MANIPAL INSTITUTE OF TECHNOLOGY



(A constituent unit of MAHE, Manipal)

JIPAL

VI SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

MAKEUP EXAMINATIONS, June 2018

SUBJECT: AUTOMOTIVE CHASSIS & SUSPENSION [AAE 3252]

REVISED CREDIT SYSTEM (18/06/2018)

Time: 3 Hours

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MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitable assumed.

1A.	How the automotive chassis frame are classified.	(03)
1B.	State the requirements and function of steering system.	(03)
1C.	The distance between the kingpins of a car is 130 cm. The track arms are 15.25 cm long and the length of the track rod is 120 cm. For a track of 142 cm and a wheel base of 285 cm, find the radius of curvature of the path followed by the near side front wheel at which correct steering is obtained when the car is running to the right.	(04)
2A.	A truck has a wheel base of 4.2 m and weight of 70,000 N. The weight carried by the rear wheel is 75% of the total weight. The center of gravity is 1.1 m above the ground. If the brakes produce a deceleration of 7 m/s^2 , determine the weight transferred from the rear to the front axle. Determine the minimum value of adhesion to allow the above retardation without skidding. Assume brake to be applied to all wheels lock simultaneously and are at impending slip during braking period.	(04)
2B.	List the factors that affects brake effectiveness.	(02)
2C.	Explain the construction and working of leaf and rubber springs.	(04)
3A.	Define the following terms (1) Camber (2) Castor (3) Included angle.	(03)
3B.	What is Semi-active Suspension?	(02)
3C.	Discuss the constructional details of (1) rack and pinion and (2) recirculating ball type steering gear box.	(05)

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4A.	An automobiles chassis consider as a simply supported beam is 9 m long and has uniformly distributed load of 2.25 kN/m for 4.4 m from the front support. The power train load is measured as a point load of 6 kN acting at 6 m from the front end support on the chassis. Calculate the maximum bending moment .Draw the shear force and bending moment diagram as well.	(05)
4B.	List different types of wheels used in automobile and explain the construction of Disc wheel.	(03)
4C.	List the factors that affect tyre life.	(02)
5A.	With the help of diagram explain Vacuum Brake System.	(04)

- **5B.** Explain any four characteristics that should be considered while designing an aluminum wheel. (04)
- **5C.** Write difference between fully floating and three quarter floating type of front axle. (02)