[4659]-39

B.E. (Mechanical) (Semester - I)
A : AUTOMOBILE ENGINEERING (Elective - II)
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 100*

Instructions to the candidates :

1) Answer 3 questions from Section - I and 3 questions from Section - II.

2) Answers to the two Sections should be written in separate books.

3) Neat diagrams must be drawn wherever necessary.

4) Figures to the right indicate full marks.

5) Assume suitable data, if necessary.

SECTION - I
Unit - I

Q1) a) Write note on different types of materials used for chassis frame. **[8]**

b) What are vehicle specifications? Describe specification of any one medium vehicle of your choice. **[8]**

OR

Q2) a) State different types of vehicle bodies and explain any one in detail. **[8]**

b) Sketch a neat layout of a four wheel drive & explain its working. **[8]**

Unit - II

Q3) a) Explain Fluid flywheel with neat sketch? **[8]**

b) Describe with neat sketch function & working of multi-plate clutch. **[8]**

OR

Q4) a) Explain the working of synchromesh gear box with the help of neat sketch. Also state its advantages & disadvantages. **[8]**

b) With the help of neat sketch explain differential unit in the back axle of a vehicle. **[8]**

P.T.O.

Unit - III

Q5) a) Define front end geometry for steering including Caster, camber, toe, steering axis Inclination & turning radius. **[10]**

b) Explain how the wheel alignment & its balancing performed in a service station. **[8]**

OR

Q6) a) Explain with neat sketch construction of stub axle & wheel mounting.**[10]**

b) Explain with neat sketch construction & working of collapsible steering. **[8]**

SECTION - II
Unit - IV

Q7) a) Distinguish between independent suspension and conventional suspension system. **[10]**

b) Sketch and describe disc brakes. What are their advantages? **[8]**

OR

Q8) a) Explain self leveling suspension system. **[8]**

b) Explain Hydro gas suspension system in detail. Also state its advantages over other brake system. **[10]**

Unit - V

Q9) a) Explain starting system used in automobile vehicle. **[5]**

b) Explain in brief electrical car layout. **[6]**

c) Explain with neat sketch lead acid battery. **[5]**

OR

Q10) Write short notes on any four: **[16]**
   a) Electronic stability control
   b) Sensors and actuators
   c) Electronic Control Unit
   d) Hybrid drives
   e) Electric Horn

Unit - VI

Q11) Write short notes on any four: **[16]**
   a) Vehicle ergonomics
   b) Air bags
   c) Vehicle performance curves
   d) Seat belt
   e) Types of Collisions

OR

Q12) a) Sketch and explain the following performance characteristics for a petrol engine driven vehicle : **[8]**

   i) variation of tractive effort against vehicle speed in first, and top gear;

   ii) total resistance against vehicle speed on level road.

   b) The coefficient of rolling resistance for a truck weighing 62293.5 N is 0.018 & the coefficient of air resistance is 0.00281 in the formula $R = K w + KaAV^2N$, where A is m^2 of frontal area and V. The speed in km/h. The transmission efficiency in the top gear of 6.2:1 is 90% and that in second gear of 15:1 is 80%. The frontal area is 5.574 m^2. If the truck has to have a minimum speed of 88 km/h in the top gear calculate.

   i) The Engine b.p. required.

   ii) The Engine speed, if the driving wheels an effective diameter 0.8125m.

   iii) The max grade the truck can negotiate at the above engine speed in second gear.

   iv) The max drawbar pull, available on level road above engine speed in second gear. **[8]**

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