

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (CE) / (CIVIL) (PIT) (Sem.-6)
STRUCTURAL ANALYSIS AND DESIGN

Subject Code : PECE-603D-18

M.Code : 79403

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

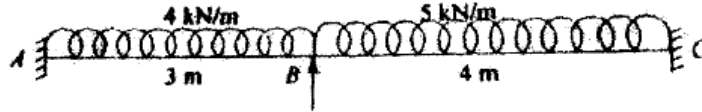
SECTION-A

1. Write briefly :

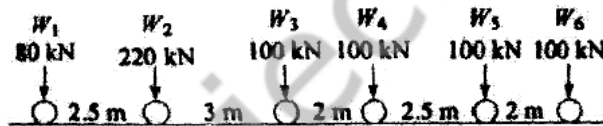
- a) What are the elements of plate girder?
- b) What are the different types of beam- columns connections?
- c) Write a note on slab base.
- d) What is column bracket?
- e) What are various types of stiffeners?
- f) Write down types of roof trusses.
- g) Write down different methods for the analysis of indeterminate structures.
- h) What are different types of liquid retaining structures?
- i) Differentiate between cantilever and counterfort retaining wall.
- j) Write down the design steps of the isolated foundation.

SECTION-B

2. Draw a neat sketch of the combined foundation. Also write down the steps to design it.
3. A continuous beam ABC of uniform section consists of spans AB and BC of lengths 3m and 4m respectively, the ends A and C being fixed. The spans AB and CD carry uniformly distributed loads of 4 kN/m and 5kN/m respectively. Find the support moments.



4. Suggest suitable dimensions and draw the pressure distribution diagrams for a counterfort retaining wall of height 6m above ground level. Also design the stem portion. The soil is having SBC 160 KN/m^2 with internal friction angle 30° . Density of soil is 16 KN/m^3 . Spacing of counter fort is 3 m C/C.
5. The load system shown in the figure moves from right to left on a girder of span 20 meters. Find the maximum shear force at a section 7.5 meters from the left end.



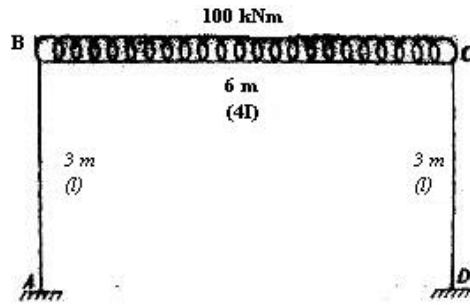
6. A non Sway column in a building frame with flexible joints is 4m high and subjected to the following load and moment:

Factored axial load 500kN, Factored moment at top of Column = 27kNm, Factored moment at bottom of column = 45kNm. Design a suitable beam column assuming Fe 250. Take the effective length of column as $0.8 L$ along both the axes.

SECTION-C

7. A Plate girder with Fe-450 steel plates is having $12\text{mm} \times 1800 \text{ mm}$ web plates and $75 \text{ mm} \times 550 \text{ mm}$ flange plates. Determine the design flexural strength if the un-restrained length is 10m.

8. Determine the moments at A, B, C, D for the portal frame loaded as shown in diagram



9. Design a reinforced concrete combined rectangular footing for two columns A and B located 3.6 m apart. The sizes of columns are 400 mm \times 400mm and 600mm \times 600mm and loads on them are 1000 kN and 1500 kN respectively. The projection of footing parallel to the length of footing beyond the axis of column A is limited to 590 mm. The SBC of soil is 280kN/m². Use M20 concrete and Fe415 steel.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.