18AU61

USN

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
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. Derive the expression for weight distribution in case of three wheeled vehicle.   **(10 Marks)**
    b. Draw the layout and explain the features for the following vehicle chassis arrangement:
        (i)   Front Engine Rear Wheel Drive
        (ii) Rear Engine Real Wheel Drive   **(10 Marks)**

OR

2   a. List the various types of chassis frames. Explain the constructional details of frames giving example.   **(10 Marks)**
    b. Calculate the maximum bending moment and maximum section modulus assuming the following data:
        Wheel base = 180 cm, Overall length = 360 cm, Equal overhang on either side, 270 kgf acting at 45 cm infront of front axle, 180 kgf acting at 45 cm behind front axle, 67.5 kgf at 45 cm behind rear axle.
        Assume dynamic stress equal to twice the static stress induced. Assume a safe allowable stress of 600 kgf/cm^2.   **(10 Marks)**

Module-2

3   a. Discuss the Rack and Pinion steering gear mechanisms with a neat sketch.   **(10 Marks)**
    b. Illustrate the following terms with a neat sketch:
        (i) Castor   (ii) Camber   (iii) Toe-in
        (iv) Toe-out   (v) Under steer   **(10 Marks)**

OR

4   a. List out the factors of wheel alignment.   **(06 Marks)**
    b. Describe the construction of front axle, its materials and loads acting with the help of a suitable sketch.   **(10 Marks)**
    c. Write short notes on power steering of a vehicle.   **(04 Marks)**

Module-3

5   a. Discuss the necessity of propeller shafts and universal joints in automobiles.   **(10 Marks)**
    b. With a neat sketch, explain the principle and construction of differential.   **(10 Marks)**

OR

6   a. Discuss fully floating and semi floating arrangements of rear axle, with a suitable sketch.   **(10 Marks)**
    b. Sketch and explain briefly the Hotchkiss Drive.   **(10 Marks)**

Module-4

7 a. Explain the following terms:
  (i) Weight Transfer
  (ii) Stopping Distance
  (iii) Brake Shoe Theory
  (iv) Braking torque
  (v) Brake efficiency with respect to braking system of automobile **(10 Marks)**
  b. Explain the factors influencing operation of Brakes in Automobiles. **(10 Marks)**

OR

8 a. Discuss the disc brakes with fixed Caliper by a suitable sketch. **(10 Marks)**
  b. Explain vacuum boosted hydraulic brakes with a neat sketch. **(10 Marks)**

Module-5

9 a. Describe Telescopic Shock absorbers with a neat sketch. **(10 Marks)**
  b. Explain the constructional details of leaf springs and coil springs with a neat sketch. **(10 Marks)**

OR

10 a. Classify different types of wheels. Explain each with a neat sketch. **(10 Marks)**
  b. Briefly explain:
  (i) Radial ply tyres
  (ii) Cross ply tyres
  (iii) Belted bias type of tyre carcassing **(10 Marks)**

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