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Total Number of Pages: 02

**B.Tech.
PEME5301**

5th Semester Back Examination 2017-18

Automobile Engineering

BRANCH: MECH

Time: 3 Hours

Max Marks: 70

Q.CODE: B407

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)**
- a) State the advantages of frameless construction. What are its disadvantages?
 - b) Why is the power of an engine expressed as 'Brake horsepower'? What are the historical facts for incorporating the words 'brake' and 'horsepower'?
 - c) Why can't water be used as brake fluid? Which car in India has distinction of using the disc brakes first?
 - d) What do you understand by 'Double De-clutching'?
 - e) What type of gear is preferred in transmission and why?
 - f) Why a slip is joint necessary to be used with the propeller shaft?
 - g) What do you mean by under steer and over steer?
 - h) What is dwell?
 - i) Define 'oiliness' of lubricating oil.
 - j) In what respects are the tractors different from trucks, other heavy commercial vehicles.
- Q2 a) A 3- forward speed and one reverse speed gear box (sliding mesh type) has to be designed. The gear box should have the following gear ratio: Top gear – 1:1, second gear – 1.5, third gear – 2.5 and reverse gear – 3.9. The distance between the axes of main shaft and layshaft is to be kept at 80 mm. The clutch gear should have 16 teeth with a diametral pitch of 3.20 mm. (7)**
- b) What do you mean hybrid vehicle? Write two advantage of it. (3)**
- Q3 a) What necessitates enforcement of a Motor Vehicle Act? Describe provision of MVA 1988 and its difference from the older MVA 1939. (6)**
- b) A car has pivot pins 1.10 m apart, the length of each truck arm is 0.1525 m and the track rod behind the axle is 1.04 m long. Determine the wheelbase for true rolling of all wheels when the inner wheel stub axle is at 55° to the center line of the car. (4)**
- Q4 a) With the help of suitable diagram, explain the construction and the working of an Overdrive. (7)**
- b) How does the three-quarter-floating axle resist various loads/stresses? (3)**
- Q5 a) Explain the working of an electric brake with the help of a suitable diagram. Discuss its advantages and limitations. (5)**
- b) Describe the construction and working of starter motor for automobiles. (5)**
- Q6 a) With the help of a neat diagram describe Hotchkiss drive. How does it differ from Torque tube drive? (6)**
- b) Explain with neat diagram working of Differential? (4)**

Q7 a) A truck weighs 61800 N and has a frontal area of 6.65 m². Effective wheel radius=0.405m. The maximum vehicle speed in top gear=80km/h. **(7)**

The transmission efficiency in top and first gears is respectively 90% and 75%. Rear axle ratio=6.15. First gear ratio=5.65

Take coefficient of air resistance=0.02796 and coefficient of rolling resistance=0.0175

Calculate the following

(i) Engine BP required to propel the vehicle on level road at 80 kmph in top gear

(ii) Engine speed corresponding to 80 kmph in top gear

(iii) The maximum gradient which the vehicle is capable of ascending in first gear corresponding to the above engine speed.

b) What do you mean by the terms 'wander' and 'shimmy' in steering? How are they caused? **(3)**

Q8 Write short notes on any TWO : **(5 x 2)**

a) Freewheel Unit

b) Solar powered vehicles

c) Bendix starting drive