Paper Code: STR-24A	**Roll No.**										

M.Tech.
(SEM II) EVEN SEMESTER EXAMINATION, 2015-16
SPECIAL TOPICS IN STRUCTURAL DESIGN

[Time: 3 hrs.] **[Max. Marks: 100]**

Note:-Attempt all questions. Each question carries equal marks. Assume any missing data (if required).

1. Attempt any two parts of the following: - **[10x2=20]**

(a) Explain the following term:-
- (i) Ductility Ratio
- (ii) Curvature Ductility
- (iii) Capacity Design
- (iv) Ductility in Earthquake Resistant Design
- (v) Pounding

(b) A three storey RC school building situated at Bhuj with the following data-

Plan Dimension	: 7m x 5m
Storey Height	: 3.15m
Total weight of beam in storey	: 130 kN
Total Weight of slab in storey	: 250 kN
Total Weight of Wall in storey	: 530kN
Total Weight of columns in Storey	: 50 kN
Live Load	: 130 kN
Weight of terrace floor	: 655 kN

The structure is resting on hard rock. Determine the total Base Shear and lateral load at each floor level for 5% of damping using seismic coefficient method.

(c) Write Down the Step by step procedure for seismic analysis of RC building. And draw the response spectra For Different type of soil.

2. Attempt any two parts of the following: - **[10x2=20]**

(a) How the spacing between trusses is determined .What is the Economic Spacing. Derive the relation among cost of truss, purling and roof covering for minimum overall cost of truss.

(b) Calculate the forces in all of the members of the truss using method of joints in Fig.1

(c) A warren girder consisting of 8m length, each span of 4 meter, loaded as shown. Determine the load in members by method of joints in Fig.2.

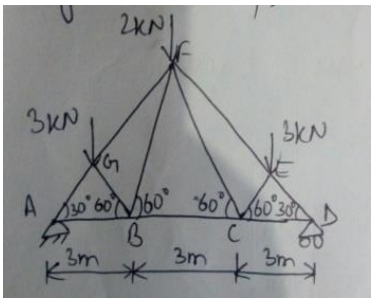


Fig.1

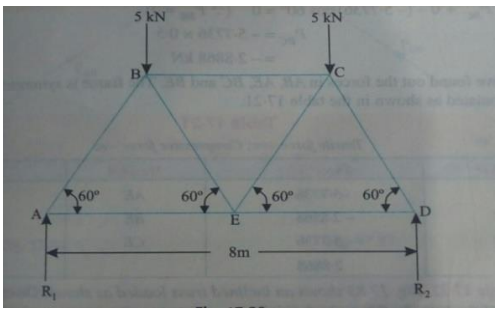
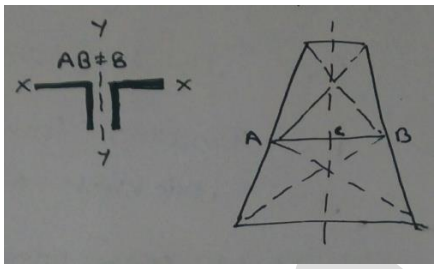


Fig.2

3. Attempt any two parts of the following: - **[10x2=20]**

(a) What are the terminologies used for designing the transmission tower. Give type of transmission tower and load acting on it. Briefly explain about tower design and describe various bracing system provided in the transmission tower with neat sketch.

(b) What is the formula for safe load carried by transmission tower according to IS 802 Part-1. What will the safe load carried by a twin angle bracing system used for horizontal member AB for length L= 8m. AB is made of two member 100 mm x 100 mm whose properties are given below . rxx=4.38 cm, ryy=3.05cm, area (A) =38.06 cm^2



(c) A microwave tower of 50 m height is proposed over a hill top the height of hill is 50 m with a gradient of 1:4 terrain category is 3 the tower is proposed at Lucknow compute the design wind pressure.

4. Attempt any two parts of the following: - **[10x2=20]**

(a) What are the design principles of plate girder bridges? Describe the design procedure of plate girder for most efficient economical size of web and flange.

(b) Design the following member of a deck type welded plate girder bridge to suit the given data and cross section of stream.

A- Web plate
B- Flange plate
C- Connection between flange and web

Given data: **-** span=30m, dead load=7.5 KN/m, live load for B.M.=2727KN L.L. for shear =2927KN. σb= 141 N/mm^2, τ =85N/mm^2

(c) What is bearing stiffener and how it is placed? Write some IS specification for their design.

5. Attempt any two parts of the following: - **[10x2=20]**

(a) Define steel chimney write about different type of chimney. Draw neat sketch of self supporting steel chimney. What are the different forces acting on steel chimney?

(b) Determine the forces acting on self supporting chimney and stress due to self weight and lining of steel chimney. Dia =6m, thickness of steel plate 12mm, density of steel=79 KN/m^3, height of chimney above section=60m, unit weight of brick lining =20 KN/m^3, outer diameter of chimney =8m, segmental height (h'=10m), wind pressure =.2317KN/m^2

(c) How many types of steel plates used in steel chimney and explain breech opening. Write about B.M. and permissible stress on self supporting chimney.