

**6E3032**

Roll No. \_\_\_\_\_

Total No of Pages: **7****6E3032****B. Tech. VI Sem. (Main & Back) Exam., May/June-2014****Civil Engineering****6CE1 Theory of Structures-II****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 24****Instructions to Candidates:-**

*Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. \_\_\_\_\_

2. \_\_\_\_\_

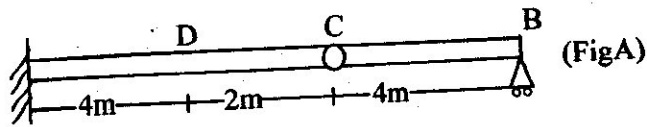
**UNIT-I**

Q.1. For the beam shown in (fig. A) draw influence line diagram for the following-

- (i) Reaction  $V_B$  at B,
- (ii) Reaction  $V_A$  at A
- (iii) Reaction Moment  $M_A$  at A
- (iv) Shear Force at D and
- (v) Bending Moment at D

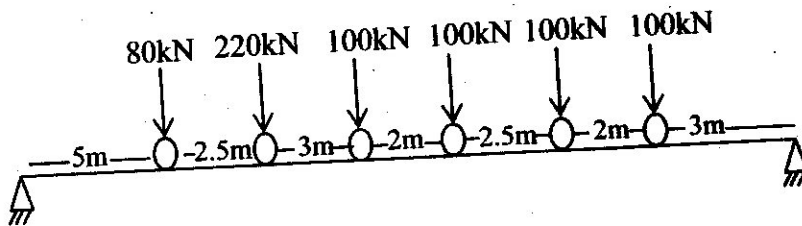
Find also the maximum values of these quantities due to a live load of 20kN/m.

[16]



**OR**

Q.1. (a) The load system shown in (fig. B) moves from right to left on a girder of span 20 meters. Find the maximum shear force at a section 7.5m from the left end. [10]



(Fig. B)

(b) Explain the theory of Muller Breslau Principal and its application. [6]

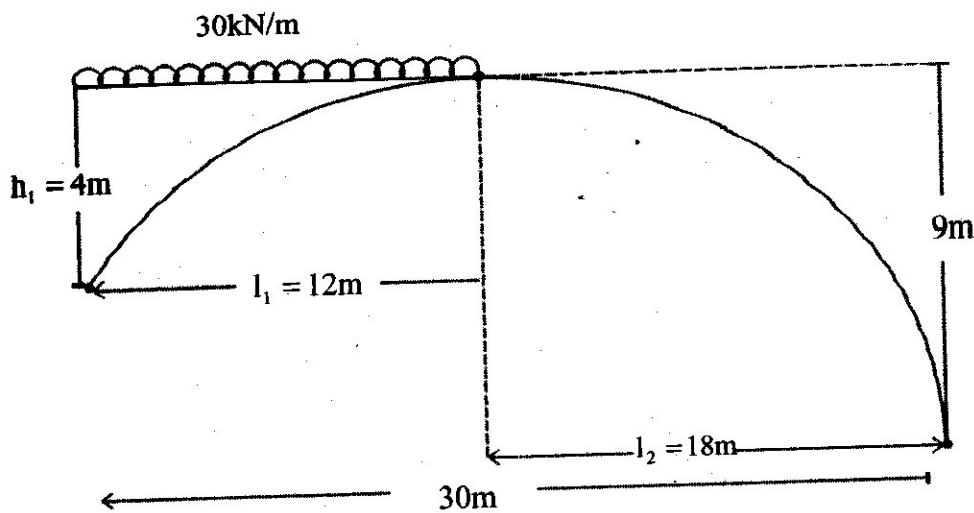
**UNIT-II**

Q.2. A three hinged parabolic arch ABC of span 30m has its Support A and B at different levels. A being at a higher level than B. The Support A is 4m below the crown hing C and 12m horizontally from A. Find the depth of the support B below the hinge C. If

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[8260]

the arch carries a U.D.L. of 30kN/m from A to C. Determine the horizontal thrust and the vertical reactions at the supports. Find also the maximum bending moments for the Arch. [16]



**OR**

- Q.2. (a) A three hinged circular arch of span 40m and rise 8m carries a concentrated load of 120kN at a horizontal distance of 10m from the left end. Find the reactions at the supports and the maximum positive and Negative Bending moments. [8]
- (b) A two hing parabolic arch of span  $l$  and rise  $h$  carries a triangular load whose intensity varies from Zero at the left end to  $w$  at a distance  $a$  from the left end. Determine the horizontal thrust at each support. [8]

