CBCS SCHEME

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15AU61

Sixth Semester B.E. Degree Examination, June/July 2019
Automotive Chassis and Suspension

Time: 3 hrs. Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Draw the neat Figures wherever necessary.

Module-1

1 a. Explain with neat sketch, layout of four wheel drive vehicle. Mention its advantages and disadvantages. **(08 Marks)**

b. Derive the expression for stability of a vehicle on a slope. **(08 Marks)**

OR

2 a. Draw a layout of a typical chassis frame show all the components mounted on it. **(08 Marks)**

b. What are the various loads acting on the chassis frame? What are the different cross sections used for the construction of chasses frame? **(08 Marks)**

Module-2

3 a. What is perfect steering? Derive expression for the basic condition for a perfect steering mechanism. **(08 Marks)**

b. Sketch and explain the factors of wheel alignment. **(08 Marks)**

OR

4 a. Explain:
i) Camber
ii) Caster
iii) Kingpin inclination
iv) Scrub radius. **(08 Marks)**

b. The front wheel at a car has pivot centers 1.1m apart. The length at each steering arms is 150mm, while the track rod is of 1.0m length. Calculate the wheel base for perfect rolling of car wheels when the inner wheel stub axle is at 55° to the rear centerline. **(08 Marks)**

Module-3

5 a. Derive the expression for a velocity ratio in a Hooke's joint. **(06 Marks)**

b. Sketch and explain rear axle drives. **(10 Marks)**

OR

6 a. What is the need of differential in automobiles? Discuss the working principle of differential. **(10 Marks)**

b. Sketch and explain Hotchkiss drive used in Automobiles. **(06 Marks)**

Module-4

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

b. A car weighs 13kN and has a wheel base of 2.5meters. The centre of gravity of the car in 1.2m infront of the Rear axial and 800mm above the ground level. The car is having brakes on all four wheels. The coefficient of adhesion between the road and the wheel is 0.5. If the car is moving up as incline of an angle whose sine is equal to 0.1, calculate:
   i) Load distribution between front and rear axles
   ii) Distance at which it can be stepped while going at a speed of 50km/hour, when only rear wheel brakes are used. **(08 Marks)**

OR

8 a. Draw and explain working of pneumatic brakes (air brakes) used in automobiles. **(08 Marks)**

b. What is the function of hill holder in automobiles? Explain its working with neat sketch. **(08 Marks)**

Module-5

9 a. What is the purpose of independent suspension? How it is achieved in front and rear axles? Explain with sketches. **(08 Marks)**

b. Explain with neat sketches:
   i) Hydraulic suspension
   ii) Rubber suspension. **(08 Marks)**

OR

10 a. Describe with sketches, the construction of
   i) Disc wheel ii) Wire wheel **(08 Marks)**

b. Compare the merits and demerits of Tubeless tyres. **(08 Marks)**

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