[This question paper contains 4 printed pages.]

Your Roll No......

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B.Tech. (C)/III

Paper ECE–306—ANALYSIS OF STRUCTURES

Time : 3 *Hours* *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer any **five** *questions.*

1. (a) A masonary dam of trapezoidal section is 12 m high with a top width of 2 metre. The water face has a batter of 1 in 12. Find the minimum bottom width necessary so that tensile stresses are not induced on the base section. Masonary weighs 22500 N per cubic metre and water weighs 9.81 KN per cubic metre. 7

   (b) Write the definitions of active earth pressure, passive earth pressure and earth pressure on rest. Also state various assumptions made in the Rankine's theory of Earth pressure. 7

2. (a) A three-hinged parabolic arch of span l has its abutments at depth h_1 and h_2 below the crown. The arch carries a u.d.l. of ω /unit run over the whole span. Determine the horizontal thrust at each support. 7

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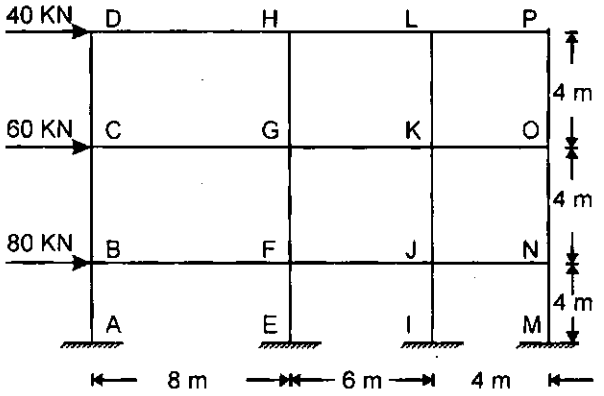
(b) A two hinged semi-circular arch of radius 10 metre is subjected to a rise of temperature 40°C. Find the maximum stress due to the rise of temperature. Take $E = 2 \times 10^5$ N/mm^2 and $\alpha = 12 \times 10^{-6}$ per degree centigrate. The depth of the arch section is 1000 mm. 7

3. A three-hinged stiffening girder of a suspension bridge of span 120 metre is subjected to two point loads of 240 KN and 300 KN at distances 25 metre and 80 metre from the left end. Find the shear force and bending moment for the girder at a distance of 40 metre from the left end. The supporting cable has a central dip of 12 metre. Find also the maximum tension in the cable, and draw the B.M.D. for the girder. 14

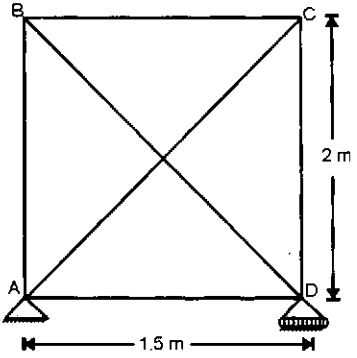
4. A flexible cable weighing 10 N/metre hangs between two supports 50 metre horizontally apart. The left support is 8 metre below the right support. The cable also supports a point load of 1200 N at a point 15 metre horizontally from the left support and 3 metre below this support.

Assuming that the weight of the cable is spread uniformly on the horizontal span, find the maximum tension for the cable. 14

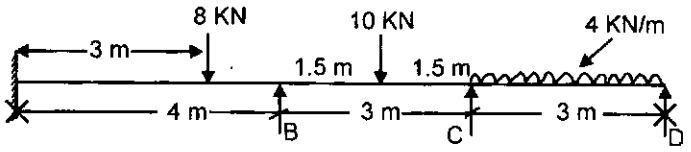
5. Analyse the frame shown in figure : 14



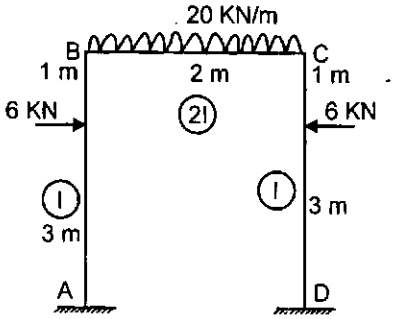
6. Write fabricating the pinjoined frame as shown in figure, the member AC was the last member to be fitted, and was found to be 1 mm short of the required length. Find the forces in all the members of the frame when the member AC is forced into position. The diagonal members are each 1000 mm^2 in area, while the remaining members are 2000 mm^2 area. Take E = 200 KN/mm^2. 14



7. By using slope-deflection method, determine the support moments for the continuous beam shown below. Draw BMD. 14



8. Analyse the portal frame by moment distribution method. 14



9. (a) What are influence lines? How is it useful in analysis of Rolling Loads? Write Muller-Breslau Principle for drawing influence line for a structure. 2+2+3=7

(b) Two wheel loads 80 KN and 200 KN spaced 2 m apart move on a girder of span 16 metre. Find the maximum positive and negative shear force at a section 4 metre from the left end. Any wheel load can lead the other. 7

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