Iden.2205　　　　　　　　Design of Structures (1+1)

Marks: 50

Time: 2 hours

1　A　**Fill in the blanks.**　　　　　　　　　　　　　　　　(10x1=10)

　　1　BIS was established by ....

　　2　ISI stands for ....

　　3　In case of deep foundation, the depth is ....than the width.

　　4　Modular ratio is equal to ....

　　5　...................... is the diameter of the hole for closed rivet.

　　B　**State True/False**

　　6　In case of shallow foundation, the depth is greater than its width.

　　7　ISO stands for Indian Organization for Standarization.

　　8　For compression member pitch should not exeed 12 t or 200 mm whichever is less.

　　9　Deep bins or silos have twice its breadth equal to its depth.

　　10　Unfinished bilts are manufactured from high carbon steel.

II　　　　**Write short notes/answers etc on ANY FIVE**　　　　(5x2=10)

　　1　Shallow bins or bunkers.

　　2　Live load and dead load.

　　3　Structural sections for steel.

　　4　Singly reinforced beam and doubly reinforced beam.

　　5　Merchant-Rantine formula.

　　6　Balanced and unbalanced section for singly reinforced beam.

　　7　Assumptions in the analysis of riveted joints.

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

1   Write all the conditions for failure of riveted joints.

2   Write advantages and disadvantages of welded connections.

3   A single riveted lap joint is used to connect plates 10 mm thick. If 20 mm diameter
rivets are used at 50 mm pitch. Determine the strength of joint and its efficiency.

Working stress in shear in rivets = 945 kg/cm^2

Working stress in bearing in rivets = 2125 kg/cm^2

Working stress in tearing in plates = 1500 kg/cm^2

4   Explain different types of welds (welded connections) with neat and clean diagrams.

5   Design a reinforced concrete beam subjected to a bending moment of 20 kN –m. Use M –
20 concrete and Fe 415 reinforcement. Keep the width of beam equal to half the effective
depth. For M 20 and Fe 415. C = 7 N/mm^2 and σ_{st} = 230 N/ mm^2. Here M = 13.33

6   The cross- section of a singly reinforced concrete beam is 300 mm wide and 400   mm,
deep to the centre of the reinforcement which consists of four bars of 14 mm diameter. If
the stresses in the concrete and steel are not to exceed 5 N/mm^2 and 140 N/mm^2,
determine the moment of resistance of the section. Take m = 18

7   A 300 mm × 300 mm R. C. member reinforced with 1257 mm^2 of steel supports an axial
compressive load of 400 kilonewtons. Calculate the stress in concrete and steel. Take m =
18

IV   **Answer any ONE of the following**   (1x10=10)

1   Define footing. Explain different types of footings with diagram.

2   Define retaining walls. Illustrate different types of retaining walls with diagram.

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