### UNIT-III

Q.3. The three hinged stiffening girder of a Suspension bridge of span 120 meters is subjected to two point loads of 240kN and 300kN at distances 25 meters and 80 meters from the left end. Find the shear force and bending moment for the girder at a distance of 40 meters from the left end. The supporting Cable has a central dip of 12 meters. Find also the maximum tension in the Cable, and draw the B.M. diagram for the girder. [16]

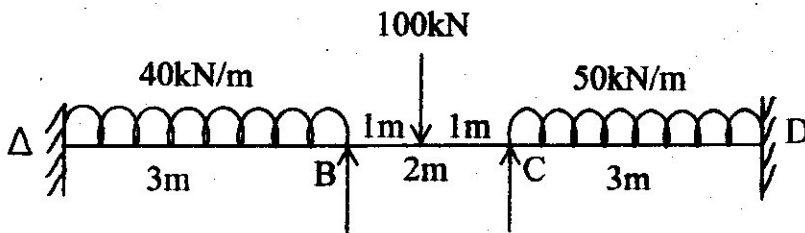
OR

Q.3. A Suspension Cable is supported from two piers 196m apart, one support being 7m above the other. The Cable carries a uniformly distributed load of 15kN/m and has its lowest point 9m below the lower support. The ends of the Cable are attached to rollers at the top of the piers and the back stays which are straight are inclined at  $30^\circ$  to the horizontal. Determine [16]

- (a) The maximum tension in the Cable
- (b) The tension in the back stays and
- (c) The vertical thrust on each pier.

## UNIT-IV

- Q.4. Determine the support moments for the continuous girder shown in fig. below. If the support B sinks by 2.50 mm. for all member take  $I = 3.50 \times 10^7 \text{mm}^4$  and  $E = 200 \text{kN/mm}^2$ . [16]



OR

- Q.4. Determine the end moments at the various joints of the frame shown in fig. C. [16]

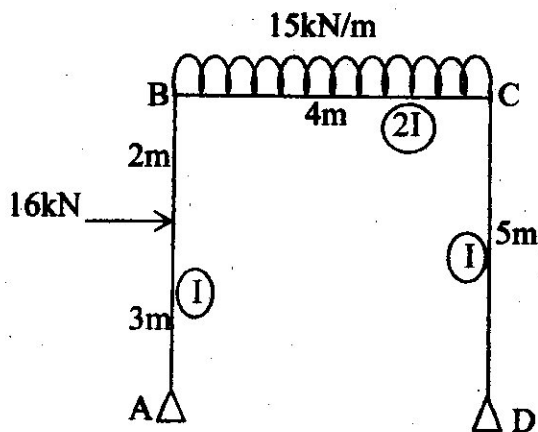


Fig. C

## UNIT-V

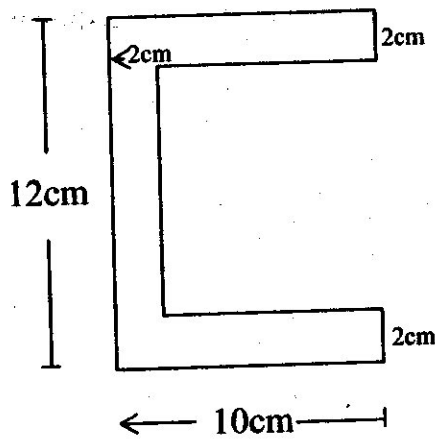
Q.5. Two rectangular bars, one of steel and other of copper each of  $(70 \times 30) \text{ mm}^2$  are placed together, to form a beam of 70 mm wide and 40mm deep, on two supports 4m apart, the copper being on the top of steel. Determine the maximum central load which can be applied to the beam if the bars are firmly secured to each other through out their length. [16]

$$E_s = 2 \times 10^5 \text{ N/mm}^2, f_s \text{ max} = 120 \text{ N/mm}^2$$

$$E_B = 0.8 \times 10^5 \text{ N/mm}^2; f_b \text{ max} = 75 \text{ N/mm}^2$$

OR

Q.5. (a) Determine the shear center of cross-see. With its Location. [8]



(b) Short Note on: -

[8]

(i) Location of NA

(ii) Shear Center

(iii) Moment of inertia

(iv) Principle axis

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