

Enrolment Number: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.TECH MID SEM EXAMINATION
3rd SEMESTER
ACY-2022-23 (ODD SEM)

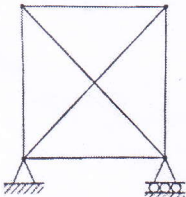
Subject Name (Code): ISM (203104215)

Branch: Civil Engineering

Date: 05/08/2022

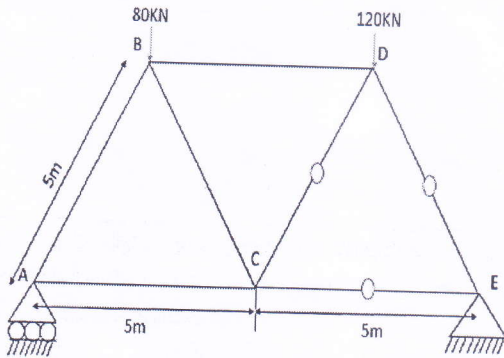
Time: 02:30PM to 04:00PM

Total Marks: 40

Sr. No.		Marks
Q.1	(A) One-line Questions 1) If $m = 2j - r$, then it is known as _____ truss. 2) The plane on which only normal stress is acting is known as _____. 3) At neutral axis bending stress is _____. 4) In the theory of simple bending, the bending stress in the beam section varies _____. 5) Methods used for analyzing the truss are _____.	05
	(B) Compulsory Question 1) Determine whether the given truss is perfect, imperfect or redundant truss.  2) Calculate resultant stress if normal stress is 56.53 N/mm^2 & tangential stress is 19.70 N/mm^2 . 3) Write flexure equation. 4) Moment of inertia of a circular section of diameter 'd' is _____. 5) In a cantilever truss it is very essential to find out the reactions before analyzing it. Agree or Disagree	05
Q.2	Attempt any four (Short Questions)	12
	(1) State the assumptions made in theory of simple bending.	
	(2) What do you mean by perfect and imperfect truss?	
	(3) A simply supported beam, rectangular in section 300 mm deep has span of 4 m. If bending stress is not to exceed 120 N/mm^2 , and $I = 8 \times 10^6 \text{ mm}^4$. Find the UDL per meter, which this beam can carry.	
	(4) The principal stresses at a point in a bar are 160 N/mm^2 tensile and 80 N/mm^2 compressive. Determine the normal, tangential and resultant stress on a plane inclined at 60° to the axis of the major stress using Mohr's circle of stresses.	
	(5) A cantilever beam of span 3m and 30cm x 60cm rectangular section carries UDL of 40 kN/m on entire span. Find maximum bending stress and draw stress distribution diagram.	
Q.3	Attempt any two	08
	(1) Enlist steps to find σ_n , σ_t & σ_R on inclined plane by Mohr circle when there are two like direct stresses acting in two mutually perpendicular dimensions.	
	(2) Draw figures for the following:	

1. When body is subjected to direct stress in one plane
2. When body is subjected to direct stress in two mutually perpendicular directions.
3. Only shear stress acting
4. Two direct stresses & shear stress acting

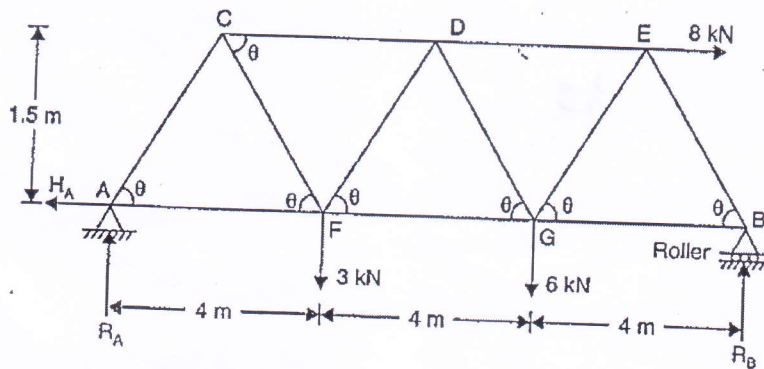
(3) Find forces in the members AB and AC by any method.



Q.4

(A) Determine the forces in the members AC and CD for the truss shown in the figure below.

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- (B) A rectangular block of material is subjected to a tensile stress of 110N/mm^2 on one plane and a tensile stress of 47N/mm^2 on the plane at right angles to the former. Each of the above stresses is accompanied by a shear stress of 63N/mm^2 . Find
- (1) the direction and magnitude of each of the principal stress
 - (2) magnitude of greatest shear stress

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OR

- (B) An I-section beam with overall width and depth as 100mm and 225mm respectively is subjected to a concentrated load W at a distance of 4m from right support of a simply supported beam of span 12m . The flange and web thickness are 11.5mm and 7.5mm respectively. If the maximum permissible bending stress is 80N/mm^2 , find the value of W .

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