JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

B.Tech-3rd Semester (CE)

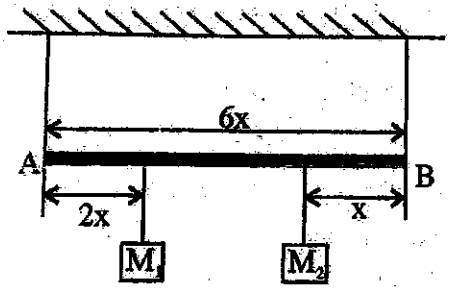
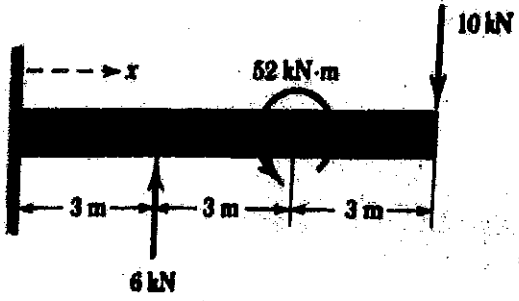
COURSE CODE (CREDITS): 25B11CE311 (4) MAX. MARKS: 15

COURSE NAME: ENGINEERING MECHANICS

COURSE INSTRUCTORS: DR SAURAV MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	A uniform long rod AB (Fig. 1) of length 6x weighing M is held horizontally by two strong vertical strings at its two ends. A weight of M_1 is hanging on the rod at a distance 2x from A and another weight M_2 ($M_2 > M_1$) is hanging at a distance x from end B. Find the ratio of tensions in the string at point A to that at point B. Given $M_1/M_2=\frac{3}{4}$ and $M/M_2=\frac{1}{3}$  **Fig. 1**	1	3
Q2	A cantilever beam of length 9m is subjected to loading conditions as shown in Fig. 2. Compute the reactions generated at fixed end.  **Fig. 2**	1	3
Q3.	A beam hinged at one end and roller on other end is subjected to following loading conditions as shown in the Fig 3. Calculate the support reactions generated if UDL is 5kN/m	1	4

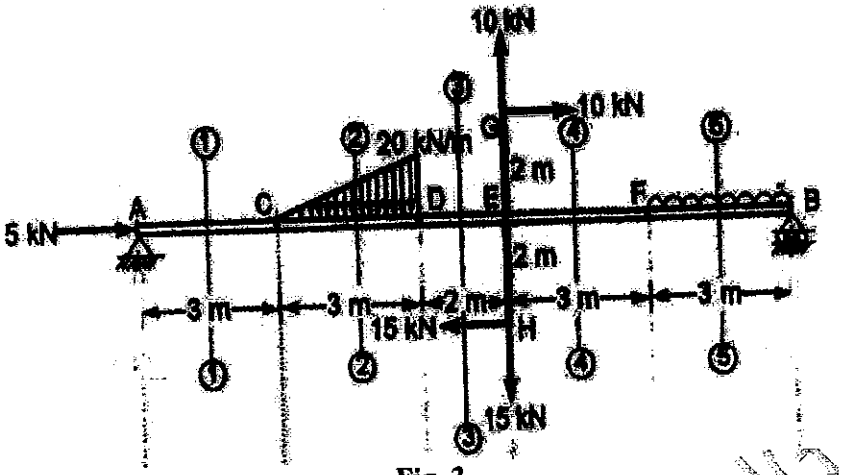


Fig. 3

Q4.	**Short answer types**	2	5

a) Explain the concept of resolution of a force into force and a couple.

b) Explain the concept of the moment of a force. How can it be represented both mathematically and geometrically?

c) What do you mean by a simplest perfect frame and a perfect frame? For the truss as shown below (Fig. 4) check whether the truss is perfect, deficient or redundant. Also find the degree of redundancy.

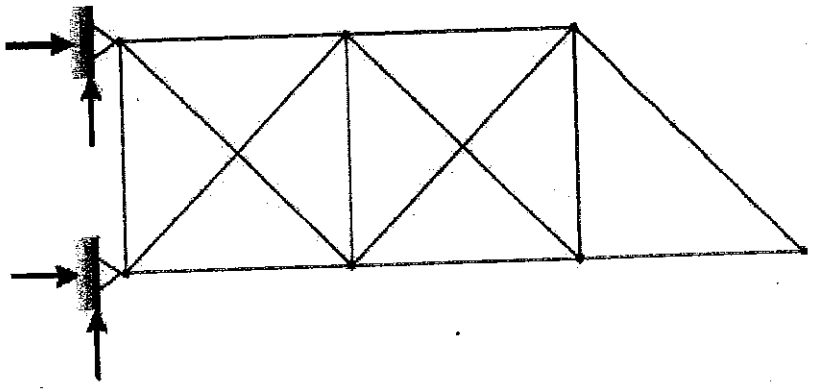


Fig 4