

Total No. of Questions : 12]

SEAT No. :

**P1063**

**[4659]-59**

[Total No. of Pages : 3

**B.E. (Mech. - Sandwich)**

**a - AUTOMOBILE ENGINEERING**

**(2008 Course) (Elective - III) (Semester - I) (402064)**

*Time : 3Hours]*

*[Max. Marks :100*

*Instructions to the candidates:*

- 1) *Attempt three questions from Section-I and three from Section-II.*
- 2) *Answers to the two sections must be written in separate answer books.*
- 3) *Figures to the right side of questions indicate full marks.*
- 4) *Use of pocket calculator is permitted.*
- 5) *Draw neat diagrams to support your answers.*

**SECTION-I**

**Q1) a)** Explain with sketch (only) the following layouts: **[8]**

- i) Four wheel drive.
- ii) Rear engine and rear wheel drive.

What are the advantages and disadvantages of above layouts?

b) What is chassis? What are the various components of chassis? Explain their functions. **[8]**

OR

**Q2) a)** Compare the merits and demerits of the frameless construction with those of the conventional framed construction chassis. **[6]**

b) A passenger car travelling at 80.45 km/hr is accelerated up a gradient of 1 in 20. The gross vehicle weight is 11026.4 N. It has a frontal area of 1.858 m<sup>2</sup> and the air resistance coefficient may be assumed as 0.0167. The rolling resistance is 221.7N. At the above speed, the engine develops 58.88 kW at engine speed of 4000 RPM. Rear axle ratio is 5:1 and transmission efficiency = 95%. **[10]**

Calculate:

- i) The total tractive resistance.
- ii) The tractive effort available at the wheels.
- iii) The acceleration while ascending the above gradient.

**P.T.O.**

- Q3)** a) Explain construction and working of synchromesh gear box with the help of neat sketch. [8]
- b) Write a short note on: [8]
- i) Propeller shaft
- ii) Rear drive axle

OR

- Q4)** a) Draw labelled diagrams of fluid coupling and torque converter and give out their differences. [8]
- b) Explain characteristics and advantages of diaphragm spring over the coil springs for applications in automobile clutch. [8]
- Q5)** a) Enumerate different types of steering gear mechanisms. Explain working of a recirculating ball type steering gear. [6]
- b) What are requirements of automobile air conditioning system and explain how they are achieved? [6]
- c) Explain following terms in relation to the riding comfort in an automobile: Pitching, Rolling and Bouncing. [6]

OR

- Q6)** a) What are the objectives of suspension system? What are the advantages of independent suspension system? [6]
- b) Explain the following terms with the help of neat sketches only:  
Caster, Camber, King pin inclination. [6]
- c) Write a short note on air distribution in air-conditioning system in automobile. [6]

### **SECTION-II**

- Q7)** a) What is the purpose of maintenance in automobile? Explain different types of maintenance required for vehicles? [8]
- b) Write short notes on anti-corrosive additives and anti-freezing solutions. [8]

OR

**Q8)** a) Name various types of tyres available in market. Explain construction of tubeless tyres with neat diagram. [8]

b) Explain briefly wheel balancing and wheel alignment from maintenance point of view. [8]

**Q9)** a) What is active and passive safety? Name all devices and explain any two briefly. [8]

b) Explain automotive lighting and light signaling devices. [8]

OR

**Q10)** Write short note on the following: [16]

a) Ergonomics in automotive safety.

b) Air bags.

c) Safety belts.

d) Day light running lamp.

**Q11)**a) List the various types of actuators used in electronic control system of vehicle. Explain any two. [10]

b) Explain in detail electronic antilock braking system. [8]

OR

**Q12)**a) Explain oxygen sensors, cranking sensors, speed sensors and fuel metering sensors in vehicle. [8]

b) Explain with the help of block diagram the electronic engine control system used in automobile. [10]

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