

# CBCS SCHEME

USN

1A715A0002

15AU61

## Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Automotive Chassis and Suspension

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain the various cross sections used in automobile chassis. (06 Marks)  
b. Briefly explain the classification of automobiles. (04 Marks)  
c. Explain the various types of chassis construction. Give example for each. (06 Marks)

OR

- 2 a. Derive an expression for weight distribution in a three-wheeled-vehicle. (08 Marks)  
b. Calculate the maximum bending moment and maximum section modulus assuming the following data:  
\* Wheelbase = 180cm  
\* Overall length = 360cm  
\* Equal overhang on either side  
\* 270 kgf acting at 45cm in front of front axle  
\* 180 kgf acting at 45cm behind front axle  
\* 180 kgf at 45cm in front of rear axle  
\* 67.5kgf at 45cm behind rear axle.

Assume dynamic stress equal to twice the static stress induced. Assume a safe allowable stress of 600kgf/cm<sup>2</sup>. (08 Marks)

### Module-2

- 3 a. Explain worm and wheel, steering gear mechanism with neat sketch. (08 Marks)  
b. Explain the terms: i) Castor ii) Camber iii) Toe-in 3 iv) Toe-out. (08 Marks)

OR

- 4 a. Explain the construction of front axle. (04 Marks)  
b. Briefly explain the functions of steering system. (04 Marks)  
c. Explain rack and pinion gear system with a sketch. (08 Marks)

### Module-3

- 5 a. Explain with neat sketch semi-floating, fully-floating rear axle. (08 Marks)  
b. Explain the functions of propeller shaft and universal joints. (08 Marks)

OR

- 6 a. Why is a differential needed in an automobile? Explain its construction and working. (10 Marks)  
b. Explain torque tube drive with sketch. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-4**

- 7 a. What are the requirements of brake fluid? (02 Marks)  
b. Write the requirements of a braking system. (02 Marks)  
c. Derive an expression for load distribution on front and rear wheels when i) Front wheels are braked ii) Rear wheels are braked iii) All four wheels are braked. (12 Marks)

**OR**

- 8 a. Briefly compare disc and drum brakes. (06 Marks)  
b. With a neat sketch explain working of disc brakes with fixed calipers. (06 Marks)  
c. What is a servo braking system? What are the various servo-mechanisms available? (04 Marks)

**Module-5**

- 9 a. Explain construction of leaf spring suspension with a sketch. (06 Marks)  
b. Write various requirements of wheel. (04 Marks)  
c. Explain two types of tyres used in automobiles. (06 Marks)

**OR**

- 10 a. What are the factors that affect tyre life and explain them? (05 Marks)  
b. Briefly explain : i) Radial-ply ii) Cross-ply iii) Belted bias type of tyre carcassing. (08 Marks)  
c. Write a short notes on the following aspects of automobile suspension system:  
i) Handling ii) Unsprung weight iii) Rolling. (03 Marks)

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