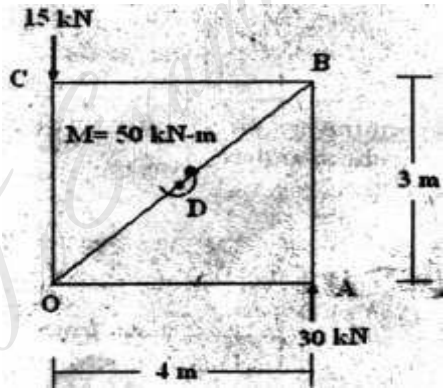
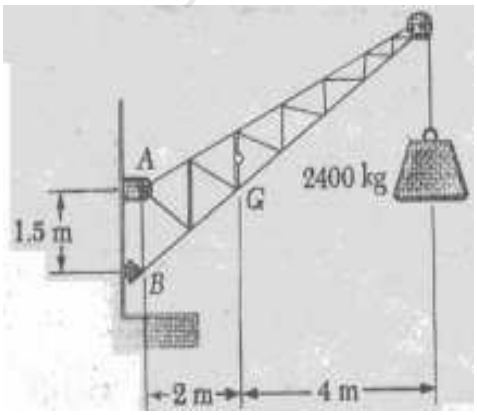
TML041/EE/20070812

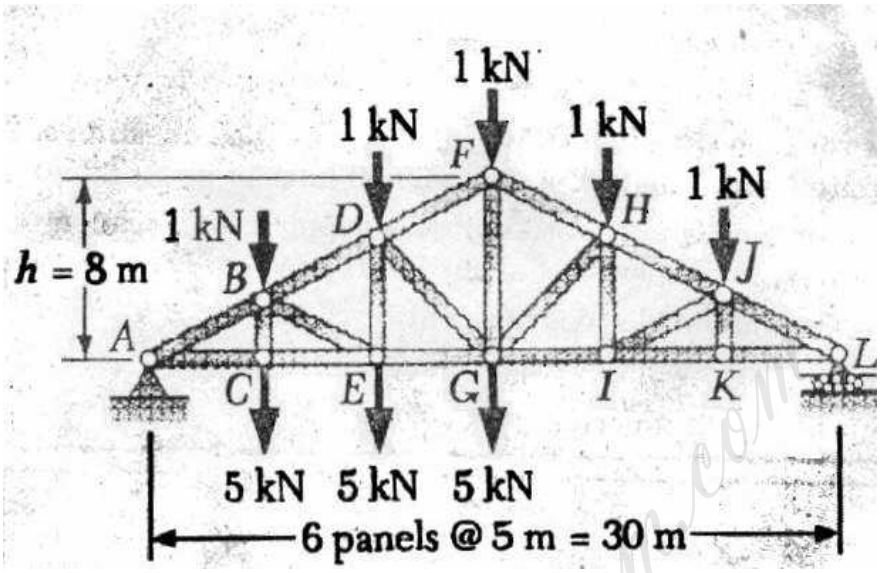
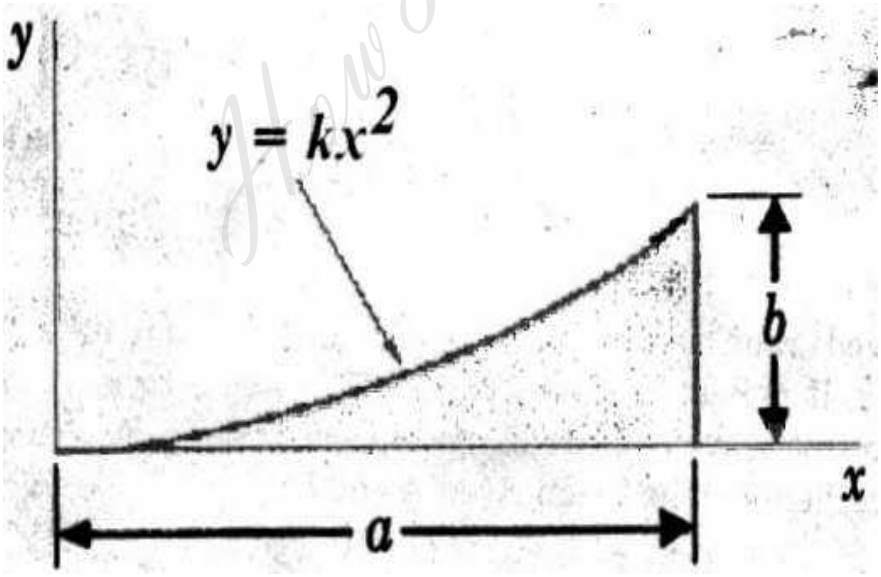
Engineering Mechanics - I

