

Total No. of Questions : 8]

SEAT No. :

P1334

[Total No. of Pages : 3

[5157] -3002
Second Year B. Arch (End-Semester)
THEORY OF STRUCTURES -III
(2015 Pattern)

Time : 3 Hours]

[Maximum Marks : 70

Instructions to the candidates:

- 1) *Q.Nos.1 & 5 are compulsory. Solve any two questions from 2,3 & 4 and two from 6, 7 & 8.*
- 2) *Assume steel of grade Fe410/E250. Yield stress = 250N/mm².*
- 3) *Take permissible bending stress in steel as 165 N/mm² and permissible shear stress as 100N/mm².*
- 4) *Take permissible tensile stress in steel as 150 N/mm².*
- 5) *Take permissible bearing stress for bolt =300N/mm² and permissible shear stress for bolt as 100 N/mm².*
- 6) *Take permissible stress in weld = 108N/mm².*
- 7) *Use of Non-programmable Scientific calculator is allowed.*
- 8) *Allow use of steel tables.*

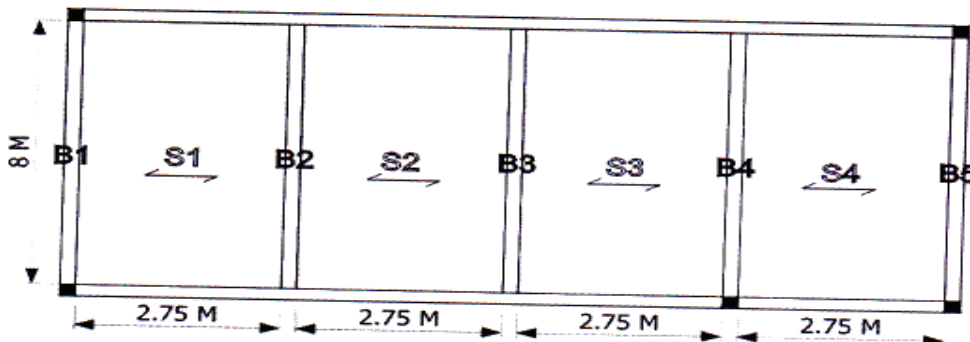
SECTION -I

Q1) As per the sketch below,

Given, RCC Slabs S1, S2, S3 & S4 -130mm.thk., Floor finish load =1.25 kN/m², Live load =3 kN/m².

- a) Calculate load on girder B3. [5]
- b) Design girder B3. [10]

Assume permissible bending stress as 165 N/mm² and permissible shear stress as 100 N/mm². Check for shear and deflection. Take allowable deflection as Span /300.



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- Q2)** a) What are the assumptions of Euler's theory? [3]
 b) Design a Stanchion for an effective length (L_e) 5m to take a load of 800kN. [7]

Q3) Answer any three of the following. [10]

- a) Write a short note on factor of safety and permissible stresses.
 b) Discuss the criteria w.r.t. load bearing structures-. i) opening in walls
 ii) Wall thickness
 c) Draw the BMD only for a 3 equal span continuous beam with a full UDL of w kN/m.
 d) Write a short note on snow load.
 e) Wind loads & reversal of stresses.

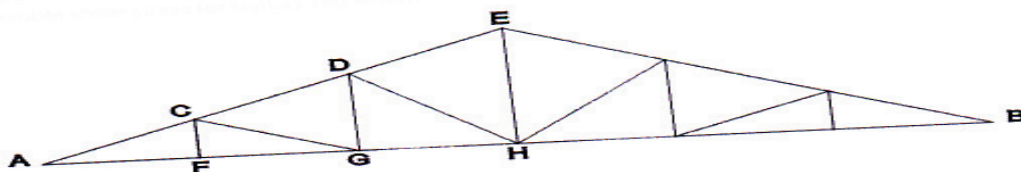
- Q4)** a) A fixed beam of span 9 m. carries an UDL of 20 kN/m and a central point load of 25 kN. Solve the fixed beam. [8]
 b) Write the formula for maximum deflection for a fixed with full UDL. [2]

SECTION -II

Q5) For the sketch below, assuming permissible tensile stress as 150 N/mm².

- a) Design the member AF for a tensile force of 125 kN. [9]
 b) Design the bolted connection also. [6]

Take permissible bearing stress for bolt =300 N/mm² and Permissible shear stress for bolt as 100 N/mm².



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Q6) a) An ISA 80×80×8 is used as compression strut 2.5 m long to carry a load of 100kN. It is welded to a gusset plate. Design the welded connection. Take permissible stress in weld as 108 N/mm². [6]

b) Explain any two of the following. [4]

i) Types of welded joints

ii) Disadvantages of riveted connections.

iii) Disadvantages of welded connections.

Q7) Answer any three of the following. [10]

a) How is load transferred across lintels? State any 3 cases.

b) Disadvantages of steel structures.

c) What are different rolled steel sections used in building construction? Explain with applications of each.

d) Common steel structures.

e) Write a short note on two hinged and three hinged arch.

Q8) a) A Hollow steel column with outer diameter 320mm & thickness 10 mm is 4.5m high. If it is fixed at one end & hinged at the other, determine the crippling load, it can take. [6]

Given, $E = 2 \times 10^5 \text{ N/mm}^2$

b) Explain shortly any 2 of the following: [4]

i) Requirement of connections in steel structures.

ii) Seismic load

iii) Live loads

