Roll No. _____ Total No. of Pages : 4

6E3032

6E3032

B.Tech VI Semester (Main/Back) exam. May, 2012

Civil Engg. 6CE51 Theory of Strutures - 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 Question carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clerly.

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

1. Nil 2. Nil

Unit - I

1. (a) A girder having a span of 18 m is simply supported at the ends. It is traversed by a train of loads as shown in Fig.1, the 50kN load lead ing. Find the maximum bending moment which can occur (i) under the 200kN load (ii) under 50kN load, using influence line diagrams. 8

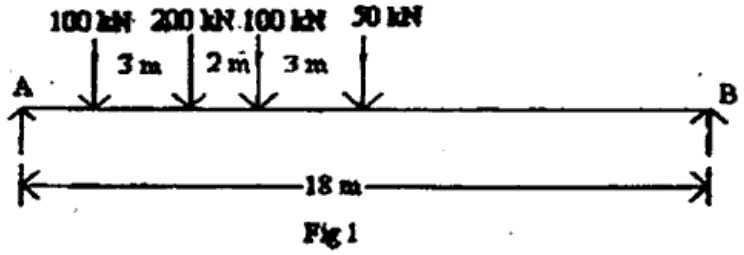

Fig 1

(b) Using Muller Breslau principle, draw the influence line for bending moment at the mid point D of span AB of the continuous beam ABC shown in fig.2. Determine the influence line ordinates at suitable in tervals and plot them. 8

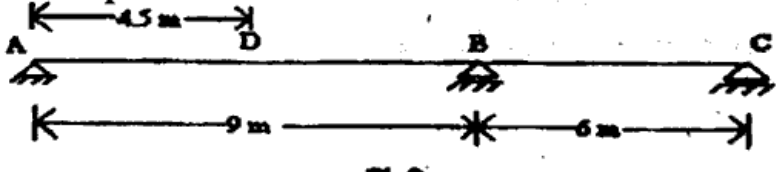

Fig.2

Or

1. (a) Draw influence lines for forces in the members P, Q, R and S of truss shown in fig.3. 10

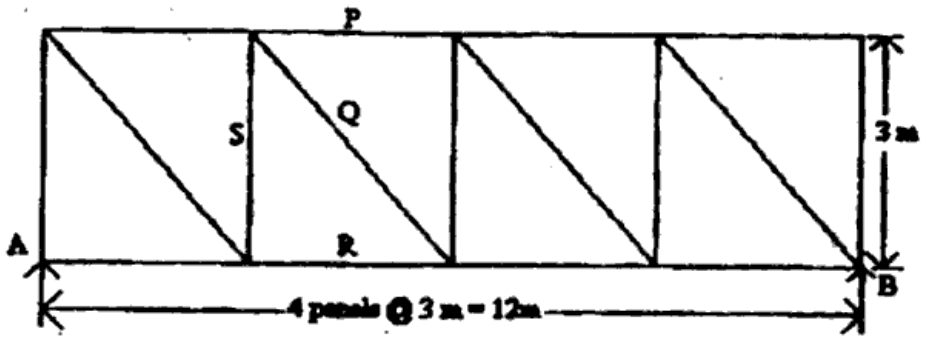

Fig.3

(b) Two point loads of 100kN and 200 kN spaced 3m apart cross a girder of span 15m from left to right with the 100kN load leading. Find the absolute maximum bending moment due to the given load system. 6

Unit - II

2. A three hinged parabolic arch has a span of 30m and a central rise of 6m. Five wheel loads of 4,5,5,3,3 kN spaced 3m, 2m, 3m and 2m in order, cross the arch from left to right with the 4 kN load leading. When the leading load is 20m from the left hinge, calculate the horizontal thrust in the arch. Also calculate the bending moment, normal thrust and shear force at the section under the tail load. 16

Or

2. A parabolic arch fixed at both ends has a span of 42m and a central rise of 8.5 m It is subjected to concentrated loads of 75 kN and 100 kN at 8m and 16m respectively from the left end. The moment of inertia of the arch rib varies as the secant of the inclination of the rib axis. Analyse the arch and find the bending moments at either support and at the crown. 16

Unit - III

3. The span of a suspension bridge with level supports is 120 meters and the central dip of two cables supporting two 3-hinges girderd is 12 m. The dead load of the bridge is 25 kN/m. Draw the influence lines for maximum positive and maximum negative bending moment. By means of influence lines, locate and find the maximum positive and negative bending moment in the girder, when a single concentrated load of 300kN rolls across the bridge. 16

