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10AU61

# Sixth Semester B.E. Degree Examination, June/July 2016
## Automotive Chassis and Suspension

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***





### PART – A

1 a. With a neat sketch, explain the transmission system in four wheel drive. **(08 Marks)**
b. Derive the weight distribution in case of three wheeled vehicle. **(08 Marks)**
c. Write advantage and disadvantage of front wheel drive. **(04 Marks)**

2 a. With a neat sketch explain the box section type of car frame. **(08 Marks)**
b. Write the materials and loads acting on the frames. **(06 Marks)**
c. Write a note on :
i) Sub frame
ii) Frame stresses
iii) Frame sections. **(06 Marks)**

3 a. Explain the terms : i) castor ii) camber iii) toe in iv) toe out. **(08 Marks)**
b. With a neat sketch explain the working principle of worm and wheel steering gear. **(08 Marks)**
The steering wheel diameter of a car using rack and pinion type of steering gear is 300 mm.
c. Calculate the pitch circle diameter of the pinion to overcome a resistance of 1 kN, with an effort of 50 N applied at the steering wheel. **(04 Marks)**

4 a. With a neat sketch explain the working principle of differential. **(08 Marks)**
b. Explain Hotchkies drive with neat sketch. **(08 Marks)**
c. Write a note on whirling of propeller shaft. **(04 Marks)**

### PART – B

5 a. Write the comparison of disc and drum brakes. **(06 Marks)**
b. Write the different requirements of brake fluid. **(06 Marks)**
c. With a neat sketch, explain the working of Disc brake with fixed caliper. **(08 Marks)**

6 a. With a neat sketch, explain the working principle of vacuum servo brake. **(10 Marks)**
b. Sketch of explain the working principle of disc brake with servo action. **(10 Marks)**

7 a. Explain the working of telescopic type of shock absorber. **(10 Marks)**
b. Write a short note on :
i) Wishbone type suspension
ii) Torsion bars. **(10 Marks)**

8 a. Briefly explain the wire wheel with neat sketch. **(08 Marks)**
b. Write the desirable properties of tyre. **(06 Marks)**
c. Write the comparison between radial and bias ply tyres. **(06 Marks)**

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## Automotive Chassis and Suspension

Time: 3 hrs. Max. Marks:100

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### PART – A

1 a. In brief explain classification of automobiles. **(10 Marks)**

b. Draw and explain transmission system for four wheel drive vehicle. **(10 Marks)**

2 a. With help of neat sketch, explain different loads acting on chassis frame. **(10 Marks)**

b. What are the different cross-sections used for chassis frame? Explain. **(06 Marks)**

c. What do you mean by torque reaction? Explain. **(04 Marks)**

3 a. Explain construction of front axle. **(06 Marks)**

b. Explain following with neat sketch:
i) Camber ; ii) Castor ; iii) King pin inclination; iv) Toe-in and Toe-out. **(08 Marks)**

c. A track has pivot pins 1.37m apart, the length of each track arm is 0.17m and the track rod is behind the front axle and 1.17m long. Determine the wheel base which will give true rolling for all wheels when car is turning, so that the inner wheel stub axle is 60° to the center line of the car. **(06 Marks)**

4 a. What is the need of differential in automobile? Discuss working principle of differential. **(08 Marks)**

b. Sketch and explain Hotch Kiss drive used in automobile. **(06 Marks)**

c. Explain construction of semi-floating and full floating rear axle with a neat sketch. **(06 Marks)**

### PART – B

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

b. List the desirable properties of brake fluid. **(04 Marks)**

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

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

b. A motor car weighs 13341.5N and has wheel base of 2.65m. The C.G. is 1.27 behind the front axle and 0.76m above the ground level. Maximum braking on all four wheels on level ground will bring the vehicle uniformly to rest from a speed of 64 kmph in a distance of 25.9 met. Calculate the value of adhesion between tyre and the road.
Under same condition, a vehicle descends a hill of gradient 1 in 20 and is braked on front wheel only. Determine the load distribution between front and rear wheels and the distance required to bring the car to rest. **(12 Marks)**

7 a. With neat sketch, explain construction of leaf spring. **(06 Marks)**

b. Write the advantages of independent suspension as compared to rigid axle suspension system. **(04 Marks)**

c. Draw and explain construction and working of hydraulic shock absorber. **(10 Marks)**

8 a. Write various requirements of automobile wheel. **(06 Marks)**

b. Explain construction of radial ply tyre with neat sketch. **(06 Marks)**

c. Explain various factors affecting tyre life. **(08 Marks)**

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