Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R5101

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Fifth Semester

R21UCE501- STRUCTURAL ANALYSIS II

Civil Engineering

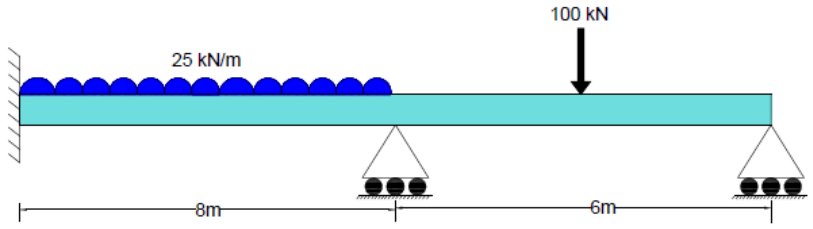
(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

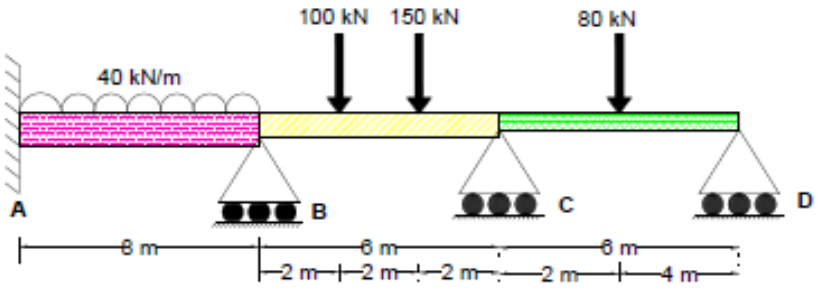
Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. List out the assumptions made for plastic analysis. CO1-U
2. Determine the working load for a simply supported beam of span 6 m subjected to udl, the plastic moment of resistance is 80 kNm. Take load factor is 1.5. CO2-App
3. List out the properties of the Stiffness matrix. CO1-U
4. Calculate the free moments for the continuous beam loaded as shown in fig. CO3-App



5. Why flexibility method is also called force method? Explain. CO1-U
6. Determine the fixed end moments for the continuous beam loaded as shown in fig. CO3-App



7. A suspension cable of horizontal span 200 m is supported at the same level and has a central dip of 20 m.Find the increase in dip of the cable if the cable is subjected to a rise in temperature 28^0c.Take thermal coefficient =$12x10^{-6}$ per ^{0}C. CO2-App

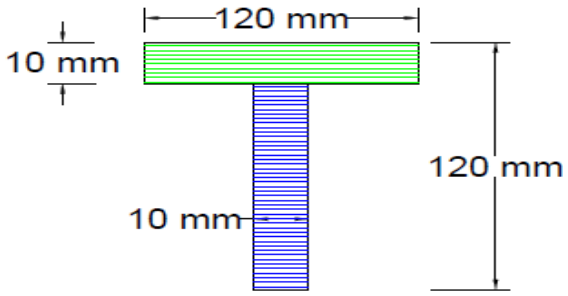
8. Explain the uses of suspension cable in constructions field. CO1-U

9. Differentiate cantilever method and portal fame method. CO1-U

10. List out the assumptions made in cantilever method. CO1-U

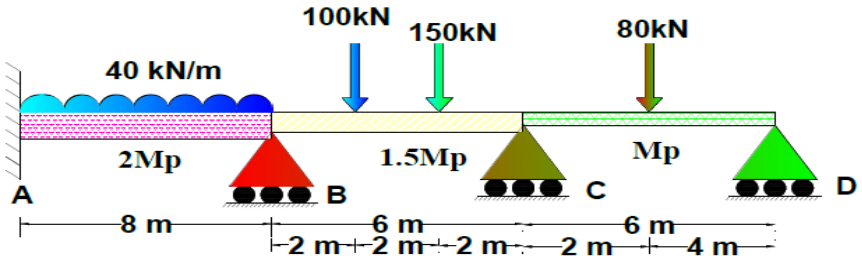
PART – B (5 x 16= 80 Marks)

11. (a) Determine the shape factor of the T section as shown in figure. CO2-App (16)

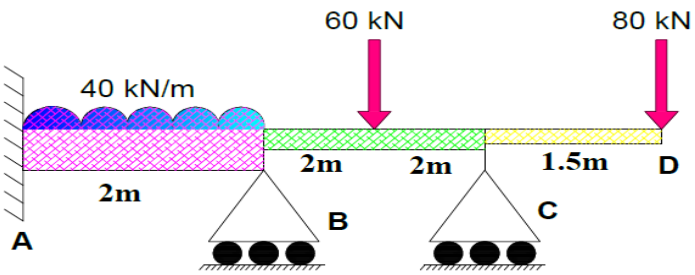


Or

(b) Determine the plastic moment of resistance for the three span continuous beam loaded as shown in figure. CO2-App (16)

