

# KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agri.Engg) Degree Programme 2014 Admission

IV<sup>th</sup> Semester-Final Examination-June/July-2016

Cat. No: Iden.2205

Marks: 50

Title: Design of Structures(2+1)

Time : 2 hours

## I. True or False

(10 x 1=10)

1. Web crippling generally occurs at the point where concentrated loads act.
2. The most economical section for a column is tubular section .

## Fill in the blanks

3. The minimum number of main steel bars provided in circular RCC column is \_\_\_\_\_.
4. The allowable stress in axial tension for rolled I-sections and channels is \_\_\_\_\_ kg/cm<sup>2</sup>.
5. The diameter of longitudinal bars of a column should never be less than \_\_\_\_\_ mm.
6. When two structural members are connected by means of a cylindrical shaped pin, the connection is called a \_\_\_\_\_.
7. Thickened part of a flat slab over its supporting column is called as \_\_\_\_\_.
8. The distance between centres of rivet holes should not be less than \_\_\_\_\_ times the diameter of the hole .
9. In riveted joints, the maximum pitch should exceed \_\_\_\_\_ times the thickness of thinner plate.
10. The cross-section of a standard fillet is a triangle whose base angles are \_\_\_\_\_ degrees.

## II Answer the following any FIVE

(5 x 2=10)

1. Discuss about the points to be considered while selecting a site for constructing a farm house.
2. State disadvantages of RCC structures.
3. Discuss briefly on girder bridges .
4. Write assumptions made before design of R.C.C. beam .
5. Differentiate a singly reinforced and doubly reinforced beam.
6. Write short notes on strength of riveted joints.
7. Write short notes on three modes of connections in steel structures.

## III. Write short notes on ANY FIVE of the following

(5x 4=20)

1. Calculate the area of steel required for singly reinforced concrete beam 230mm wide and 390mm deep to resist an ultimate moment of 50kn-m. Assume m20 and fe 500 combination of concrete and steel and effective cover = 40mm.
2. Derive the governing equations of a doubly reinforced beam.
3. Discuss in detail about the design aspects of ferro cement tanks.

4. A double angle tie ISA 150x75x10 mm ( short legs back-to-back) of a roof truss is connected to the same side of a gusset, with rivets 18 mm in diameter, such that each angle is reduced in section by one rivet hole only. Determine the tensile strength of the member. Tack rivets have been provided at suitable spacing.
5. Design a horizontal compression member carrying a load of 40 tonnes. Length of the member is 3.5 m. Assume both ends pinned.
6. Design a one way slab with a clear span of 3.5m, simply supported on 200mm thick masonry walls to support a live load of 4 KN/m<sup>2</sup>. Adopt M20 concrete and Fe 415 steel.
7. A mild steel column of 50 mm diameter is hinged at both of its ends. Find the crippling load for the column, if its length is 2.5 m. Take E for the column material as 200 GPa.

**IV. Write essay on ANY ONE of the following**

(1 x 10=10)

1. Find the suitable pitch for double riveted double cover butt joint for plate 1.5 cm thick. Given that the pitch for inner row of rivets is half the pitch for the outer row. Take  $f_t = 1500$  kg/cm<sup>2</sup>,  $f_s = 945$  kg/cm<sup>2</sup> and  $f_b = 2125$  kg/cm<sup>2</sup>
2. Discuss in detail about the four modes of failure of a compression member.