Reg. No. : | | | | | | | | | | |

Question Paper Code: 36014

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Sixth Semester

Civil Engineering

01UCE604 - STRUCTURAL ANALYSIS – II

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What are critical stress resultants?
2. Define absolute maximum bending moment.
3. State Muller Breslau's principle.
4. Give some practical examples of rolling loads.
5. Differentiate three hinged arch and two hinged arch.
6. State Eddy's theorem.
7. Mention the different types of cable structures.
8. Define tension coefficient.
9. What is shape factor?
10. What are the different types of mechanisms?

PART - B (5 x 16 = 80 Marks)

11. (a) Two point loads of 100 *kN* and 200 *kN* spaced 3 *m* apart cross a girder *AB* of span 15 *m* from left to right with the 100 *kN* load leading. Draw the influence line for shear force and bending moment and find the value of maximum shear force and bending moment at a section *D* 6 *m* from the left hand support. Also find the absolute maximum bending moment due to the given load system. (16)

Or

(b) A simply supported beam has a span of 15m. UDL of 40kN/m and 5m long crosses the girder from left to right. Draw the influence line diagram for shear force and bending moment at a section 6m from the left end. Use these diagrams to calculate the maximum shear force and bending moment at this section. (16)

12. (a) Find the influence line diagram for reaction B in a continuous beam ABC of span AB = 6m and BC = 5m. Support A is hinged and support B and C is roller. Take EI as constant throughout. (16)

Or

(b) Make neat diagrams of the influence lines for shearing force and bending moment at a section 3 *m* from one end of a simply supported beam, 12 *m* long. Use the diagrams to calculate the maximum shearing force and the maximum bending moment at this section due to a uniformly distributed rolling load, 5 *m* long of 2 *kN* per meter intensity. Use Muller-Breslau's principle. (16)

13. (a) A fixed parabolic symmetric arch of span 30 *m* and central rise 6 *m* has moment of inertia at any section I = $I_O \sec \theta$, where I_O is the moment of Inertia at the crown and θ is the inclination of the tangent with the horizontal. Find the reactions at the support when the arch is subjected to a load of 240 *kN* acting at a distance of 6 *m* from the left support. Determine the moment under the load and at the crown. (16)

Or

(b) A symmetrical three hinged parabolic arch of span 40m and rise 8m carries an udl of 30kN/m over the left half of the span. Calculate the reactions at the supports and also bending moment, radial shear and normal thrust at a distance of 10m from the left support. (16)

14. (a) A three hinged stiffening girder of a suspension bridge of span 100m is subjected to two point loads of 200kN and 300kN at the distance of 25m and 50m from left end. Find the shear force and bending moment for the girder at a distance of 30m from left end. The supporting cable has a central dip is 10cm. and also find maximum tension in the cable with its slope. (16)

Or

(b) Explain the analysis procedure for a space truss using tension coefficient method. (16)

15. (a) A two span continuous beam *ABC* has span lengths *AB* = 6 *m* and *BC* = 6 *m* and carries a uniformly distributed load of 30 *kN/m* completely covering the spans *AB* and *BC*. *A* and *C* are simple supports. If the load factor is 1.80 and the shape factor is 1.15 for the *'I'* section, find the section modulus needed. Assume yield stress for the material as 250 N/mm^2. (16)

Or

(b) Analyze the propped cantilever beam is carrying UDL of w/m over the entire span length of L. Also determine the collapse load, if plastic moment is Mp. (16)