Total No. of Questions : 10]

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SEAT No. :

[Total No. of Pages : 3

[Max. Marks : 70

B.E. (Mechanical)

AUTOMOBILE ENGINEERING

(2015 Course) (Semester-I) (Elective-II) (402045 A)

Time : 2½ Hours]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of electronic pocket Calculator is allowed.
- 5) Assume suitable data, if necessary.
- Q1) a) Describe the classification of Automobile. [5]
 - b) What are the functions of frame? List three types of chassis construction.[5]

OR

- **Q2)** a) What is an over drive? Explain the working of it.
 - b) What is the function of clutch? Discuss various factors affecting the torque transmission in a clutch. [5]
- Q3) a) Sketch the construction of front axle of automobile. Describe with neat sketch front wheel-stub axle assembly. [5]
 - b) State the requirements of an automobile wheel. Explain with neat sketch construction of Disc type wheel. [5]

OR

- Q4) a) Describe with neat sketch concept of toe in and toe out. What is purpose of it?
 - b) Explain various considerations for the design of tyre treads. [5]

P.T.O.

[5]

- Q5) a) What is purpose of independent suspension? Explain with neat sketch McPherson strut front independent suspension system.[8]
 - b) Describe construction and working of disc brakes and compare with conventional drum brake system. [8]

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OR

- **Q6)** Write short note on the following: (Any two)
 - a) Mechanical Brake.
 - b) Leaf Spring construction and Types.
 - c) Hydro gas Suspension.
 - d) Power assisted brakes.
- Q7) a) For a Car, the road resistance if given by 23 N per 1000 N, the air resistance is 0.0827 V², transmission efficiency is 88 percent in top speed, Car weight 19934 N when fully loaded. Calculate: [8]
 - i) The engine power required for a top speed of 144 km/hr.
 - ii) The acceleration in m/s² at 48 Km/h, assuming the torque at 48 km/hr in the top gear 25% more than at 144 km/h.
 - iii) The power required to drive the car up to a gradient of 1 in 5 at 48 km/h, transmission efficiency 80% in bottom gear.

Consider $g = 9.81 \text{ m/s}^2$

b) List and discuss ergonomic consideration in design of interior of automobile.
[8]

OR

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- Q8) a) What is purpose of servicing of vehicle? What are advantages of it? Discuss servicing schedule of a light motor vehicle.[8]
 - b) What are the type of drive motor used in Electric vehicle? Which is the best one? Why? Explain. [8]
- **Q9)** a) Describe various tests carried out to check battery condition.
 - b) What sensors are used on engine of automobiles? Describe the purpose of each. [9]

[9]

[18]

OR

Q10)Write short note on the following (any three):

- a) Battery for electric vehicles.
- b) Oil and Temperature gauges.
- c) Maintenance of Clutch.
- d) Layout of HEV.

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