

Ex/Arch/CE/T/114/2018(S)

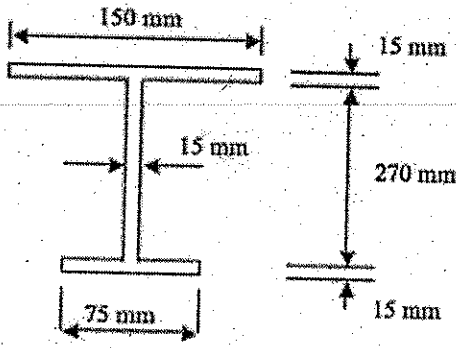
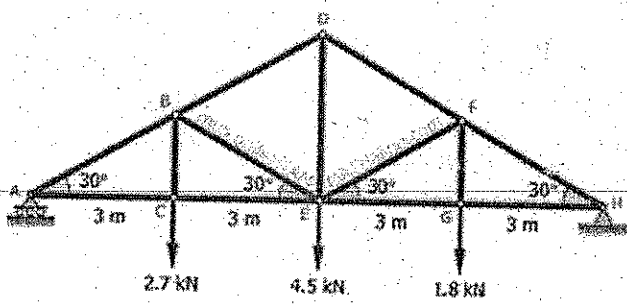
# Bachelor of Architecture - First Year - First Semester (Old) 2018

## Structural Mechanics I (Supplementary)

Time: Three Hours

Full Marks 100

[Assume reasonable values of any data not given but required for design.]

No. of questions	Answer any five of the questions.	Marks (5X20 =100)
1) a)	State and define parallelogram law of forces.	6
(b)	Define theory of perpendicular axis. What is couple?	6
(c)	Define the following with example Coplanar force, Collinear force, Concurrent force, Coplanar non-concurrent force.	8
2) a)	Write a short note on different kinds of truss.	6
b)	Find the moment of inertia of the following section (about C.G.). All dimensions are in mm. 	14
3	Solve the following truss by any one method. 	20
4(a)	State and prove theorem of parallel axis.	7
(b)	Describe different type of levers	5

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(c)	Write the basic differences among center of mass, center of gravity and centroid. Explain how center of gravity is determined of a body.	4+4
5)a)	An oil drum of 500 mm diameter and 3 m long is to be rolled across a footstep of 150 mm high. Find the minimum push required at the top of the drum. Take the density of the oil as 1 kg/litre. Neglect weight of the drum.	10
(b)	Derive the Moment of inertia of a circular hollow section of internal diameter 'd' and external diameter 'D'.	10
6 (a)	State and proof Lami's Theorem	5
(b)	The following forces act at a point. i) 50 N inclined at $20^\circ$ towards Northeast ii) 30 N towards North iii) 20 N towards North West iv) 40 N inclined at $40^\circ$ towards southwest. Find the magnitude and direction of the resultant forces. a) By analytically b) By graphically	6+9