Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name : Structural Analysis - 1

Subject Code : 4TE03STR1 **Branch: B.Tech (Civil)**

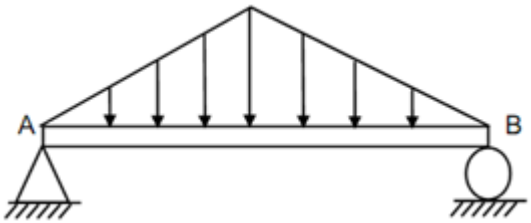
Semester : 3 **Date :27/03/2017** **Time : 10:30 To 01:30** **Marks : 70**

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) What is elasticity? (1)
b) Define : strain (1)
c) Write down equation of hooke's law (1)
d) What do you means by compound bar? (1)
e) Write principle of superposition (1)
f) What is poisson's ratio? (1)
g) What is modulus of rigidity? (1)
h) Give name of this load. (1)



i) Write equation of maximum stress (1)
j) What is slenderness ratio? (1)
k) Define radius of gyration (1)
l) What is proof resilience? (1)
m) Define volumetric strain (1)
n) Write down equation of deformation of the body due to self weight. (1)

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

Q-2 **Attempt all questions** **(14)**

(a) Explain stress strain curve for mile steel. **(7)**
(b) The ultimate tensile strength of mild steel is 200N/mm2. A tie bar of equal legs angle section has carry an axial pull of 150KN. Decide suitable dimensions of the section if the mean thickness is 10mm. take the factor of safety 2. **(7)**

Q-3		**Attempt all questions**	**(14)**
	(a)	Derive equation of thermal stresses in bar due to tapering section.	**(7)**
	(b)	A steel road of 16mm diameter and 5m length is corrected to two grips at each end at a temperature of 150^0 C. find the pull exerted when the temperature falls to 40^0 C . if the ends (i) Do not yield (ii) yield by 1.0mm take coefficient of thrrmal expansion α as $12x10^{-6}$ per C	**(7)**
Q-4		**Attempt all questions**	
	(a)	Derive equation of volumetric strain of a rectangular body subjected to an axial force	**(7)**
	(b)	A steel bar of 1m length is subjected to 120KN axial tensile force. The cross section of bar is 20mmx20mm. the increase in length is found to be 0.5 mm and decrease in thickness is 0.003 mm. find the value of young modulus and poisson's ratio.	**(7)**
Q-5		**Attempt all questions**	**(14)**
	(a)	Enlist various type of beam. Explain any one in detail	**(7)**
	(b)	A beam ABCD in which AB=2m , BC=4m , and CD=2m carries a point load of 3 kN each at A and D and U.D.L of 4KN/m between B and C. beam is simply supported at point B and C. Draw S.F and B.M diagram.	**(7)**
Q-6		**Attempt all questions**	**(14)**
	(a)	Derive equation for maximum and minimum stress in rectangular section	**(7)**
	(b)	A circular column 450mm in diameter carries a load of 600KN at an eccentricity of 100mm calculate maximum and minimum stresses for the column.	**(7)**
			(14)
Q-7		**Attempt all questions**	
	(a)	A 'T' section is having flange with 100mm and total depth 80mm. the thickness of flange and web is 10mm. the length of column is 3m and it is hinged at both ends. If $E=2.1x10^5$ N/mm2 find Euler's buckling load.	**(7)**
	(b)	Write assumption and limitation of Euler's formula.	**(7)**
Q-8		**Attempt all questions**	**(14)**
	(a)	Derive equation of strain energy due to gradual loading	**(7)**
	(b)	Calculate the shear strain energy per unit volume at a point in a material when shear stress is 8 KN/cm^2 and $G=0.8x10^4$ KN/cm^2	**(7)**