Registration No:

Total Number of Pages : 1   **M.TECH**
M.TECH 2ND SEMESTER (AR 17) SUPPLEMENTARY EXAMINATIONS, APRIL/MAY 2019
ADVANCED STEEL STRUCTURES
Branch: SE, Subject Code:MSEPE2042

Time: 3 Hours   **Max Marks : 70**

PART-A   **(10 X 2=20 MARKS)**

1. Answer the following questions.
- (a) Classify the types of moment resistant bases.
- (b) Differentiate between moment resisting plates and shear resisting plates.
- (c) Summarize the limitations of stress concentration factor.
- (d) Draw the sketch of split beam connections.
- (e) Define characteristic load.
- (f) How is economical spacing of roof trusses obtained?
- (g) What are girts?
- (h) Identify the loads that will act on the column of crane girder.
- (i) Write the fundamental conditions for plastic analysis.
- (j) Explain upper bound theorem.

PART-B   **(5 X 10=50 MARKS)**

Answer any five questions from the following.

2. (a) Describe in detail about the following: (i) lateral buckling of beams (ii) Compression member (iii) Flange Curling (iv) Wall Studs. [5]
   (b) A steel supported joist with a 4.0 m effective span of UDL of 50 KN over its span inclusive of its self weight. The beam is laterally supported throughout. Design the beam using working stress method steel of grade is Fe410. [5]

3. (a) A beam fixed at both ends is subjected to a uniformly distributed load 'w' on its right half portion. Identify the collapse load if the beam has uniform cross section. [5]
   (b) Write the formula and find the shape factor for the following sections (i) Square of side 'a' with its diagonal parallel to z-z axis (ii) Hollow tube section with its external diameter 'D' and internal diameter 'd' (iii) Triangular section of base 'b' and height 'h' . [5]

4. (a) A flat roof building of 18m span has 1.5m deep trusses at 5m centers. The total dead load is $0.7kN/m^2$ and the imposed load is $0.75kN/m^2$. Design the truss using angle sections with welded internal joints and bolted field splices. [5]
   (b) Discuss in detail about aseismic design of steel buildings. [5]

5. (a) An industrial building is made of 10 portal frames spaced 6m apart. The frame has a span of 20m and 4m rise with a column height of 6m above ground level. Assuming the column bases are hinged, discuss and design the frame for dead, live and wind loads as per IS875. [5]
   (b) Summarize the methods available for the analysis of roof trusses. [5]

6. (a) A 120mm diameter and 6mm thick pipe is fillet welded to a 14mm plate. It is subjected to a vertical factored load of 4.5kN at 1m from the welded end and a factored twisting moment of 1.8kNm. Examine and design the joint assuming shop welding and steel of grade fe410. [5]
   (b) Discuss briefly the following with neat sketches. (i) Bracing system in roof truss (ii) Connection of purlin to rafter (iii) Anchorages of truss with concrete column [5]

7. (a) Prepare the design of a column consisting of ISHB 350 @67.4 kg/m carries an axial load of 350KN and a bending moment of 100 KNm in the plane of web. Design the attached base for the column with the provision of anchor bolts to resist the bending moment. Take permissible bearing pressure on footing as $4N/mm^2$. [5]
   (b) Illustrate the following with sketches with reference to light-gauge sections (i) Stiffened and unstiffened compression elements (ii) Flat-width ratio? [5]

8. Write short notes on
   - (a) Design strength of bolt [5]
   - (b) Design considerations of steel structure [5]