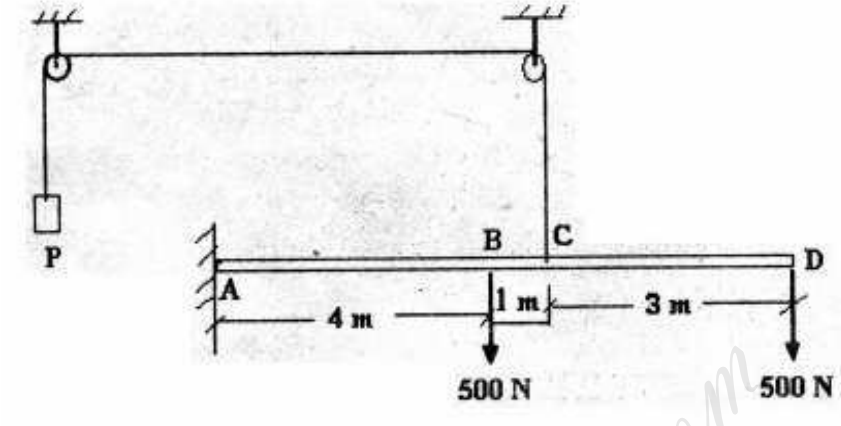
Time : 180 minutes **Marks : 100**

Instructions for the students :

1. All questions are compulsory.
2. "Long Answer type Question (LAQ)" is a supply type question of 20 marks, which require typical answer of about 60-80 lines in about 32-40 minutes.
3. "Short Answer type Question (SAQ)" is a supply type question of 5 marks, which require typical answer of about 15-20 lines in about 08-10 minutes.
4. Use of non-programmable type of scientific calculator is allowed.
5. Draw neat diagrams wherever necessary.
6. Assume suitable data if necessary.

Q. No.	Question (Q)	Question Marks
	Long Answer type Questions (LAQ's)	
1.	(a) Find the result of the following system acting on a body *OABC* shown in fig. 1. Find the points where the resultant cuts the *X* and *Y* axes. What is the distance of resultant from *O* ?  Fig : 1	**10**
	(b) A fixed crane has a mass of 1000 kg and is used to lift a 2400 kg crate. It is held in place by a pin at *A* and a rocket at *B*. The components of the reactions at A and *B*.  Fig : 2	**10**

2.	In the truss shown in fig. 3. Determine the force in members *FH*, *GH* and *GI*.  Fig : 3	**20**
3.	Determine by direct integration the location of the centroid of a parabolic spandrel.  Fig. : 4	**20**

4.	For the cantilever, determine range of values of load *P* for which the magnitude of the fixing moment at *A* does not exceed 400 kN-m. Refer Fig. 5.  Fig. : 5	**20**
	Short Answer type Questions (SAQ's)	
5.	State and prove the "Law of parallelogram of Forces".	**5**
6.	Distinguish between Moment of force and a couple.	**5**
7.	Explain : i) Cone of Friction ii) Angle of Repose	**5**
8.	Distinguish between Perfect truss, Deficient truss and Redundant truss.	**5**