Enrollment No: _____ **Exam Seat No:**_____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name : Structural Analysis-III

Subject Code : 4TE05STA1 **Branch :** B.Tech (Civil)

Semester : 5 **Date :** 04/12/2015 **Time :** 2:30 To 5:30 **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 plastic analysis, the shape factor for rectangular section is 1
(A) 1.8 (B) 1.5 (C) 2.5 (D) 1.9

b) The stiffness value K, for a beam with far end simple is 1
(A) 3EI/L (B) 2EI/L (C) 4EI/L (D) 6EI/L

c) Moment required to produce unit rotation is called 1
(A) Rigidity (B) Flexibility (C) Stiffness (D) None of these

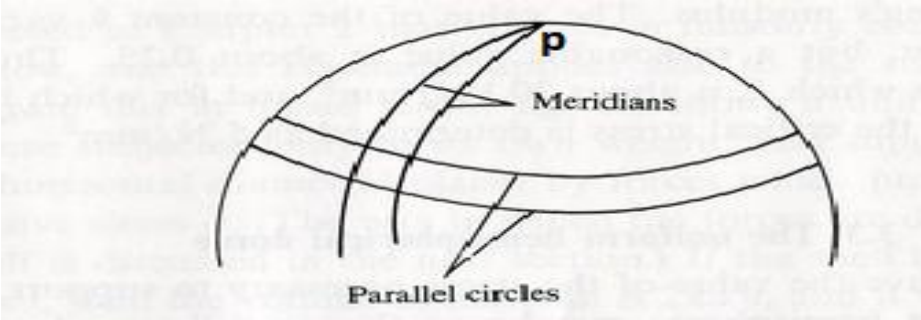
d) If Q is load factor, S is shape factor and F is the factor of safety in elastic design, the following is correct 1
(A) Q = S+F (B) Q = S-F (C) Q = F-S (D) Q = F × S

e) Muller breslau principle for ILD is applicable for 1
(A) Simple beam (B) Continuous beam (C) Redundant truss (D) All of these

f) In analysis of truss the incorrect assumption is, 1
(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

g) Meridional trust in conical domes subjected to uniformly distributed load is 1
(A) $(w/2t) \times (y/\cos^2\theta)$ (B) $(3w/2t) \times (y/\cos^2\theta)$
(C) $(2t/w) \times (y/\cos^2\theta)$ (D) $(2t/w) \times (\cos^2\theta / y)$

h) In the analysis of circular beam supported symmetrically, the shear stress(F_0) value is 1
(A) (w + R) (B) (w + R) θ (C) w.R. θ (D) None of these

i) 

1

In the above fig. point p is known as
(A) Latitude (B) Longitude (C) Crown (D) None of these

j) From the above question parallel axis is also known as 1
(A) Latitude (B) Longitude (C) Crown (D) None of these

k) Taj mahal (Agra – India) is the example of 1
(A) Conical dome (B) Spherical dome (C) 'A' & 'B' both (D) None of these

l) Give two example of beam curved in plan 1

m) Generally Post tensioning method is use full for 1
(A) Short span (B) Long span (C) 'A' & 'B' both (D) None of these

n) A device generally used to enable the tendon to impart and maintain prestress in the concrete which is known as the 1
(A) Tendon (B) Anchorage (C) 'A' & 'B' both (D) None of these

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

Q-2		**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 fig-1 compute ordinates at 2 m interval.	**12**
	b)	Draw qualitative ILD for two story building frames	**2**
Q-3		**Attempt all questions**	**(14)**
	a)	Explain " losses in prestress" in detail.	**8**
	b)	State and explain the MULLER BRESLAU principle.	**6**
Q-4		**Attempt all questions**	**(14)**
	a)	A prestressed concrete I-beam has its upper flange 750 mm × 200 mm, lower flange 400 mm × 300 mm and web of 150 mm width and 500 mm depth. It is supported over a span of 30 m and carries u.d.l of 4 kN/m, exclusive of self-weight. It is prestressed with 120 wires of 5 mm diameter each, with their centroid 100 mm from the soffit and initially tensioned to 1000 N/mm^2. Assuming 15 % loss in prestress. Determine the extreme fibre stresses at mid span for (i) {prestress + self weight }	**7**
	b)	From the above question determine the extreme fibre stresses at mid span for (ii) {prestress + self weight + live load}	**7**
Q-5		**Attempt all questions**	**(14)**
	a)	Find the shape factor and plastic moment capacity of a Tee section with a flange 100 × 12 mm and web 180 × 10 mm, assume f_y = 250MPa. Also find collapse load if it is used for a simply supported span 3m.	**7**
	b)	Differentiate between flexibility method and stiffness method	**3**
	c)	Write S_{MS} matrix for plane truss member for structure axes	**4**

