Total number of printed pages:02 **DEGREE/7TH/UCE 702**

2022

DESIGN OF STRUCTURES-II

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Assume suitably for any missing data

*Answer **any five** questions.*

1.	a)	What are the advantages of steel as structural material?	12
	b)	Explain, the different types of bolts used in steel connection?	06
	c)	What is limit state method of design?	02
2.	a)	Determine the strength of 20 mm dia. bolt of grade 4.6 for following cases. The main plate to be joined are 10 mm thick (a) Lap joint (b) Single cover butt joint, cover plate being 8 mm thick (c) double cover butt joint, cover plate being 8mm thick.	20
3.	a)	With neat sketches, explain the types of welds.	08
	b)	A tie member of ISMC 225@ 254.1 N/m is connected to either side of gusset plate of 10 mm thick. Design the welded joint to develop full strength of the tie, if the overlap is restricted to 275 mm.	12
4.	a)	What are the various modes of failure of tension member?	06
	b)	Determine the tensile strength of the plate 150 mm x 10 mm connected to 12mm thick gusset plate using M16 bolts. Grade of bolt is 4.6.	14
5.	a)	Explain, the failure modes of an axially loaded column.	08
	b)	Design a 4 m high column of rolled steel section of grade Fe 410 to support a service load of 600 kN. The column is effectively held in position and restrained against rotation at both the ends.	12
6.	a)	What is strut? And what the various types of struts?	07
	b)	A single angle discontinuous member ISA 100 mm x100 mm x10 mm with single bolt connection is 2.0 m long. Calculate the safe load carrying capacity of the section. If, it is connected by one bolt at each end and (a) if both ends are fixed and (b) if both ends are hinged.	13

7.	Design a simply supported beam of span 5 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The beam is subjected to a dead load of 18 kN/m (excluding self-weight) and imposed load of 25 kN/m. Assume Fe 410 grade steel.	20