Or

3. (a) Write down the assumptions made in analyzing the stiffened girder suspension bridges. 2

(b) Draw the influence lines for horizontal thrust in the cable, bending moment and shear force in the stiffening girder at a section 100m from the left hand support of a 2-hinged stiffened suspension bridge of span 400m with 40m central dip of the cable. 14

Unit - IV

4. Analyze the beam shown in fig.4 by Kani's method. Draw B.M.D. 16

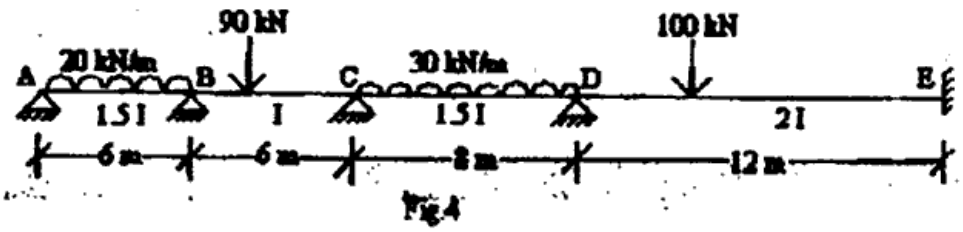

Fig.4

Or

4. Analyze the frame shown in fig.5 by Kani's method. Draw B.M.D. 16

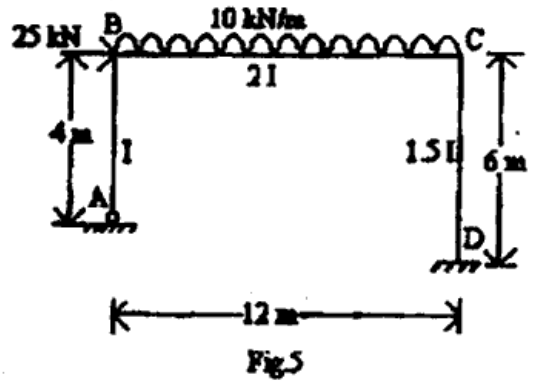

Fig.5

Unit - V

5. (a) Define the following terms: 8

i) Moment of inertia

ii) Shear center

iii) Centroid

iv) Principal Axes

(b) Determine the shear centre of the cross -section shown in fig.6 8

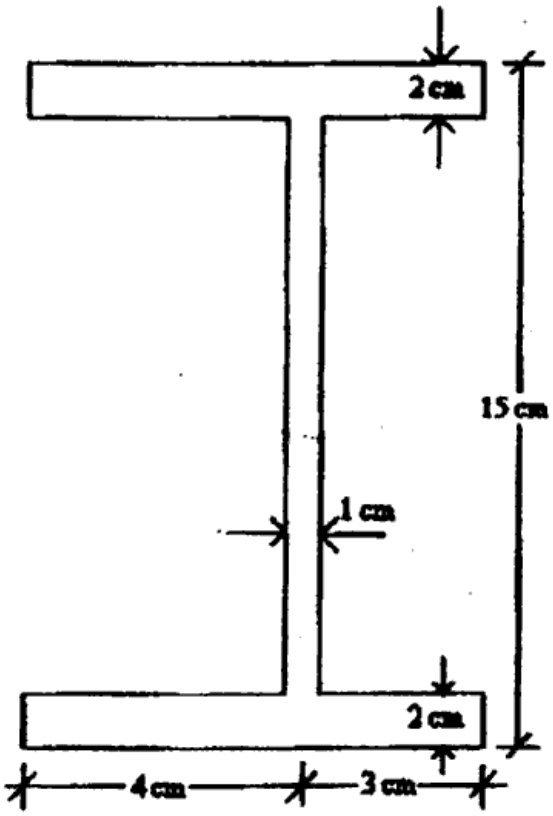

Fig.6

Or

5. Two rectangular bars, one of brass and the other of steel, each of 80 mm x20 mm are placed together, to form a beam of 80mm wide and 40mm deep , on two supports 2m apart, the brass being on the top of steel. Determine the maximum central load which can be applied to the beam if the bars are

(a) separate and can bend independently, and

(b) Firmly secured to each other throughout their length. Take the following values:

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

$E_b = 0.8 \times 10^5 \text{ N/mm}^2$; $f_{b,max} = 75 \text{ N/mm}^2$ 16