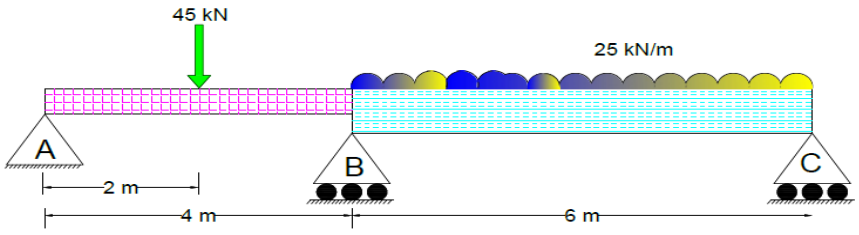


12. (a) Analyse the continuous beam loaded as shown in fig. by matrix stiffness method. Assume EI is not uniform throughout. Sketch the BMD CO4-Ana (16)



Or

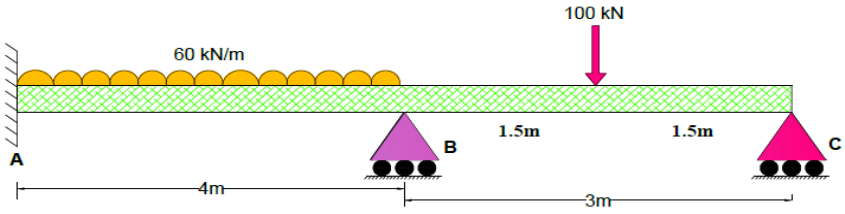
(b) Analyse the continuous beam loaded as shown in fig. by matrix stiffness method. Assume EI is not uniform throughout. Sketch the BMD. CO4-Ana (16)



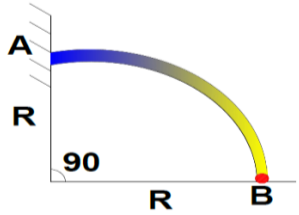
13. (a) Determine bending moments& support reactions for the two spans continuous beam of section is fixed at A hinged at B and C. Span AB is 4 m and BC is 3 m long. Span AB is loaded with uniformly distributed load of intensity 60 kN/m Span BC is loaded with mid span point load of 100 kN. Sketch the bending moment diagram using matrix flexibility method. CO3-App (16)

Or

(b) Analyse the bending moments & Support reactions for the two span continuous beam loaded as shown in fig. by Compatibility method. Assume EI is not uniform throughout. CO3-App (16)

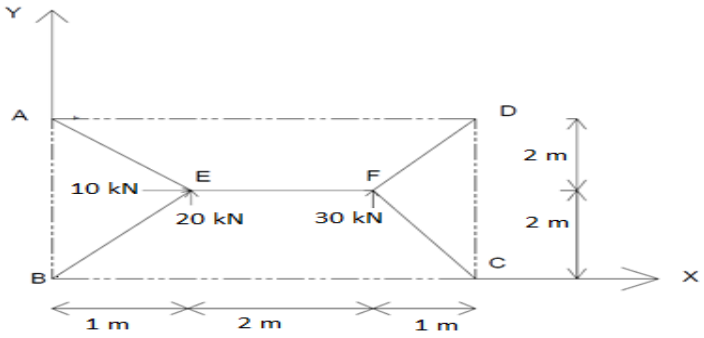


14. (a) A curved beam in the form of a quadrant of a circle of radius R and having a uniform cross section is in a horizontal plane. It is fixed at A and free at B as shown in Fig. It carries a vertical concentrated load W at the free end B. Compute the shear force, bending moment and twisting moment values and sketch variations of the above quantities. Also determine the vertical deflection of the free end B. CO4-Ana (16)

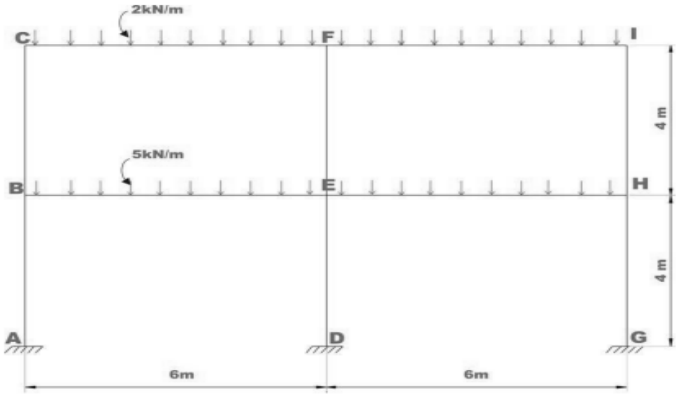


Or

(b) A Space frame shown in fig. is supported at A, B,C and D in a horizontal plane through ball joints. The members EF is horizontal and is at a horizontal and is at a height of 3m above the base. The loads at the joint E and F shown in fig act in a horizontal plane. Find the forces in all the members of the frame. CO4-Ana (16)



15. (a) Analyse the building frame shown in figure for vertical loads using approximate methods. CO5-Ana (16)



Or

(b) Analyse (approximately) the moment at the joints *E* and *C* caused by members *EF* and *CD* of the building bent in Fig. CO5-Ana (16)