Code No. : **5037/M**

FACULTY OF ENGINEERING
B.E. 3/4 (Civil) II Semester (Main) Examination, May/June 2012
THEORY OF STRUCTURES – II

Time: 3 Hours] [Max. Marks : 75

***Note**: Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.*

PART – A 25

1. Define equivalent uniformly distributed load. 2
2. Draw the influence line for S.F. at section 5 m from one end of a simply supported beam of 25 m span carrying a rolling udl of 1kN/m of 8 m. 3
3. Write the expression for horizontal thrust and normal reaction of two hinged arches. 2
4. A three hinged arch rib of parabolic shape carries a concentrated load of 20 kN from the left end at distance of 8 m. The span and rise at the center of arch are 24 m and 8 m respectively. 3
5. The cables of a suspension bridge of 200 m span and central dip 15 m supports of cable are at same level. Calculate the length. 3
6. If the supports of a three hinged arch yield horizontally by a small amount what will be the effect on horizontal support reaction ? 2
7. What are the specific advantages of the column analogy method over other method of analysis ? 2
8. Using column analogy method find out the stiffness carry over factors for a uniform beam fixed at both ends. 3
9. What are the assumption made in cantilever method ? 2
10. At a section 2 m from the left support of a simply supported beam of span 6 m, the B.M due to moving udl shorter than the span will be maximum when. 3

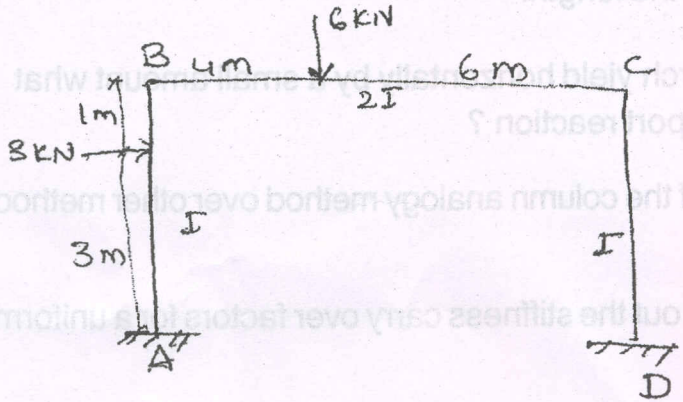
PART – B 50

11. A uniform load of 1 kN/m, 4 m long cross a girder of 16 m span. Calculate the maximum S.F. and B.M diagram and calculate values at section 6 m and 8 m from left hand support.

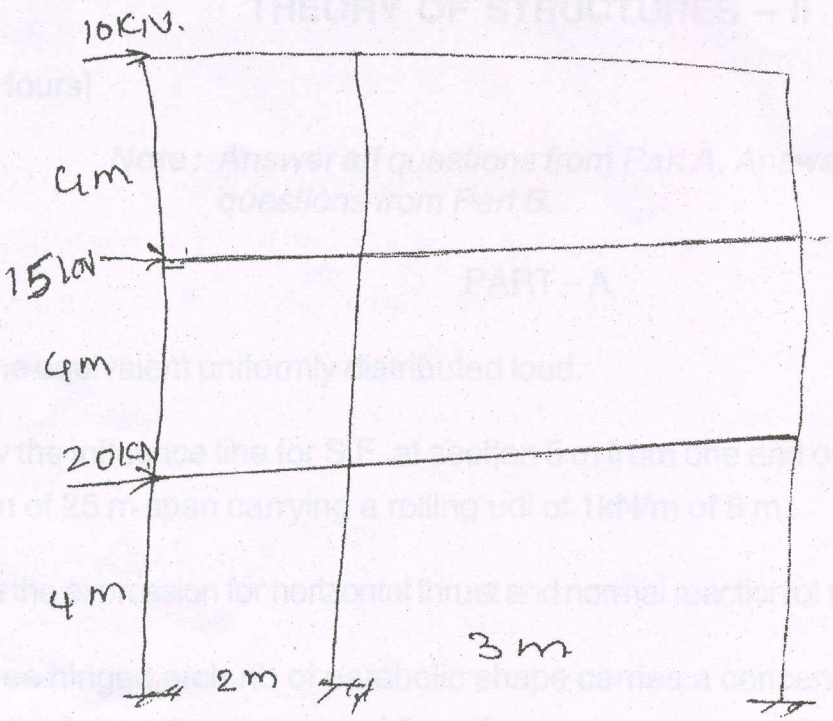
12. An unsymmetrical parabolic arch of 20 m span has two hinges at the springings and one at the highest point of the arch which is 9 m and 4 m above left hand and right hand supports respectively. The arch is loaded with a uniformly distributed load of 30 kN/m run covering a horizontal distance from the left hand support to the highest point of the arch. Find the reaction at the supports and normal thrust and radial shear at a section 4 m from the right hand support.

13. A symmetrical suspension bridge has two cable each of 200 m span and central dip of 20 m. It carries a total load of 500 kN. Which is uniformly distributed over the entire span of the cable. Calculate the horizontal component of tension and maximum tension in each cable.

14. Analyse the portal frame shown in fig



15. Find the forces in the members by portal frame.



EI is constant

16. A parabolic arch, hinged at the ends has a span 30 m and rise 5 m. A concentrated load of 12 kN acts at 10 m from the left hinge. The second moment of area varies as the secant of the slope of the rib axis. Calculate the horizontal thrust and reaction at the hinges. Also calculate the maximum bending moment anywhere on the arch.

17. Draw IL for B.M at a point 10 m distant from the left hand abutment of a bridge girder of 25 m span, and the maximum B.M at that point due to a series of wheel loads 10, 20, 20, 20 and 20 t at centre 4, 2.5, 2.5 and 2.5 m. The loads can cross in either direction, the 10 kN wheel load leading in each case.