Q-6		**Attempt all questions**	**(14)**
	a)	A beam circular in plan is loaded with uniformly distributed load of 140 kN/m inclusive of self-weight. The radius of the beam is 5 m. the beam is supported by six symmetrically placed columns. Draw S.F, B.M and T.M diagram for one of the spans.	**8**
	b)	Find shape factor for a beam of circular section of radius R.	**6**
Q-7		**Attempt all questions**	**(14)**
		Analyse the building fram shown in fig.2 by approximate method and draw shear force, bending moment and axial force diagrams.	**14**
Q-8		**Attempt all questions**	**(14)**
		Analyse the frame shown in fig.3 by cantilever method and draw SFD, BMD and Axial force diagram	**14**

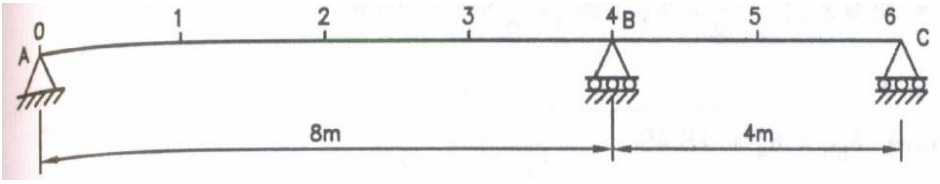


Fig.1 Q-2 (a)

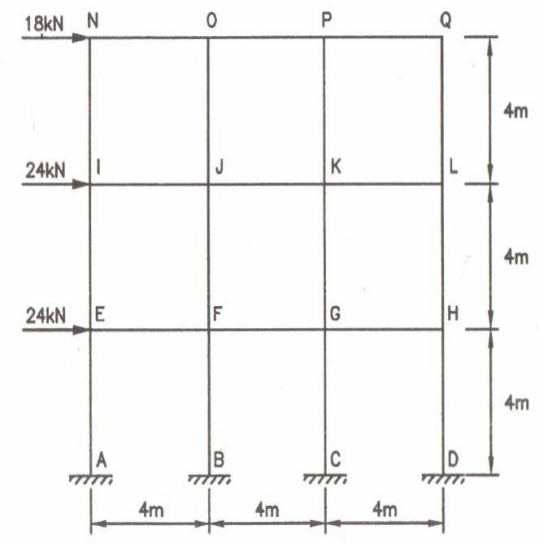


Fig. 2 Q-7

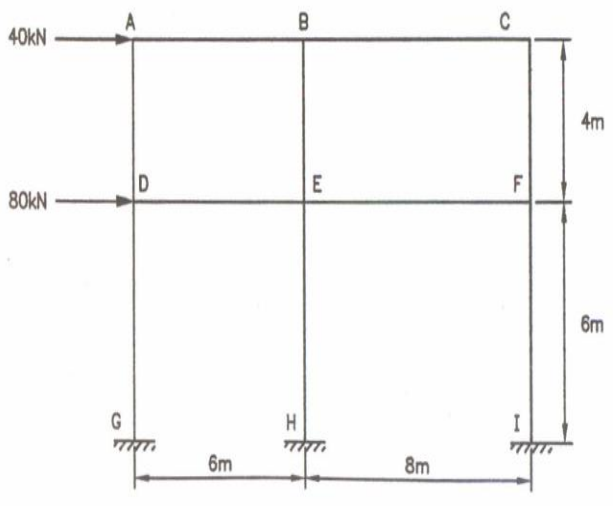


Fig.3 Q-8