BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: BARCH **SEMESTER : II**
BRANCH: ARCHITECTURE **SESSION : SP/2025**

SUBJECT: AR153 STATICS AND STRENGTH OF MATERIALS

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Explain the conditions of equilibrium of a body subjected to co-planar and concurrent system of forces?	[2]	1	2
Q.1(b)	The 20 kg homogeneous smooth sphere rests on the two inclined surfaces as shown in figure 1. Determine the reaction forces at the contact points A and B.	[3]	1	3

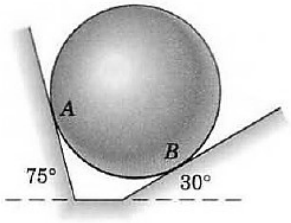

Figure 1

Q.2(a)	Explain resultant of a system of forces with example.	[2]	1	2
Q.2(b)	Determine and locate the resultant of the two forces and one couple acting on the beam as shown in Figure 2. The beam is fixed at left.	[3]	1	3

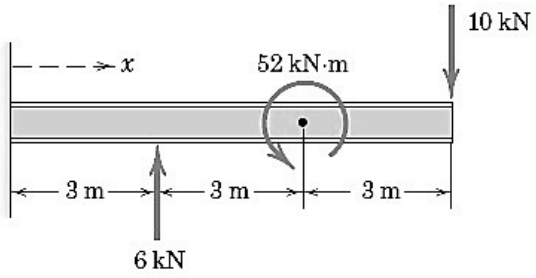

Figure 2

Q.3(a)	Explain the terms: Plane truss and Simple truss.	[2]	2	2
Q.3(b)	Calculate the forces acting through the members AD and DC of the truss shown in Figure 3. Use method of joints.	[3]	2	3

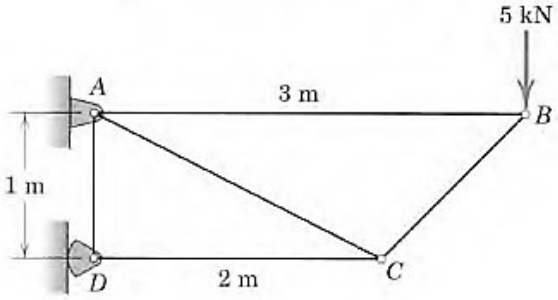

Figure 3

PTO

Q.4(a)	Illustrate the assumptions followed to analyze a plane truss problem.	[2]	2	3
Q.4(b)	Calculate the forces in members BC, BE, and EF of the truss shown in Figure 4. Use method of sections.	[3]	2	3

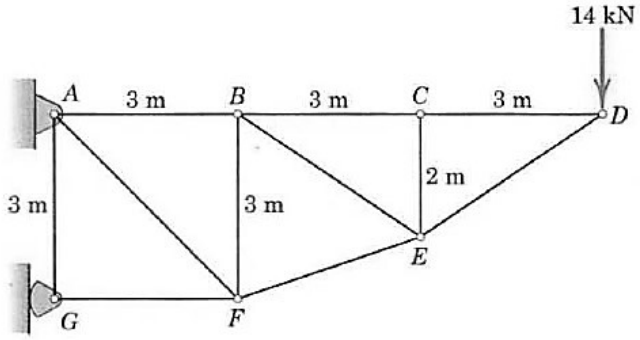

Figure 4

Q.5	Determine the location of the centroid of the area under the parabola about the x-axis as shown in Figure 5.	[5]	3	3

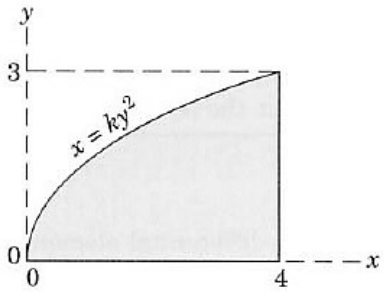

Figure 5

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