**KERALA AGRICULTURAL UNIVERSITY**
**B.Tech.(Agri. Engg.) 2019 Admission**
**IV Semester Final Examination- November 2021**

**Iden.2205** **Design of Structures (1+1)**

**Marks: 50**
**Time: 2 hours**

**I** **Fill in the blanks** **(10x1=10)**

1. Concrete is strong in ..... and shear but weak in .....
2. ..... include self weight of structure and all together superimposed load
3. .....and ..... are the examples of compressive members.
4. .....are widely used for joining light metals.
5. Size of the rivet is determined by .....where t = thickness of plate.

**State True/False**

6. Lap joint and butt joint are the type of rivet joint.
7. The maximum slenderness' ratio is determined by compression members $l/R_{max.}$
8. P. C. C. and R. C. C. are two types of concrete.
9. Critical load may be given by $P_{cr} = \pi^3 EI / l^4$
10. ISO stands for Indian Strength Organization.

**II** **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. Define various types of load acting on a structure.
2. Write use of BIS code.
3. Write the difference between Tension member and Compression member.
4. Write the various advantages of RCC construction.
5. Write different types of joints.
6. Why steel is used in RCC structure.
7. What is moment of resistance?

**III** **Answer ANY FIVE of the following** **(5x4=20)**

1. Write the design procedure of rivet joint.
2. The cross - section of a singly reinforced concrete beam is 300 mm wide and 400 mm deep to the centre of reinforcement, which consists of 4 bars of 14 mm diameter. If the stresses in concrete and steel are not to exceed 5 N/mm$^2$. Determine moment of resistance of the section. Take m = 18.
3. Write basic rules for design of slab (IS: 456 – 2000).
4. State and explain methods of design of R.C sections.
5. Find the rivet value of 18 mm diameter rivets connecting 10 mm thick plates. If the rivets are (a) in single shear (b) in double shear. Take $f_s$ = 100N/mm$^2$ and $f_b$ = 300 n/mm$^2$
6. Write down the various types of failures of a riveted joint.
7. Find the efficiency of a double riveted two strap butt joint, if the main plates are 20 mm thick, diameter of rivet is 22 mm and rivet pitch is 85 mm. The safe stress in tension, bearing and shear are 150, 300 and 100 N/mm$^2$ respectively.

**IV** **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Write down the advantages and disadvantages of welded connection with some examples.
2. Find the efficiencies of the following riveted joints:
   (a) Single riveted lap joint for 8 mm thick plates with 16 mm diameter rivets at a pitch of 50 mm centres.
   (b) Double riveted lap joint for 8 mm thick plates with 16 mm diameter rivets at a pitch of 75 mm centres.

   Assume the following working stresses:
   Permissible tensile stress in steel plate =150 $N/mm^2$
   Permissible bearing stress in rivets = 300 $N/mm^2$
   Permissible shearing stress in rivets = 100 $N/mm^2$

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