

**GUJARAT TECHNOLOGICAL UNIVERSITY****M.E Sem-II Remedial Examination December 2010****Subject code: 722007****Subject Name: Advanced Steel Structures****Date: 22 /12 /2010****Time: 02.30 pm – 05.00 pm****Total Marks: 60****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, relevant codes for loads and steel tables are permitted.

- Q.1** (a) An ISMB 600 is connected to a column by web cleats with a single row of bolts. If the reaction is 350 kN and there are four 20 mm diameter bolts through the web, as shown in **fig. 1**, check if the section is adequate for block shear failure. Assume design strength of web 250 MPa. **08**
- (b) Write short note on 'Moment Resistant Connections'. **04**
- Q.2** (a) Write short note on 'Seismic Force Resisting Systems'. **06**
- (b) Explain the design criteria of steel structures under fatigue load. **06**
- OR**
- (b) What are the general requirements for plastic design? Explain them. **06**
- Q.3** Find the collapse load for the frame of uniform cross section shown in **fig. 2**, under applied factored loads. Also find the minimum section required to resist applied loads. **12**
- OR**
- Q.3** (a) Using the plastic design, select suitable I section in Fe 410 grade steel for **fig. 3**. **06**
- (b) Write short note on 'Effect on shear force on plastic moment capacity'. **06**
- Q.4** (a) Explain the necessary checks to be performed while using plastic design for portal frames. **06**
- (b) List the various steps involved in the design of steel truss bridges for road ways. **06**
- OR**
- Q.4** (a) List the various steps involved in the design of steel truss bridges for rail ways. How it will differentiate with road ways. **08**
- (b) Explain in short P- $\delta$  effects and P- $\Delta$  effects. **04**
- Q.5** A non-sway column of multistoried building frame with flexible joints is 4 m high and subjected to the following load and moment:  
Factored axial load = 500 kN and  
Factored moment at the top of column = 27 kN.m  
Factored moment at the bottom of column = 45 kN.m  
Design suitable beam – column assuming  $f_y = 250 \text{ N/mm}^2$ . Take effective length of the column as 0.8L along both axes. **12**
- OR**
- Q.5** (a) Design the base plate for a wide flange section 310 x 310 x 143 multistoried building column subjected to a factored axial load of 450 kN and bending moment of 85 kN.m. Assume a M30 grade of concrete for foundation. **08**
- (b) Explain the different steps to be followed while designing a beam-column of multistoried building. **04**

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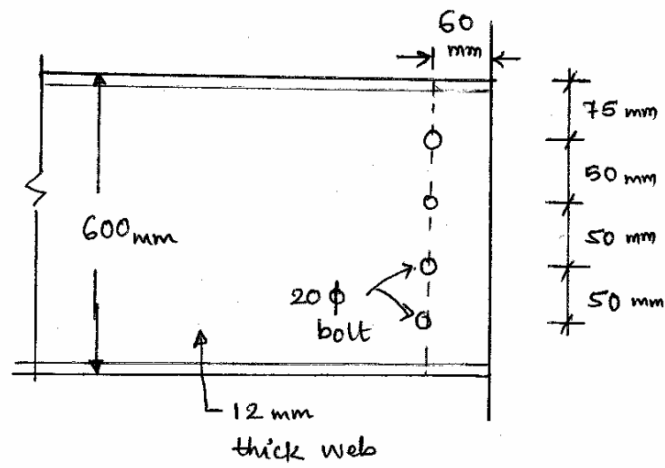


Fig. 1 (Q.1 (a))

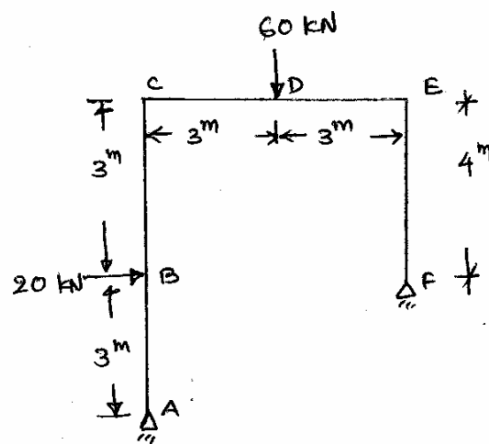


Fig. 2 (Q.3)

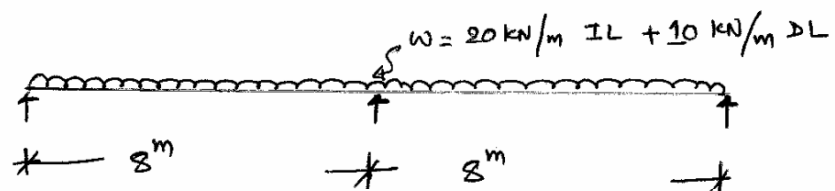


Fig. 3 (OR Q.3(a))

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