KERALA AGRICULTURAL UNIVERSITY
B.Tech (Agrl.Engg.) 2015 Admission
IV Semester Final Examination-July-2017

Cat. No: Iden.2205

Title: Design of Structures (2+1)

Marks: 50

Time: 2 hours

I Fill up the blanks/Define
(10x1=10)
1. The maximum area of tension reinforcement in beams shall not exceed ------------
2. The minimum number of main steel bars provided in R.C.C circular columns is ------------
3. Cantilever retaining walls can safely be used for a height not more than ------------
4. The effective span of a simply supported slab, is ------------
5. The rolled steel I-sections are most commonly used as beams because------------
6. Partial safety factor.
7. Slab base
8. Web crippling in steel beams.
9. Shape factor
10. Laterally supported beam.

II Write short notes/answers to any FIVE of the following
(5x2=10)
1. What do you understand by buildup columns?
2. List out the types of foundations.
3. Write short note on reinforcements used in RCC structures.
4. Explain Limit state of collapse.
5. Explain the design recommendations of lateral ties in column.
6. Distinguish Lap joint and butt joint with the help of figures.
7. Sketch various failure patterns of welded connections.

III. Write short answers to any FIVE
(5x4=20)
1. Briefly describe the design aspects of ferrocement tanks.
2. A RCC beam is supported at 2 walls 700mm thick spaced at a clear distance of 5.5 m. The beam arries a superimposed load of 15kN/m. Use M25 concrete and Fe 415 steel. Design the section.
3. Describe the steps involved in the design of an isolated footing.
4. Design a simply supported one way slab with a clear span of 4m which carries an imposed load of 5kN/m 2 .Assume a support width of 180mm.Use M20 & Fe415 steel.
5. Calculate the strength of 20mm dia bolt of grade 4.6 for a lap joint.
6. Find the moment of resistance of a T beam having the following data:
   Bf=740mm, d=400mm, bw=240mm, Df=100 mm, Ast=5 bars of 20mm dia. Use Fe250 andM15 grades.
7. An RCC column 4m long and 400mm dia is reinforced with 8 bars of 20mm dia. Find the safe load of column using M20 concrete and Fe 415 steel.

IV Write essay on any ONE
(1x10=10)
1. Design a single angled section for a tension member of a roof truss to carry a factored tensile force of 225kN and the member is subjected to possible reversal stresses due to the action of wind. The effective length of the member is 3m.Use 20mm shop bolt of grade 4.6 for the connection.
2. A cantilever retaining wall has to retain earth embankment 4m high above ground level. Unit weight of earth is 20kN/m3and its angle of repose is 30^0. And the embankment is horizontal at its top. SBC 120kN/m2 and μ = 0.5. Use M20 concrete & Fe415 steel. Proportion the section and check for stability. Also design the stem of retaining wall.

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