Code No: R1932242 **R19** **SET - 1**

III B. Tech II Semester Regular Examinations, June-2022

AUTOMOTIVE CHASSIS DESIGN

(Automobile Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Why an I-section at the middle and rounded off square or oval section at the ends are used for the rigid type front axle of commercial vehicles? Explain in detail. [8M]
   b) Explain Climbing ability. [7M]

(OR)

2. a) Explain how the torsional stiffness and bending rigidity of ladder type vehicle frame may be tested in the laboratory. Supplement your answer with sketches of the test set–up. [8M]
   b) List the advantages and disadvantages of front-wheel drive. [7M]

UNIT-II

3. a) Discuss in detail the types of steering linkages and their significance with a neat sketch. [8M]
   b) Explain the advantages and limitations of Recirculating ball type steering gear. [7M]

(OR)

4. a) A car with a wheel track of 147.2 cm and wheel base of 274 cm is fitted with an Ackerman's steering mechanism. The distance between the axis of the pivot pins is 122 cm and the tie–rod is 110.6 cm long. The track arm is 15.25 cm long. Find the turning circle radius of the car, so that true rolling motion is there for all the wheels. [8M]
   b) Explain in detail about Influence of type and position of the steering gear. [7M]

UNIT-III

5. a) Discuss in detail about the steps followed in design of coil spring and leaf spring for a suspension system. [8M]
   b) What are the main advantages of an independent wheel suspension? [7M]

(OR)

6. a) List out the different types of independent front suspension system and write down the merits of this system. With the aid of sketch explain the constructional details of a Mc.Pherson strut type suspension system. [8M]
   b) Describe anti-dive and anti-squat considerations. [7M]

UNIT-IV

7. a) An automobile engine develops 23 kW at 1500 rpm and its bottom gear ratio is 3.06. If a propeller shaft of 40 mm outside diameter is to be used, determine the inside diameter of mild steel tube to be used, assuming a safe shear stress of 55 × 103 kPa for the MS. [8M]

   b) Explain the working of a typical differential unit used in automobiles. [7M]

(OR)

8. a) Explain the method of calculation of total resistance to vehicle motion and gear ratios of a vehicle. [8M]

   b) Explain the method of calculation of total resistance to vehicle motion and gear ratios of a vehicle. [7M]

UNIT-V

9. a) Explain the construction and working of diaphragm clutch with neat sketch and its advantages and disadvantages. [8M]

   b) Explain in detail about continuous variable transmission. Also list out its advantages and limitations. [7M]

(OR)

10. a) Compare and contrast CVT vs DCT engines. [8M]

    b) Explain the various functions of clutch in an automobile. [7M]

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