GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEMESTER–VIII- EXAMINATION –SUMMER 2020

Subject Code: 2180610   Date:28/10/2020
Subject Name: Design of Steel Structure
Time:02.30 pm to 05.30 pm   Total Marks: 70
Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of IS 800:2007,IS:875 and Steel table is permitted.

Q.1	(a)	Explain effect of wind load on structure.	03
	(b)	Discuss various load combination for the design of steel structure.	04
	(c)	Find the maximum load inclined at 60^0 to the horizontal, Which the bracket can transmit , if 5 bolts of grade8.8 and 20 mm diameter are used to connect 10 mm thick plates to the flange of column.	07
Q.2	(a)	What are the application of plate girder?	03
	(b)	Distinguish between angle purlin and tubular purline.	04
	(c)	A beam ISMB 400 is connected to the flange of column ISHB 300. The beam is transferring and reacytion of 200kN. (Factored) and factored moment of 30 kN.m. Design suitable framed welded ,connection ,with fillet on both sides and top and bottom of beam.	07

OR

	(c)	Explain the hinge length and assumptions made in plastic analysis in detail.	07
Q.3	(a)	What are the various types of the stiffners.	03
	(b)	Which are the different types of the loads acting on Gnatry girder?	04
	(c)	Calculate wind load for the above purlin, if truss is constructed in Jaipur having upwind angle 20 .It has 10% permeability . The life ,class ,category, height and h/w ratio for the truss are 75 years,B, 2,18 m and 1.2 respectively. Ignore local effect.	07

OR

Q.3	(a)	Explain effect of earthquake load on structure.	03
	(b)	Write various types of truss girder.	04
	(c)	Write the design steps of channel/I-section Purlines.	07
Q.4	(a)	What is tension field action?	03
	(b)	Enlist different types of connections and explain any one with sketches.	04
	(c)	Explain in detail buckling of web plate.	07

OR

Q.4	(a)	Enlist various types of imposed loads on structures and describe any one.	03
	(b)	List the element of welded plate girder.	04
	(c)	Provide a suitable section for following data for Gantry Girder . No need to carry out the checks. A simply supported gantry girder to carry two electric ally overhead crane travelling with following details. 1.Crane capacity = 200 kN 2.Self weight of crane girder =200 kN 3.Wheel spacing =3.5 m 4.Weight of crab = 40 kN 5.Span of crane between rails = 15 m 6.Span of gantry girder = 7.5 m 7. Self weight of rail section= 300 N/m 8.Minimum hook approach =1.2 m 9. Take yield stress of steel =250MPa. Assume no lateral restraint along the span.	07

1

Q.5	(a)	Explain light moment connection.	03
	(b)	Define terms: (1) Shape factor (2) collapse load	04
	(c)	Design a cross beam for steel foot bridge for the following data:	07

Type of truss: warren type,
Span: 18 m ,Width of walk way: 4 m, Pannel length = 3m, Flooring = RCC slab 120 mm thick. Live Load: 5 kN/m2 .Assume Suitable data if required.

OR

Q.5	(a)	Explain the concept of plastic analysis and design.	03
	(b)	State the assumptions made in plastic design.	04
	(c)	Determine the collapse load for simply supported beam carrying a concentrated load W.	07

****