintain prestress in the concrete which is known as the 01
(A) Tendon (B) Anchorage (C) 'A' & 'B' both (D) None of these
- d) In the analysis of circular beam supported symmetrically, the shear stress (F_0) value is _____ 01
(A) $(w + R)$ (B) $(w + R) \Theta$ (C) $w.R.\Theta$ (D) None of these
- e) The stiffness value K , for a beam with far end simple is _____ 01
(A) $3EI/L$ (B) $2EI/L$ (C) $4EI/L$ (D) $6EI/L$
- f) Where the maximum torsion occurred in the case of a circular ring beam supported on n number of column. 01
- g) What is shape factor? 01
- h) Give the shape factor value for equilateral triangle. 01
- i) What is carry over factor? 01
- j) Define the following terms: 05
Tendon, Prestressing, Posttensioning, flexibility matrix, stiffness matrix.

Attempt any four questions from Q-2 to Q-8

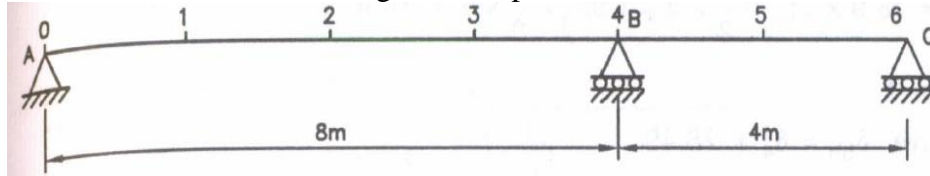
Q-2 Attempt all questions (14)

- (a) Using Column analogy method, determine the end moment in a fixed beam of span L , subjected to a concentrated load W at distance a from left end A. 10



- (b) Explain the applications of muller Breslau principles in brief. **04**
Q-3 Attempt all questions (14)
 (a) A semicircular arch of radius R subjected to a uniformly distributed load of w /unit length over the entire span. Assuming EI to be constant, determine the horizontal thrust. **10**

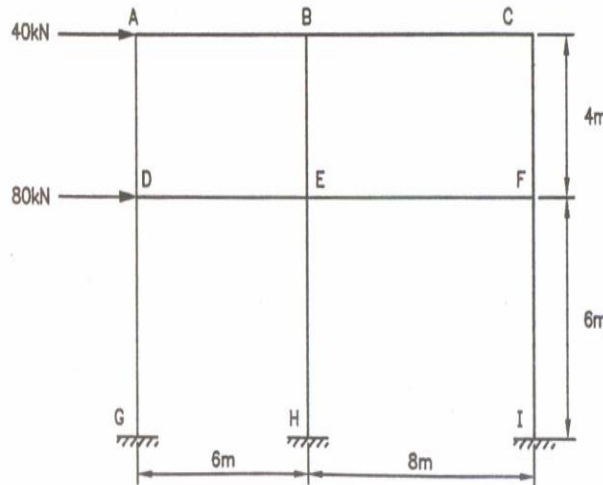
- (b) Explain the consistent deformation method with suitable example. **04**
Q-4 Attempt all questions (14)
 (a) Draw the influence line for reactions V_a , V_b , and V_c for the two span continuous beam shown in figure. Compute ordinates at 2 m interval. **12**



- (b) Which steps are to be followed in flexibility method? **02**
Q-5 Attempt all questions (14)
 (a) Calculate the shape factor for the hollow rectangular section having outer dimension $300\text{ mm} \times 150\text{ mm}$ and thickness 10 mm . **07**
 (b) Find the shape factor and plastic moment capacity of a Tee section with a flange $100 \times 12\text{ mm}$ and web $180 \times 10\text{ mm}$, assume $f_y = 250\text{ MPa}$. Also find collapse load if it is used for a simply supported span 3 m . **07**

- Q-6 Attempt all questions (14)**
 (a) Write down the rotational matrix for plane frame, plane truss and space frame. **07**
 (b) Explain the static and kinematic method in plastic analysis. **07**

- Q-7 Attempt all questions (14)**
 Analyse the frame shown in figure by cantilever method and draw SFD, BMD and Axial force diagram. **14**



- Q-8 Attempt all questions (14)**
 Analyse the building frame shown in figure by approximate method and draw shear force, bending moment and axial force diagrams. **14**



