SUB: Structural analysis-1(SA-1)   **F.M:**100

BRANCH:CIVIL ENGINEERING

I.SHORT QUESTIONS:[answer any 20 questions]   (2X20=40)

1. Define crown of an arch.
2. How normal thrust at a section in a three hinged arch is calculated?
3. What is the difference between the basic action of an arch and a suspension cable?
4. Differentiate between static and kinematic indeterminancy with example?
5. What is the importance of ILD for moving loads in structural anaysis?
6. What is the nature of forces in the cable?
7. Draw influence line diagram for shear force and bending moment at mid span of a simply supported beam of length "L" .
8. Differentiate the statically determinate and statically indeterminate structures?
9. Distinguish beween plane struss and space struss ?
10. Define the horizontal thrust at the support .
11. How normal thrust at a section in three hinged arch is calculated ?
12. Under what conditions will the bending moment in an arch be zero through out ?
13. State the advantages of arches over beams.
14. What is the dgree of static indeterminancy of a three hinged parabolic arch ?
15. What are stiffening girders?
16. Write use of influence line diagram.
17. What is meant by perfect frame ?
18. What is meant by absolute maximum bending moment in a beam ?
19. Write applications of influence line diagram ?
20. Show a suspension cable with different level.
21. Draw free body diagram of space truss.
22. What isthe advantage of an arch over a beam ?

II.LONG QUESTIONS:[Answer any 10 questions]   (6X10=60)

1. A udl live load of 60 KN/m run of length 5m.moves on a girder of span 16m.Find the maximum +ve and –ve S.F at a section 6m.from the left end.
2. A udl of length 10m and an intensity 5KN/m is crossing a simply supported beam of span 5m.Calculate
   (i)   Maximum S.F and B.M at a point 1m from left support.

(ii) The load position for absolute maximum B.M and this value.

3. Two wheel load 80 KN and 200 KN spaced at 2m apart move on a girder of span 16m.Find the maximum +ve and –ve shear force at a section 4m.from the left end.Any wheel load can lead the other.Also find maximum B.M at this point.

4. A simply supported girder has span of 12m.If 200 KN load moves from left to right.Find the maximum B.M which can occues at a section 4m from the left end.

5. A suspension bridge of 250m span has three hinged stiffening girder supported by a cable with a central dip of 25m if 4 point loads of 150 KN each are placed at the distance of 20m,30m,40m,50m from the left hand hinge.Find the S.F and B.M in the girderof 62.5m from each end.Also find maximum tension in the cable.

6. A cable is suppoted between two points 30m horizontally apart.The left support is 3m above the right support.The cable carries a load of 2KN/m on the hrizonal span.The cable carries a load of 2KN/m on the horizontal span.The lowest point of the cable is 6m below the left support.Find the maximum tension in the cable.

7. A three hinged arch of span l and rise h carries a uniformly distributed load of w per unit run over the whole span.Show that the horizontal thrust at each support is wl^2/8h .

8. A three hinged parabolic arch of span 6m with a central rise of 2m having a hinge provided at the crown.If a point load of 3KN moves from left to right.Draw the ILD for B.M at a horizontal distance of 4m from left end.Find also the maximum positive and maximum negative bending moment values and corresponding locations.

9. A cable carrying a load of 10 KN per metre run of horizontal span is stretched between supports 100m apart.The supports are at same level and the central dip is 8m.Find the greatest and least tension in the cable.

10. A three hinged parabolic arch of span 40m and rise 8m carries a udl of 30 KN/m on the whole span and a point load of 200 KN at a distance of 5m from right end.Find the horizontal thrust.Find also bending moment,normal thrust and radial shear at a section 8m from the left end.

11. A three hinged parabolic arch is subjcted to a udl of 10 KN/m for the left half portion.Using ILD,find the B.M,radial shear andnormal thrust at a section 4m from the left support.

12. Draw ILD for normal thrust and bending moment at a section of a three hinged arch.

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