

USN

--	--	--	--	--	--	--	--	--	--

10CV82

**Eighth Semester B.E. Degree Examination, June/July 2019**  
**Design and Drawing of Steel Structures**

Time: 4 hrs.

Max. Marks:100

- Note: 1. Answer any ONE full question, each from PART-A and PART-B.**  
**2. Use of IS-800: 2007, and steel tables SP(6) are permitted.**  
**3. Missing Data, if any may be suitably assumed.**

**PART - A**

- 1 a. A secondary beam ISLB 400 @ 558.2 N/m is connected to a main beam ISMB 600 @ 1202.7 N/m with the top of their flanges not at the same level. The framed connection has the following details :  
Connecting cleat Angles 2 ISA 90×90×8mm Six bolts of diameter of 20mm are used to connect angles to web of secondary beam. Draw to suitable scale.
- i) Sectional elevation (08 Marks)
  - ii) Side view showing all details. (07 Marks)
- b. Column splice connection is made between bottom column ISHB 400@ 0.774kN/m and top column section ISHB 350 @0.674 kN/m. The thickness of bearing plate is 32mm two filler plates each of 25mm thick are provided for top column. The thickness of splice plate is 10mm. 6 No of 20mm diameter bolts are provided in two rows for connection between bottom column flange and splice plate each. 8 No of 20mm diameter bolts are provided in two rows for connecting each of top column flange, filler plate and splice plate such that 6 bolts connect the flange, filler plate and splice plate and the remaining 2 bolts connect only flange and filler plate. Assume pitch of bolts as 70mm. Draw to a suitable scale :
- i) Elevation (08 Marks)
  - ii) Side view (07 Marks)
- 2 a. A built up column consisting of Two-ISM 350@ 421N/m are placed back to back as the distance of 200mm. The members of built up column are connected by batten of ISF 60 × 10mm with spacing of 300mm C/C. Use suitable length of batten so as to accommodate the weld length of 200mm, and weld size of 6mm (fillet weld) on each side of the ISMC. Draw to a suitable scale :
- i) PLAN (06 Marks)
  - ii) Front elevation showing batten length (08 Marks)
- b. A Gusseted base for a column section ISHB 300@ is to be detailed with the following details :
- i) Base plate of size 800 × 800 × 20mm
  - ii) Web cleat 2 Nos ISA 80 × 80 × 8mm with 5mm fillet weld allround
  - iii) Gusset plate – 2 Nos – 800 × 16mm
  - iv) Flange plate – 2Nos – 800 × 300 × 12mm
  - v) Flange cleat angles – 2 No's 150 × 115 × 15mm (150mm to connect gusset plate)
  - vi) Bolts of 10No of 20mm diameter to connect angle, flange plate and gusset plate,  
Draw to a suitable scale
- i) FRONT VIEW (06 Marks)
  - ii) SIDE VIEW (05 Marks)
  - iii) TOP VIEW (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

**PART - B**

- 3 Design the top Chord member, bottom Chord member and Inner Chord member. Forces in the members under service load condition are presented in Table Q3 and in Fig Q3. Use class 4.6 bolts or diameter 16mm. Draw to suitable scale the following:
- Half elevation
  - Connection Details at  $L_0$  t  $U_2$

MEMBER	FORCES (MAX UNDER SERVICE LOADS)		
	DL (in KN)	LL (in KN)	WL (in KN)
Top Chord	-9.2	-8.2	37.0
Bottom Chord	+7.9	+7.0	-26.6
Inner Chord	+3.2	+2.8	-14.80

Table Q3

+ Ve Tension  
- Ve compression

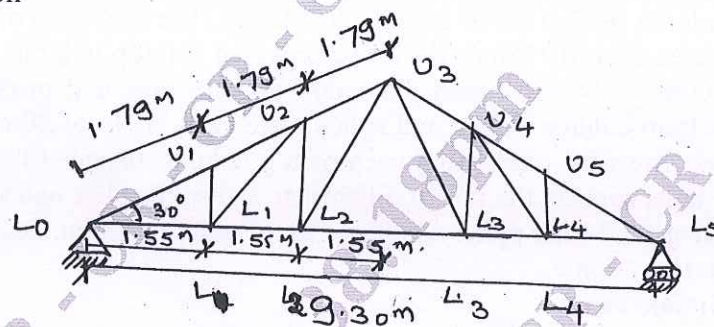


Fig Q3

- Design (40 Marks)  
Half elevation (20 Marks)  
Connection detail AT  $L_0$  t  $U_2$  (10 Marks)
- 4 Design a simply supported Gantry Girder for the following data. The Girder is electrically operated. Yield stress of steel  $250\text{N/m}^2$ . Use welded connection. (40 Marks)
- Span of crane girder (effective) = 20m
  - Effective span of Gantry Girder = 7m
  - Capacity of crane = 220kN
  - Self weight of crane excluding crab = 200kN
  - Weight of crab = 60kW
  - Wheel base distance = 3.4m
  - Minimum hook approach = 1.1m

Draw to a suitable scale :

- The C/S of gantry girder and its attachment to supporting column of the bracket (details of the column and bracket to be assumed) (10 Marks)
- Plan details (arrangement of columns, crane, gantry) (10 Marks)
- Side elevation. (10 Marks)

CMRIT LIBRARY  
BANGALORE - 560 037

\*\*\*\*\*