Total No. of Question : [4]

Registration No. : ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

Programme Name : Bachelor of Civil Engineering
Regular S.Y.B.Tech.Sem.IV ESE May / June 2023
IV SEMESTER (2021 BATCH)
201CEL211-Structural Analysis

Duration : 2 Hours   **Marks : 50**
Instructions :

(Q1) ALL QUESTIONS COMPULSARY   [20.0]

  (a) What are the different types of trusses explain any three in details?   [6.0]
      OR
      Define Slope, Deflection and what is relation between it in form of differentiation
      equation?

      CO :- CO1
      Blooms Taxonomy :- Remember

  (b) A simply supported beam subjected to two point loads 10 kN and 40 kN at 1 meter and   [7.0]
      4 meter from left hand support respectively. Total span of beam is 6 meter. Calculate
      deflection under point loads using macaulays method. (Take E = 2 x 10^5 Mpa, and I
      = 3 x 10^8 mm^4)

      CO :- CO2
      Blooms Taxonomy :- Apply

  (C) A steel rod 20 mm diameter and 2.5 meter long. Find maximum instantanious stress   [7.0]
      and workdone at maximum elongation when an axial load of 50 kN is suddenly
      applied. E= 2 x 10^5 Mpa

      CO :- CO2
      Blooms Taxonomy :- Apply

(Q2) All Questions are Compulsory   [10.0]

  (a) Explain middle Fourth rule for circular section?   [3.0]

      CO :- CO3
      Blooms Taxonomy :- Analyze

  (b) Find the greatest length for which a mild steel strut of T-shaped cross section, the area   [7.0]
      of which is 20 cm2 and the least moment of inertia of which is 200 cm4, may be used
      with one end fixed and other entirely free in order to carry a working load of 70 MN/m2
      of section, the working load being one fourth of the crippling load.
      Rankine constant for mild steel are: a = 1/7500, fc = 330 MN/m2.

      CO :- CO3
      Blooms Taxonomy :- Analyze

(Q3) All Questions are Compulsory [10.0]

(a) What are the different stability conditions of a Dam? [4.0]

CO :- CO3
Blooms Taxonomy :- Analyze

(b) A masonry pier, rectangular in shape, measuring 1.5 m along X-axis and 1.0 m along [6.0]
Yaxis;
is subjected to a compressive force of 20 kN at a point located 0.2 m away from
one of its corner in both the directions. Find the axial load present on the pier, along
with the 25 kN force, if the minimum stress in pier is 0.625 kN/m^2 ?

CO :- CO3
Blooms Taxonomy :- Analyze

(Q4) All Questions are Compulsory [10.0]

(a) A shaft 5 cm external dia. and 1 cm internal dia. , transmit 300 HP at 30 rpm. It is also [5.0]
subjected to Bending moment of 25 kNm and end thrust 200 kN. Determine Direct
stress, shear stress and combined stress?

CO :- CO4
Blooms Taxonomy :- Analyze

(b) A cylindrical shell of 3 mm thickness is closed at end. It has internal length 30 cm and [5.0]
dia. 10 cm . Determine longitudinal and circumferential stress, if fluid pressure is 5
Mpa and E= 200 Gpa.

CO :- CO4
Blooms Taxonomy :- Analyze

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