Total No. of Questions : 12]

SEAT No. :

P864

[Total No. of Pages : 3

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B.E. (Mechanical) (Semester - I)

AUTOMOBILE ENGINEERING

(2008 Course) (Elective - II (a))

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) What is chassis? Compare conventional chassis frame with frameless type chassis frame. **[8]**

b) Sketch a typical layout of a passenger car and briefly describe its various parts. **[8]**

OR

Q2) a) Explain front engine rear wheel drive vehicle with help of neat sketch. Describe its advantages & disadvantages over other layouts. **[8]**

b) Explain with neat sketch different types of vehicle bodies. **[8]**

Unit - II

Q3) a) Describe working of sliding mesh gear box with help of a neat sketch. Also state its advantages & disadvantages. **[8]**

b) Explain with neat sketch a non slip differential unit in the back axle of a vehicle. **[8]**

OR

Q4) a) Explain centrifugal clutch with neat sketch. **[8]**

b) Describe continuous variable transmission with neat sketch. **[8]**

P.T.O.

Unit - III

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

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

OR

Q6) a) Define following. **[10]**

l. Steering axis inclination

2. Castor

3. Slip angle

4. Scrub radius

5. Cornering force

b) Explain with neat sketch construction and working of recirculating type of steering gearbox. **[8]**

SECTION - II

Unit-IV

Q7) a) Explain the independent front suspension arrangement with the help of a neat sketch. State its advantages. **[10]**

b) Explain a hydraulic braking system with neat sketch. **[8]**

OR

Q8) a) Explain the working and construction of the shock absorber. **[8]**

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

Unit-V

Q9) a) Explain with neat sketch wiper mechanism. **[5]**

b) Explain with lay out lighting system of any typical car. **[5]**

c) State different types of Batteries. Explain any one with neat sketch. **[6]**

OR

Q10) Write short notes on any four: **[16]**

i. Electronic stability control

ii. Sensors and actuators

iii. Vehicle starting system

iv. Dash board instruments

v. Traction control devices

Unit-VI

Q11) Write short notes on any four: **[16]**

i. Active safety and passive safety

ii. Vehicle body movements

iii. Vehicle performance curves

iv. Vehicle interior

v. Types of Collisions

OR

Q12) a) Explain ergonomic consideration for vehicle. **[6]**

b) A truck weighs 58860 N and is powered by an engine which develops 60.311 kW at 2000 rpm. The rolling resistance is given by 0.02W, where W represents vehicle weight in N. The frontal area of the vehicle is $7.5m^2$ and the coefficient of air resistance K = 0.005. Effective wheel radius = 0.35m, second gear ratio = 2.5: 1 and transmission efficiency in second gear 80%. If the truck is operating at 20 km/hr in second gear and corresponding engine speed is 2000 rpm calculate:

(1) suitable rear axle ratio;

(2) The tractive effort available at wheels;

(3) Grade ability of truck;

(4) Maximum acceleration (m/sec^2)

(5) Inertia of revolving component may be neglected. **[10]**