

Manipal Institute of Technology, Manipal



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(A Constituent Institute of Manipal University)

V SEMESTER B.TECH (AERONAUTICAL AND AUTOMOBILE ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: AUTOMOTIVE CHASSIS AND SUSPENSION [AAE 355] REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ANY FIVE FULL the questions.
- ✤ Missing data may be suitable assumed.
- 1A. What are the functions of chassis frame?
- **1B.** Mention the different layouts of an automobile with reference to power plant **(03)** location.
- 1C. The load distribution between the front and rear axle of a motor vehicle weighing 1350 kgs is that 48% of the total load is taken by the front axle. The width of the track is 140 cm and the distance between the centers of the spring pads is 66 cm. Design a suitable I-section for the front axle assuming that the width of the flange and its thickness are 0.6 and 0.2 of the overall depth of the section respectively and the thickness of the web 0.25 of the width of the flange. Assume a working stress of 915 kg/cm².
- 2A. Mention the parameters which affect the braking efficiency and stopping (02) distance.
- **2B.** With a neat sketch, briefly explain the Sliding caliper Disc brake system. **(03)**
- 2C. A truck has a wheel base of 4.2 m and weight 67000 N, 75% being of the rear axle. Its center of gravity is 1.1 m above the ground. If the brakes produce a deceleration of 3 m/s². Find the weight transferred from the rear to the front axle. Assume brake torques at all wheels to be equal and wheels to be of the same size, what is the braking effort at each wheel? What is the minimum value of adhesion to permit the above deceleration without skidding? When the truck is moving on a road with coefficient of adhesion 0.6, what is the theoretically possible deceleration, assuming all four wheels to lock simultaneously?
- **3A.** Write the purpose of servo-brakes in an Automobile. (02)
- **3B.** Briefly explain the working principle of Tandem master cylinder

(03)

3C.	A motor car has wheel base of 2.7 m and the height of its C.G above the ground level is 0.6m and it is 1.1 m in front of rear axle. If a car is traveling at 50 km/hr on level track, determine the minimum distance in which the car may be stopped when: a) Rear wheels are braking, b) Front wheels are braking, c) All wheels are braking. (μ =0.6)	(05)
4A.	Explain with neat sketch Re-circulating ball type steering gears box.	(05)
4B.	Explain parallel type steering linkage.	(03)
4C.	A motor car has a wheelbase of 2.75 m and pivot center of 1.08 m. The front and rear wheel track is 1.23 m .Calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels ,the angle of inside lock is 40°.	(02)
5A.	Classify and explain different types of spring used in automobile.	(04)
5B.	Write characteristics of suspension system for automobiles.	(04)
5C.	Explain the following terms: (1)Brake dip (2) Unsprung weight	(02)
6A.	The front mounted engine rear wheel drive is said to be well balanced. Why?	(02)

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6B.	Explain different types of wheel design.		(04)

6C. Explain tyre rotation for Cars with a neat sketch. (04)

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