C.U.SHAH UNIVERSITY
Winter Examination-2015

Subject Name : Structural Analysis-II

Subject Code : 4TE04STA1   **Branch :B.Tech**(CIVIL)

Semester :IV   **Date :** 20/11/2015   **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)   Simply supported beam is _____   **1**
          (A)Determinate (B) indeterminate (C) A & B both (D) none of the above
  b)   K.I for fixed beam?   **1**
          (A) 1 (B) 0 (C) 3 (D) 6
  c)   Moment required to produce unit rotation is called   **1**
          (A)deflection (B) flexibility (C) stiffness (D) rigidity
  d)   The sum of distribution factor for moment at any joint is   **1**
          (A) 0 (B) 1.5 (C) 2.0 (D) 1.0
  e)   For a fixed end support slope will be   **1**
          (A) maximum (B) minimum (C) zero (D) A & B both
  f)   Moment distribution method is   **1**
          (A) an iterative method   (B) an exact method
          (C) an approximate method (D) none of the above
  g)   A three hinged arch is generally hinged at its supports and   **1**
          (A) at one quarter span (B) any where in the rib
          (C) at the crown   (D) all of the above
  h)   Muller breslan principle in structural analysis is used for   **1**
          (A) superposition of load   (B) drawing influence line diagram
          (C) writing virtual work equation (D) all of the above
  i)   The moment distribution method is   **1**
          (A) an iterative method   (B) an exact method
          (C) an approximate method   (D) none of these
  j)   STAAD uses _____method of analysis for plate element.   **1**
          (A) Finite element method   (B) finite difference method
          (C) stiffness method   (D) flexibility method
  k)   A rigid jointed plane frame is stable and statically determinate if   **1**
          (A) (m + r) = 2j (B) (m + r) = 3j (C) (3m + r) = 3j   (D) (m + 3r) = 3j
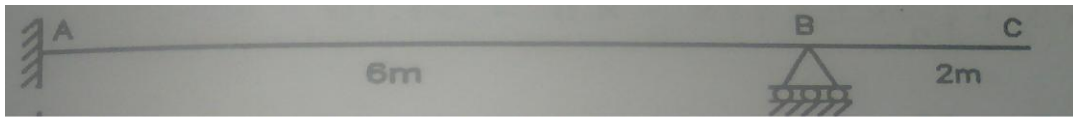 **l)**   Select the correct statement   **1**

(A) flexibility matrix is a square symmetrical matrix
(B) Stiffness matrix is a square symmetrical matrix
(C) both (A) & (B)
(D) none of these

m) The carry over factor in a prismatic member whose far end is fixed is   **1**
(A) 0   (B) ½   (C) ¾   (D) 1

n) Principle of super passion is applicable when   **1**
(A) deflection are linear functions of applied load
(B) material obeys hook's law
(C) the action of applied forces will be affected by small deformation of the structure
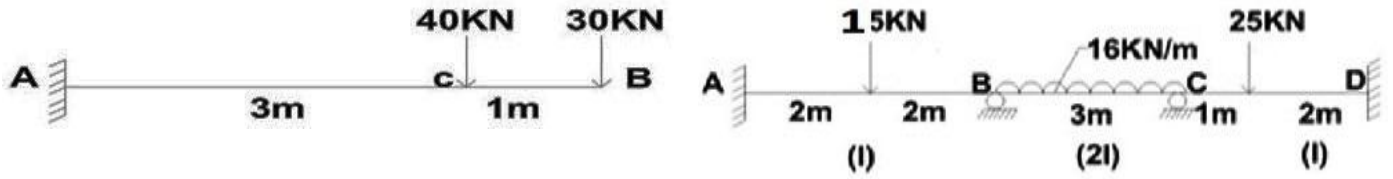(D) none of the above

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

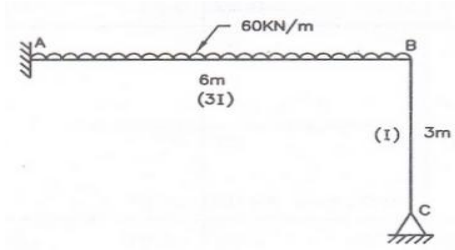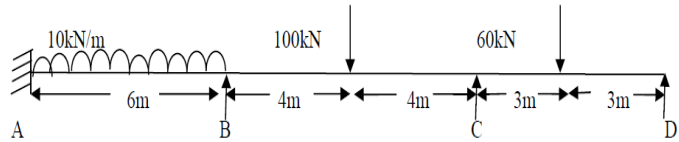|			
Q-2		**Attempt all questions**	**(14)**
		Draw influence line diagrams for V_a, V_b and M_a for a beam shown in Fig.1.	
Q-3		**Attempt all questions**	**(14)**
	a)	Calculate θ_B and δ_B for a beam shown in figure-2 ,Take $E = 2 \times 10^5 N/mm^2$, $I = 5 \times 10^8 mm^4$. Use castigliano's first theorem.	**7**
	b)	Explain castigliano's seconed theorem and write formula for the member in banding and in axial loading.	**7**
Q-4		**Attempt all questions**	**(14)**
		Analyse the beam shown in figure-3 by slope deflection method and draw SFD and BMD.	**14**
Q-5		**Attempt all questions**	**(14)**
	a)	Analyse the building frame by moment distribution method and Draw shear force and bending moment diagrams for a given frame in fig. 4	**10**
	b)	Derive the equation for fixed end moment developed if one of the supports of a fixed beam settles by amount 'δ'.	**4**
Q-6		**Attempt all questions**	**(14)**
	a)	A three hinged parabolic arch has a span 20m and central rise 3m. it carries a point load of 10KN at 7.5m from the left hinge. Calculate normal thrust, shear and B.M at section 7.5m from right end hinge. And calculate maximum positive and negative bending moments and their position.	**10**
	b)	Find SI and KI from given fig in question no – 5.	**4**
Q-7		**Attempt all questions**	**(14)**
	a)	Explain three hinge arch and write down the equation for radial shear and normal thrust.	**7**
	b)	Explain principle of superposition with neat sketch.	**7**
Q-8		**Attempt all questions**	**(14)**
	a)	For the structure shown in the figure.5 calculate the stiffness matrix and load vector.	**7**
	b)	For the above problem Q.8 (a), calculate the nodal displacements and hence draw the shear force and bending moment diagrams.	**7**

A ————————————— B —— C
    6m   2m

Question-2   Fig.1

        40KN   30KN
A ————————— C ——— B
    3m   1m

Question -3(a) Fig.2

        15KN   16KN/m   25KN
A ———— B ———————— C ———— D
    2m   2m   3m   1m   2m
    (I)   (2I)   (I)

Question -4 Fig.3

        60KN/m
A ——————————— B
    6m
    (3I)
            (I) | 3m
                C

Question-5(a)   Fig.4

    10kN/m   100kN   60kN
A ——————— B ——— C ——— D
    6m   4m   4m   3m   3m

Question-8 Fig.5