TED (21)–3014 REVISION 2021

SREE NARAYANA POLYTECHNIC COLLEGE KOTTIYAM

THEORY OF STRUCTURES

SERIES-I

TIME -1hour **Maximum marks:20**

PART–A

(Maximum marks25)

I Answer all the following questions in one word or sentence, each questions carry 1 mark

1.	Algebraic sum of all the vertical forces to left or right of the section is called ..Shear force..	CO1	A
2.	At point of contra flexure the value of bending moment is.....0.....	CO1	A
3.	A beam with more than two supports is called..Continuous beam	CO1	R
4.	Name 3 types of load.	CO1	R

PART - B

II. Answer all questions, each question carry 3 marks

1.	Draw SFD and BMD of a cantilever beam AB = 6m, carrying a point load of 3t at its free end.	CO1	A
2.	Explain the sign conventions in drawing shear force diagram and bending moment diagram.	CO1	A
3.	Draw SFD and BMD of a simply supported beam AB = 8m, carrying point loads of 2t and 4t at 2m and 4m from end A.	CO1	A

PART – C

II. Answer the question below, carry 7 marks

1.	Draw SFD and BMD of a simply supported beam AB = 8m, carrying a point load of 2t at a point C which is 4m from end A, and a UDL of 2t/m from point C to B. Also calculate the maximum bending moment in the beam.	CO1	A

Series Test : 2	SREE NARAYANA POLYTECHNIC COLLEGE,KOTTIYAM CIVIL ENGINEERING	Total Marks - 20
Time - 1 Hr 10:30 AM to 11:30 AM	THEORY OF STRUCTURES (3014) Module II	08-11-2022

PART –A

(Answer all questions – each question carries 1 mark)

1. Define effective length of column	CO2	R
2. Define a short column	CO2	R
3. Define the term strut	CO2	R
4. State the relation between slenderness ratio and least radius of gyration	CO2	R

4 Marks

PART- B

(Answer any three questions – each question carries 3 marks)

1. State the different end conditions and corresponding Euler's crippling load for a long column	CO2	R
2. Illustrate the effective lengths of columns based on end conditions	CO2	A
3. A steel column of length 6m and dia. 100mm with one end fixed and the other end free . Find the buckling load capacity of column. Given $E = 2 \times 10^5$ N/mm²	CO2	A
4. Draw the elastic curve of a fixed beam due to external loading.	CO2	A
5.How Rankine's formula is applicable for both short and long column ?	CO2	A

3x3 = 9 Marks

PART- C

(Answer any one question – each question carries 7 marks)

1. A solid round bar 3m long and 50mm diameter is used as a strut. Determine crippling load for all the different end conditions, taking $E = 2 \times 10^5$ N/mm²	CO2	A
2. Explain the term limit of eccentricity and derive the expression for eccentricity for a solid circular section	CO2	U

7 Marks

Series Test : 2	SREE NARAYANA POLYTECHNIC COLLEGE,KOTTIYAM CIVIL ENGINEERING	Total Marks - 20
Time - 1 Hr 10:30 AM to 11:30 AM	THEORY OF STRUCTURES (3014) Module IV	07-12-2022

PART –A

(Answer all questions – each question carries 1 mark)

1. Define continuous beam	CO4	R
2. Define portal frame	CO4	R
3. Define carry over factors in moment distribution method	CO4	R
4. Define stiffness of a structural member	CO4	R

4 Marks

PART- B

(Answer any two questions – each question carries 3 marks)

1. State and explain the Clapeyron's theorem of three moments	CO4	R
2. Explain stiffness factor	CO4	U
3. Define the terms i) Fixed end moments ii) Distributed moments	CO4	R

3x2 = 6 Marks

PART- C

(Answer any one question – each question carries 10 marks)

1. A continuous beam ABC is simply supported at A and C . The span AB is 6m long and carry a central point load of 8 KN. The span BC is 5m long and carry a central point load of 10 KN . Find the support moment at B and draw the SFD & BMD.	CO4	A
2. A beam ABC is freely supported at A, B & C such that AB = 6m and BC = 4m. Span AB carries a UDL of 50 KN/m while span BC carries a point load of 100 KN at 3m from B. Draw SFD & BMD and indicate the salient values	CO4	A

10 Marks

Series Test : 2	SREE NARAYANA POLYTECHNIC COLLEGE,KOTTIYAM CIVIL ENGINEERING	Total Marks - 20
Time - 1 Hr 9:30 AM to 10:30 AM	THEORY OF STRUCTURES (3014) Module III	07-12-2022

PART –A

(Answer all questions – each question carries 1 mark)

1. Define the term deflection of a beam	CO3	R
2. Define pure torsion	CO3	R
3. Define the term Mohr's theorem I	CO3	R
4. Define elastic curve of a beam.	CO3	R

4 Marks

PART- B

(Answer any three questions – each question carries 3 marks)

1. Draw elastic curves for the following beams i) S S beam ii) Fixed beam iii) Cantilever beam	CO3	R
2. State and explain Mohr's theorems.	CO3	R
3. A cantilever beam 3m span carries a point load of 25KN at the end. Find the slope and deflection at the free end. E = 200 KN/mm^2 and I = 360 x 10^{6}mm^4. Use moment area method.	CO3	A
4. State the assumptions made while deriving the torsion equation.	CO3	R
5. Write three advantages of a fixed beam	CO3	R

3x3 = 9 Marks

PART- C

(Answer any one question – each question carries 7 marks)

1. A simply supported beam of span 6m is carrying two point loads. Each of 20 KN at 2m and 4m from the left end. Determine the slope at the end and deflection at mid span of the beam. EI of the beam is 20000 KNm^2. Use moment area method.	CO3	A
2. A hollow circular shaft of 25mm outside diameter and thickness of metal of 2.5mm is subjected to a torque of 60 Nm. Find the shear stress at the outer and inner faces of the cross section of the shaft	CO3	A

7 Marks