KERALA AGRICULTURAL UNIVERSITY

**B. Tech. (Agrl. Engg.) 2022 & Previous Admissions**

**IV Semester Final Examination – July 2024**

**Iden.2205** **Design of Structures (1+1)** **Marks: 50**

**Time: 2 hours**

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

1. If a roof is sloping at 12°, imposed load to be considered in the design is .....kN/m2.
2. Minimum thickness of rolled steel flats available is ..... mm.
3. For rivet diameter ≥ 25mm, the size of rivet hole is kept .....mm more than size of rivet.
4. Bars larger than ..... mm diameter should not be bundled.
5. The ratio of lateral strain to the linear strain is called .....
6. One bag of cement generally used in India weighs ..... kg.
7. The unit weight of R.C.C is..... $N/m^3$.
8. Working Stress Method is based upon..... theory.
9. In the absence of data the approximate value of the total shrinkage strain may be taken as.....
10. Yield strength of mild steel is .....

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

1. Write the names of common steel structures.
2. Define pitch of the bolts with diagram.
3. In two-way slab, where the torsion reinforcement is provided?
4. What are the assumptions made in the design of bearing bolted connections?
5. What are retaining walls, and what are the key differences between cantilever and counterfort retaining walls?
6. Differentiate between singly R.C. Beam and doubly R.C. Beam.
7. Define Effective depth and effective cover.

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

1. What are the advantages and dis advantages of welded connections?
2. A one-way slab for a public building is 200 mm in overall thickness. It is simply supported on a span of 4 m. Determine the factored moment and factored shear force.
3. Find the longitudinal steel required in a column of size 400mm X 600mm subjected to an axial working load of 2000kN. The column has an unsupported length of 3m and is braced against side sway in both directions. Use M20 grade concrete and Fe415 grade steel.
4. State and explain different types of footings.
5. Determine weather RCC beam of size 300 X 600 mm is over reinforced or underenforced if $A_s$= 1200$mm^2$. M25 concrete and Fe450 steel is used in the section.
6. List the different modes of failures of a tension member.
7. Describe the functions of each component of Plate Girder.

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

1. Design the RCC roof slab of size 4.53m X 6.78m to the centre lines of brick masonry walls supporting the slab on all the four sides. The slab carries a superimposed load of 1.5 $kN/m^2$ and self-weight in addition to a 75mm thick weathering course with a unit weight of $20kN/m^3$. The slab is simply supported on all the four edges with corners free to lift. The materials used are M15 grade concrete and HYSD steel bars of grade Fe415.
2. What are the factors that influence the strength of tension members? Brief in detail.

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