# Automotive Chassis and Suspension
# VTU CBCS Question Paper Set
# 2018

USN | | | | | | | | | |

**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)**
   c. The steering wheel diameter of a car using rack and pinion type of steering gear is 300 mm.
      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)**

* * * * *

## Sixth Semester B.E. Degree Examination, June/July 2017
## Automotive Chassis and Suspension

Time: 3 hrs.                                                                        Max. Marks:100

Note: *Answer FIVE full questions, selecting*
*at least TWO questions from each part.*

### PART – A

1    a.   Discuss in detail classification of automobile.                                    (06 Marks)
     b.   With neat sketch explain transmission system of front engine rear wheel drive vehicle.
                                                                                              (08 Marks)
     c.   Derive expressions for wheel reactions in three wheeled vehicle resting on level road.
                                                                                              (06 Marks)

2    a.   With neat sketches discuss various loads acting on chassis frame.                   (12 Marks)
     b.   Draw and explain various tests to be carried out on chassis frame.                  (08 Marks)

3    a.   Discuss construction of front axle with a neat sketch.                              (08 Marks)
     b.   Briefly explain following :
          i) Caster angle        ii) Camber angles        iii) King pin inclination.          (06 Marks)
     c.   With neat sketch explain :
          i) Worm and sector steering gear        ii) Rock and pinion steering gear.          (06 Marks)

4    a.   What is the need of differential in automobile? Explain construction and working of
          deferential with neat sketch.                                                      (12 Marks)
     b.   Explain semi floating and full floating arrangement of rear axle. Also mention loads acting
          on axle in each arrangement.                                                       (08 Marks)

### PART – B

5    a.   Write any four advantages of disc brakes over drum brakes.                          (04 Marks)
     b.   Explain with a neat sketch working of hydraulic brake system. Also mention its advantages.
                                                                                              (12 Marks)
     c.   What are the requirements of brake fluid?                                           (04 Marks)

6    a.   Discuss working of air brakes. Also mention its advantages.                         (10 Marks)
     b.   Explain with neat sketch working of vaccume brakes.                                 (10 Marks)

7    a.   Explain with neat sketch construction of leaf spring.                               (06 Marks)
     b.   Write any four advantages of independent suspension system over rigid axle suspension
          system.                                                                            (04 Marks)
     c.   Discuss construction and working of telescopic shock absorber.                      (10 Marks)

8    a.   Explain any two types of wheels used in automobiles.                                (06 Marks)
     b.   Write advantages of radial ply tyres over cross ply tyres.                          (04 Marks)
     c.   Discuss various factors affecting the tyre life.                                    (10 Marks)

* * * * *

USN ☐☐☐☐☐☐☐☐☐☐ 　　　　　　　　　　　　　　　　**10AU61**

# Sixth Semester B.E. Degree Examination, June/July 2015
## 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. 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)

\* \* \* \* \*