Total No. of Questions : 10]

SEAT No. :

P2152

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B.E. (Mechanical)

AUTOMOBILE ENGINEERING

(Semester - II) (Elective - III) (Open Elective) (2012 Pattern)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain with neat sketch an 'Articulated Vehicle Layout'. **[5]**

b) Write note on Vacuum operated clutch. **[5]**

OR

Q2) a) Write short note with sketch on Continuous Variable Transmission. (CVT)**[5]**

b) Explain with neat sketch various loads acting on Vehicle Frame. **[5]**

Q3) a) Define with neat sketches the following terms related to steering geometry.**[6]**

i) Camber

ii) Scrub radius

iii) KPI (King Pin Inclination)

b) How tyres are rated and specified. **[4]**

OR

Q4) a) Explain with neat sketch 'Hotchkiss Drive'. **[5]**

b) What are different types of stub axles. Explain any one with neat sketch.**[5]**

Q5) a) What are different types of shock absorbers. Explain with neat sketch 'Telescopic type hydraulic shock absorber'. **[8]**

b) Explain with neat sketch Antilock Braking System (ABS). Write its advantages and limitations over other types. **[8]**

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OR

Q6) a) Explain with the help of suitable diagram Hydro gas suspension. State its merits and demerits. **[8]**

b) Explain with neat sketch the working principle of Hydraulic brakes and write its advantages and limitations. **[8]**

Q7) a) A Ashok Leyland truck has a gross vehicle weight of 89026 N. Engine displacement is 10 m^3, power is 77.3 KW at governed speed of 2400 rpm and maximum torque 345.8 N-m at 1400 rpm. Rear axle ratio is 6.166 : 1. Fourth speed reduction ratio in transmission is 1.605 : 1, drive line losses amount to 10.7 KW at 1400 rpm. Tyre size is 0.4572 m × 1.016 m (effective wheel diameter is 0.950 m), frontal area of truck is 6.95 m^2. Calculate the grades which the vehicle can climb in fourth gear in still air conditions.

i) At Governed engine speed. **[6]**

ii) At speed of maximum torque in the equation $R = Kr. W + Ka. A.V^2$ **[4]**

Where, Kr = 0.014, Ka = 0.0462 and V in Km/h.

Overall gear ratio G = 6.166 × 1.605 : 1 = 9.9 : 1

b) Write short notes on the following (any two) **[8]**

i) NVH in automobiles

ii) Electrical car layout

iii) Air bag systems

OR

Q8) a) Write short notes on the following (any two) **[8]**

i) Road performance curves.

ii) Automatic seat belts.

iii) Roll over safety Regulations.

b) Explain with schematic diagram 'Solar Operated vehicle'. **[5]**

c) Write working principle of any type of tachometer. **[5]**

Q9) a) Explain the following (any two) **[8]**

i) Trafficator

ii) Electrical Horn

iii) Electric Wind Screen Wiper

b) Explain any two complaints of propeller shaft assembly along with four causes and remedies of each complaint. **[8]**

OR

Q10) a) Write short notes on following (Any Two) **[8]**

i) Traction Control Devices.

ii) Dashboard Instruments.

iii) Electrical Fuel Pump

b) Explain with neat sketch 'Lead Acid Battery'. Write its advantages and limitations over other types of batteries. **[8]**

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