

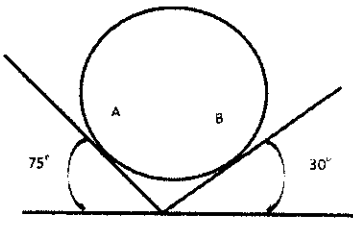
BACHELOR OF ARCHITECTURE FIRST YEAR FIRST SEMESTER EXAM 2018

STRUCTURAL MECHANICS I

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)	Define the following with example Coplanar force, Collinear force, Concurrent force, Coplanar non-concurrent force.	8
(b)	Define theory of parallel axis. What is couple?	5
(c)	Write the basic differences among center of mass, center of gravity and centroid. Explain how center of gravity is determined of a body.	3+4
2 (a)	State and define parallelogram law of forces.	5
(b)	The following forces act at a point i) 50 kN inclined at 20° towards Northeast ii) 80 kN towards North iii) 90 kN inclined 45° from West iv) 1200 kN inclined 45° from South Find the magnitude and direction of the resultant forces. a) By analytically b) By graphically	6+9
3) (a)	State and proof Lami's Theorem	10
(b)	A 20 kg homogenous smooth sphere rests on two inclined planes as shown in following figure. Determine the contact force A and B. 	10

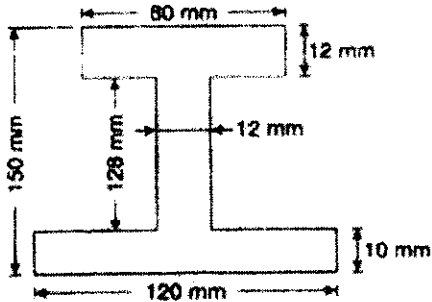
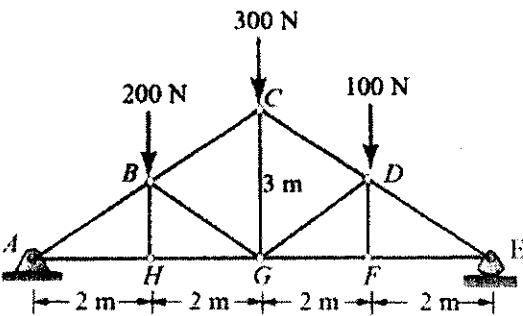
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4) a)	Write a short note on different kinds of truss.	6
b)	Find the moment of inertia of the following section (about C.G.). 	14
4) (a)	Solve the following truss by method of joint. 	15
(b)	Find the member force of BG of the above truss by method of section.	5
5) (a)	State and prove <i>theorem of perpendicular axis</i> .	10
(b)	Derive the Moment of inertia of a triangular section of base b and height h.	10
6) a)	A compound lever as shown in following figure is required to lift a heavy load W. Find out the value of W, if an effort (F) of 10 kN is applied at A.	10

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Marks 10

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		4
b)	<p>Find the support reaction of the following beam, If the moment M is applied at mid-point of the beam.</p>	6
c)	<p>Describe different type of levers.</p>	