Total No. of Questions : 12]

SEAT No. :

P1527

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B.E. (Mechanical Engineering)

AUTOMOBILE ENGINEERING

(2008 Course) (Semester-I) (402045 A) (Elective-II)

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

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION-I

Q1) a) Explain classification of automobile with the help of examples and give specification of any one petrol car of your choice. **[8]**

b) Explain with neat sketch layout of a four wheel drive. **[8]**

OR

Q2) a) Explain front engine front wheel drive vehicle with neat sketch. Write its advantages and disadvantages over the other layouts. **[8]**

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

Q3) a) Explain with neat sketch construction and working of multi-plate clutch. **[8]**

b) Explain fluid coupling with neat sketch. **[8]**

OR

Q4) a) Explain working of sliding mesh gear box with neat sketch. Also state its advantages and disadvantages. **[8]**

b) Draw a neat sketch of typical differential unit in the back axle of vehicle and explain its working. **[8]**

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Q5) a) Enumerate different types of steering gears. Explain with neat sketch construction and working of power steering unit. **[10]**

b) How are the tyres classified and rated. **[8]**

OR

Q6) a) Define front end geometry for steering including castor, camber, steering axis inclination, toe and scrub radius. **[10]**

b) Describe various types of stub axles with the help of suitable diagram and state merits and demerits of each of them. **[8]**

SECTION-II

Q7) a) Explain in detail the function and construction of a leaf spring with neat sketch. **[8]**

b) Explain ABS (Antilock Braking System) in detail. Also state its advantages over hydraulic brake system. **[10]**

OR

Q8) a) Explain the independent front suspension arrangement with the help of neat sketch. State advantages of it. **[10]**

b) Explain with neat sketch the working of hydraulic brakes. **[8]**

Q9) a) Sketch and describe the components and operation of a battery used in automobile. **[8]**

b) Explain with lay out lighting system of any typical car. **[8]**

OR

Q10) Write short notes on Any Four: **[16]**

a) Vehicle charging system.

b) Dash board instruments.

c) Electronic stability control.

d) Sensors and actuators.

e) Preventive maintenance of vehicle.

Q11) Write short notes on Any Four: **[16]**

a) Seat belts.

b) Ergonomic consideration for vehicle.

c) Vehicle performance curve.

d) Vehicle interior.

e) Air bags.

OR

Q12) a) Explain in details Active safety and Passive safety. **[6]**

b) A passenger car 13348.56 N. The rolling resistance may be assumed as 44.78 N of vehicle weight. The air resistance is given by $0.00018\ AV^2$ where A is frontal area and V is car speed. The frontal area of the vehicle is 2.324 m^2 and car speed is 48.54 km/hr. **[10]**

i) Determine the power required to propel the vehicle on level road.

ii) If the tractive effort available at the wheel is 1860.27, find the maximum gradient which the vehicle can climb.

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