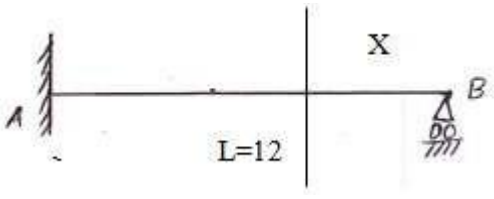
CE8602 STRUCTURAL ANALYSIS-II

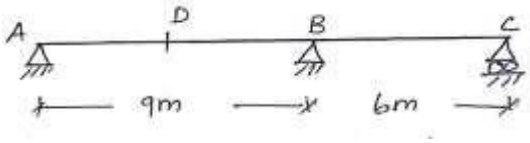
Important 13 Mark Questions

Part-B

1. A single moving load of 10kN moves on girder of span 200mConstruct the influence lines for shear force and bending moment for a section 50m from the left support. Construct the Influence lines for points at which the maximum shears and maximum bending moment also determine these maximum values.
2. Two-wheel loads of 12 kN and 6 kN at a fixed distance apart of 2m, cross a beam of 12m span, Draw the influence line for bending moment and shear force for a point 5m from the left support, and also determine the maximum bending moment and shear force at that point.
3. Four-wheel loads of 60, 40, 80 and 50 kN cross a girder of 20m span, from left to right followed by udl of 8kN/m and 2m long with the 60kN load leading. The spacing between the loads in the same order are 3m, 3m and 2m. The head of the udl is at 4m from the last 50kN load, using influence lines calculate the S.F and B. M at a section 8m from the left support when the 40kN load is at centre of the beam.
4. The four equal loads of 150 KN ,each equally spaced at apart 2m and UDL of 60 KN/m at a distance of 1.5m from the last 150 KN loads cross a girder of 20m from span R to L.Using influence line calculate the S.F and BM at a section of 8m from L.H.S support when leading of 150KN 5m from L.H.S
5. Draw the IL for reaction at B and for the support moment M_A at A for the propped cantilever AB of 12m as shown in fig. Compute influence line coordinates at 1.5 m intervals.

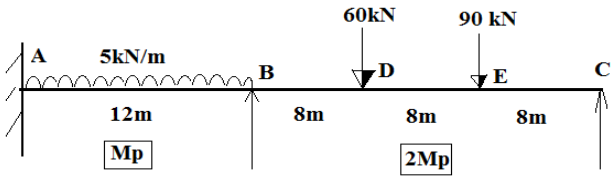


6. Using muller Breslau principle, draw the ILD for the bending moment at D. the middle point of span AB of a continuous beam shown in fig. compute the ordinates at 1m interval. Determine the maximum hanging bending moment in the beam when two concentrated loads of 8KN each and separately by a distance 1m passes through the beam from left to right.



7. Draw the ILD for the propped cantilever reaction of a propped cantilever beam having span 6m. EI is constant.
8. Draw the influence line for M_B for the continuous beam ABC of span AB= 3m and BC = 4m Simply supported at A, B &C. Compute the ordinates at every 1m interval using Muller Breslau principle. EI= constant.
9. A circular three hinged arch of span 25m with a central rise of 5m is hinged at the crown and the end supports. It carries a point load of 100kN at 6m from the left support. Examine and Calculate the reaction at the supports and Moment at 5m from the left support.
10. A three hinged circular arch of span 16m and rise 4m is subjected to two-point loads of 100 kN and 80 kN at the left and right quarter span points respectively. Examine and find the reaction at the supports. Find also the bending moment, radial shear and normal thrust at 6m from left support.
11. A symmetrical three hinged arch has a span of 50 & rise 5m. Find and examine the maximum bending moment at a quarter point of the arch caused by a uniformly distributed load of 10kN/m which occupies any portion of the span. Indicate the position of the load for this condition.
12. A three hinged parabolic arch has supports at different levels having span 20m and carries a UDL of 30kN/m over the left half of the span. The left support is 5m below the crown and the right support is 4m below the crown. Draw the BMD. Also analyze and find the normal thrust and radial shear at a section 4m from the left support.
13. A suspension cable of 130m horizontal span is supported at the same level. It is subjected to a udl of 28.5kN per horizontal meter. If the maximum tension in the cable is limited to 5000kN, calculate the minimum central dip needed.
14. A suspension bridge is of 50m span with a 16m wide roadway. It is subjected by a pair of cables having a central dip of 4.2m. Find the cross-sectional area of the cable necessary if the maximum permissible stress in the cable material is not to exceed 600N/mm^2.
15. A suspension cable of span 100m and dip 10m carries a udl of 8kN of horizontal span over the full span. Find the vertical and horizontal forces transmitted to the supporting pylons.

16. A suspension cable of 75m horizontal span and central dip 6m has a stiffening girder hinged at both ends. The dead load transmitted to the cable including its own weight is 1500 kN. The girder carries a live load of 30kN/m uniformly distributed over the left half of the span. Assuming the girder to be rigid, calculate the shear force and BM in the girder at 20m from the left support. Also calculate the maximum tension in the cable.
17. Calculate the shape factor for a Rectangle section of breadth 'b' and depth 'd', Diamond section of breadth 'b' and depth 'd'.
18. Calculate the shape factor for a triangle Centroid lying at d/3 from the base of depth, 'd', and breadth 'b'. Circular section of diameter 'D'.
19. A mild steel I-section 200mm wide and 250mm deep has a mean flange thickness of 20mm and a web thickness of 10mm.Analyse the S.F. and the fully plastic moment if σ_y=252N/mm².
20. Analyse the shape factor of the I-section with top flange 100mm wide, bottom flange 150mm wide, 20mm thick and web depth 150mm and web thickness 20mm.
21. A continuous beam ABC is loaded as shown in the Fig. Examine the required M_p if the



load factor is 3.2.

22. A fixed beam of span 'l' carries a uniformly distributed load 'w' on the right half portion. Find the value of collapse load W_c. The beam is of uniform moment of resistance.
23. A three-span continuous beam ABCD has the span lengths of AB= BC= CD=8m and carries an udl of 40kN/m completely covering the spans and A & D are simply supported ends. If the load factor is 1.5 and Shape factor is 1.15 for the "T" section. Find the section modulus needed. Assume the yield stress for the material as 300N/mm².
24. Determine the collapse load of the beam load as shown in fig.