

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agri.Engg) 2013 Admission

IVth Semester Final Examination- June/July -2015

Cat. No: Iden.2205

Title: Design of structures (2+1)

Marks: 50

Time: 2 hours

Fill up the blanks with appropriate word(s)

(10 × 1 = 10)

1. R.C.C. _____ are provided to transmit the load of the structure supported by _____ to the soil.
2. The stress in _____ is equal to m times the stress in _____ where m is modular ratio.
3. The amount of transverse reinforcement varies from a minimum of _____ % of gross concrete area for ordinary slab to _____ % for bridge slab.
4. The position of a backfill lying above the _____ plane at the elevation of top of a wall is called _____.
5. _____ earth pressure is exerted on a wall when it has a tendency to move _____ the backfill.
6. In case of R.C.C. beam, the location of the _____ axis varies with the amount of _____ steel used.
7. Tensile strength of concrete is about _____ to _____ % of its compressive strength.
8. The size of butt weld is specified by its _____ thickness while the size of fillet weld is the _____ leg length.
9. _____ and _____ are commonly called as bins.
10. The _____ load of a column is defined as the load at which column is in _____ condition.

Write short notes on any FIVE questions

(5 × 2=10)

1. Concept of analysis and design of a concrete structure.
2. Different types of welds.
3. An isolated T-beam has the flange width of 120 cm, flange thickness of 10 cm, overall depth of 40 cm, rib width of 20 cm and effective cover to tensile reinforcement 4 cm. The beam is reinforced with bars of 4 nos. & 20 mm diameter arranged in one row. Taking $c = \sigma_{cbc} = 50 \text{ kg/cm}^2$, $t = \sigma_{st} = 1400 \text{ kg/cm}^2$ and $m = 18$, determine the moment of resistance of the section.
4. For a balanced rectangular section of a singly reinforced beam, determine the following :
(i) depth of neutral axis. (ii) moment of resistance assuming the allowable stresses in

5. Find the suitable pitch for single riveted lap joints for plates 1 cm thick, $\sigma_s = 94 \text{ N/mm}^2$ and $\sigma_b = 212 \text{ N/mm}^2$.
6. Design a footing for a square column $400 \text{ mm} \times 400 \text{ mm}$ carrying load of 1000 kN . The bearing capacity is 200 kN/m^2 . Take $c = 5 \text{ N/mm}^2$, $t = 140 \text{ N/mm}^2$ and $m = 18$.
7. A reinforced concrete column 4 m long (effective) and 40 cm in diameter is reinforced with 8 bars of 20 mm diameter. Find the safe load the column can carry. Take $\sigma_{cc} = 40 \text{ kg/cm}^2$ and $\sigma_{sc} = 1300 \text{ kg/cm}^2$. The column carries lateral ties.

III. Write short essays on any FIVE questions

(5 x 4=20)

1. Balanced section of a singly reinforced beam.
2. Riveted joints and its types.
3. Design of one way slab using IS code method.
4. The depth of foundation and fixation of base width for a cantilever type retaining wall.
5. Describe dimensions of T-beam.
6. Describe design procedure of R.C.C. column.
7. Derive an equation for Euler's Crippling load for steel column with both ends fixed.

IV. Write essay on ANY ONE

(1 x 10 = 10)

1. Design a R. C. C. slab for a room of size $5 \text{ m} \times 6 \text{ m}$ -using IS code method. The wall is simply supported on all the four edges with corner held down and carries a superimposed load of 3500 N/m^2 inclusive of floor finishes etc. Use M 15 mix.
2. Describe silos and the Janssen's theory for the analysis of pressure on the side of a bin.