Code No.: 6325

FACULTY OF ENGINEERING

B.E. (III/IV Year) (Civil) II Semester (Main) Examination, June 2010

THEORY OF STRUCTURES – II

Time : 3 Hours] [Max. Marks : 75

Answer **all** *questions from* Part A.
Answer any **five** *questions from* Part B.
Assume missing data, if any, suitably.

Part A – (Marks : 25)

1. State the condition to obtain the maximum bending moment that can occur under a particular chosen wheel load, when a series of wheel loads move across a simply supported girder. 2
2. State the Eddy's theorem of arches. 2
3. Calculate the length of a suspension cable of span 200m and central dip 18m. Supports of the cable are at same level. 2
4. What is an analogous column? What are its characteristics? 2
5. State the assumptions made in cantilever method of analysis. 2
6. Construct the influence diagrams for shear force and bending moment at section C for the over-hanging beam shown in fig.1. Hence calculate the maximum of these values due to a travelling point load of 100KN.

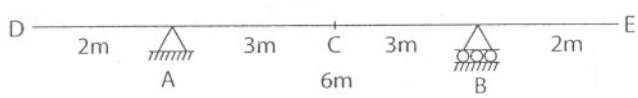

Fig. 1 3

7. A uniform three-hinged parabolic arch, of span 60m and rise 15m, carries a u.d.l. of 40 KN/m. Calculate the horizontal thrust in the arch and also bending moment at its left quarter span point. 3
8. A u.d.l. of intensity 24 KN/m and of length 6m, crosses a simply supported girder of span 24m. Calculate the Equivalent Uniformly Distributed Load (EUDL) for the beam. 3
9. A fixed beam, of uniform EI, is of 12m span and caries a mid-point load of 40KN. Using column analogy method, analyse and draw BMD for the beam. 3
10. Sketch a typical three-hinged stiffening girder showing all the important components on it. Is this girder a statistically determinate one or an indeterminate one? If indeterminate to what degree? 3

Part B – (Marks : 5 × 10 = 50)

11. Two point loads 80KN and 45KN, spaced @ 4m, crosses a simply supported girder of span 12m from left to right with 45KN load leading. Construct the curves of maximum shear forces and bending moment for the beam indicating all important values on them.

12. A three hinged segmental arch, of span 20m and rise 10m, carries a u.d.l. of

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40KN/m over its left half portion. Determine the horizontal thrust in the arch and also draw BMD for the arch.

13. A suspension cable, of 80m span and 8m central dip, is having supports at the same level and carries a u.d.l. of 24KN/m over its full span. Determine length of the cable and maximum tension in the cable.

14. A rectangular portal frame ABCD is simply supported at A and D and loaded as shown in fig.2. Using column analogy method, draw BMB for the frame.

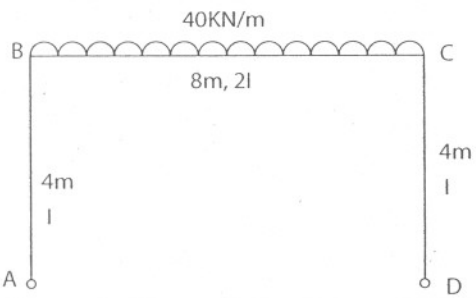

Fig. 2

15. A three hinged parabolic arch is of span 24m and rise 4m. Construct the influence line diagrams for horizontal thrust and also for bending moment, normal thrust and radial-shear at a section 6m from the arch's left hinge. Also calculate the maximum values of horizontal thrust and maximum positive and negative bending moments when a 120KN point load crosses the arch from left to right.

16. A uniform two hinged parabolic arch of span 60m and rise 15m carries a u.d.l. of 40KN/m over its middle 20m length. Determine the horizontal thrust and also draw BMD for the arch. Assume $I = I_c \, Sec\theta$.

17. Using portal method of analysis, analyse and draw BMD for the portal frame shown in fig.3.

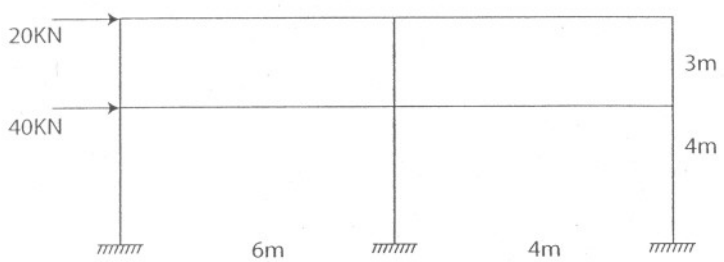

Fig. 3