

5TH SEM/ CIVIL /2022(W)

Th-2 Structural Design-II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. What do you mean by efficiency of joint ?
 - b. What is the relation between yield strength and ultimate strength of bolt?
 - c. What is slenderness ratio?
 - d. Define local buckling.
 - e. What is web buckling and web crippling ?
 - f. What is the basic difference between bearing type and HSFG bolts?
 - g. What are the possible failure criteria for tension member?
 - h. Write full form of HFS &ERW ?
 - i. What is radius of gyration?
 - j. What is fillet weld ?
2. Answer **Any Six** Questions 6 x 5
 - a. State all the assumption taken for design of bearing bolts.
 - b. Select a suitable angle section to carry a factored tensile force of 170 KN assuming a single row of M20 bolts and assuming design strength as $F_y=250$ MPa.
 - c. What are the different types of beam sections used in design according to slenderness value?
 - d. What are the types of welds used in steel design explain with neat sketch.
 - e. Determine the plastic moment capacity and plastic section modulus of a symmetrical 'I' section having depth of section as 300mm and width 150mm. Thickness of flange is 14.2 mm and thickness of web is 8.1 mm about z-z axis.
 - f. A butt weld is used to connect two plates of 180mm x 18mm each. Find out the stress developed in the weld if it is subjected to a moment of 13000 KN mm.
 - g. Why tubular sections are preferred over other steel sections?
3. Design a lap joint between two plates each of width 120 mm, if thickness of one plate is 20mm and the other is 11 mm. The joint has to transfer a design load of 240 KN, the plates are of Fe410 grade use bearing type bolts of property class 4.6. 10
4. A tension member consists of a flat 120mm x 8mm is connected to a gusset plate of 12mm thick by 2 numbers of M20 bolts. If steel grade Fe410 and bearing bolts of property class 4.6 are used in field, determine the strength considering all failure criteria . 10
5. Calculate the factored axial load on the column section ISHB 400 @ 806.38 N/M. The height of column is 3.0 m and it is pin ended use steel of Fe410 grade. 10
6. Design a simply supported beam of effective span 1m carrying a factored concentrated load of 360KN at mid span. 10
7. Describe factors affecting the strength of a tubular section. 10