

TH1 STRUCTURAL DESIGN - I

Time- 3 Hrs

Full Marks: 80

Answer any five Questions including Q No.1 & 2
Figures in the right-hand margin indicates marks
IS 456 code book is allowed in the exam

2 x 10

1. Answer **All** questions
 - a. Define characteristic strength of material?
 - b. What is the value of modular ratio for M20 concrete and Fe415 steel?
 - c. Mention any two disadvantages of a singly reinforced beam over doubly reinforced beam?
 - d. What do you mean by M25 grade of concrete?
 - e. Write down the forms of shear reinforcement.
 - f. Write the IS code provision for effective width of flange for an isolated T-beam?
 - g. Differentiate between one way slab and two-way slab.
 - h. What is the minimum number of longitudinal reinforcement to be provided for a square column?
 - i. Mention two important purposes of providing stirrups in beams.
 - j. At which section critical bending moment is calculated for an isolated square footing supporting a concrete column?

5 x 6

2. Answer **Any Six** Questions
 - a. Find out the design constants (c,j,k) of a rectangular section by taking M25 grade of concrete and Fe415 grade of steel. (Use WSM)
 - b. Write down the assumptions made for flexure in limit state of design.
 - c. A singly reinforced concrete beam 250mm width is reinforced with four bars of 20 mm diameter at an effective depth of 400mm. Calculate the ultimate moment of resistance of the section in LSM if M20 grade of concrete and Fe 415 grade of steel is used.
 - d. A steel bar of 20mm diameter of Fe 415 is embedded in M25 grade concrete. Calculate its development length in tension and compression.