CBCS SCHEME

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18AU61

Sixth Semester B.E. Degree Examination, July/August 2022
Automotive Chassis and Suspension

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Classify and explain chassis frames. **(08 Marks)**

b. With a neat sketch, explain the layout of a four wheel drive automobile. **(08 Marks)**

c. State the advantages and disadvantages of front wheel drive. **(04 Marks)**

OR

2 a. With the help of sketch, explain different loads acting on chassis frame. **(08 Marks)**

b. Explain: (i) Sub frames (ii) Frame defects **(08 Marks)**

c. Briefly explain front engine-front wheel drive. **(04 Marks)**

Module-2

3 a. With a neat sketch, explain Rack and Pinion type of steering gear. **(10 Marks)**

b. Explain the following terms:
(i) Camber (ii) Castor (iii) King pin inclination (iv) Toe in **(08 Marks)**

c. State the advantages of power steering over manual steering system. **(02 Marks)**

OR

4 a. State the functions of steering system. **(05 Marks)**

b. A track has pivot pins 1.37 m apart. The length of each track arm is 0.17 m and the track rod is behind the front axle 1.17 m long. Determine wheel base which will give true role all wheels when car is turning, so that inner wheel stub axle is 60° to the center line of the car. **(07 Marks)**

c. With a neat sketch explain the types of stub axle. **(08 Marks)**

Module-3

5 a. What is the need of differential in automobile? Discuss working principle of differential with a neat sketch. **(10 Marks)**

b. Two shafts A and B, whose axes are intersecting but inclined to each other at 15° are connected by means of a Hooke's joint. A flywheel of weight 180 kN and radius of gyration 80 mm is fitted to shaft B. If the shaft A rotates at uniform speed of 2000 rpm, what is the maximum torque in B? **(06 Marks)**

c. Write a short note on propeller shaft. **(04 Marks)**

OR

6 a. Explain semi floating and full floating axle with a neat sketch. **(08 Marks)**

b. Explain Hotchkiss drive with neat sketch. **(08 Marks)**

c. Briefly explain final drive. **(04 Marks)**

Module-4

7 a. With a neat sketch, explain the working principle of vacuum servo brake. **(08 Marks)**

b. A car weighs 13 kN and has a wheel base of 2.5 metres. The centre of gravity of the car is 1.2 m in from of the rear axle and 800 above the ground level. The car is having brakes on all four wheels. The coefficient of adhesion between the road and the wheels is 0.5. If the car is moving up an incline of angle whose sine is equal to 0.1, calculate:

(i) Load distribution between front and rear axles

(ii) Distance at which it can be stopped while going at a speed of 50 km/hr when only rear wheel brakes are used. **(08 Marks)**

c. Explain parking and emergency brakes. **(04 Marks)**

OR

8 a. With a neat sketch, explain the working of Master Cylinder. **(08 Marks)**

b. With a neat sketch, explain working of disc brakes. Also mention its advantages over drum brakes. **(08 Marks)**

c. Briefly explain requirements of brake fluid. **(04 Marks)**

Module-5

9 a. With a neat sketch, explain wishbone type suspension. **(07 Marks)**

b. Sketch and explain the working of telescopic shock absorber. **(08 Marks)**

c. State the advantages of independent suspension over rigid axle suspension. **(05 Marks)**

OR

10 a. With a neat sketch, explain disc wheel. **(06 Marks)**

b. State the functions of tyre and briefly explain desirable properties of tyre. **(08 Marks)**

c. Briefly explain the advantages of tubeless tyre over conventional tube tyre. **(06 Marks)**

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