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Total Number of Pages: 02

B.TECH
PCME5301

5th Semester Regular / Back Examination 2016-17

AUTOMOBILE ENGINEERING

BRANCH: MECHANICAL

Time: 3 Hours

Max Marks: 70

Q.CODE: Y314

**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) Name the material used for brake linings and write down the assumption in designing brake lining of a brake shoe.
- b) Show in a graph the variation of engine power and torque with engine speed.
- c) Explain briefly the parking brake.
- d) Compare merits and demerits of vehicles having front mounted and rear mounted engines.
- e) With the help of flow diagram show the difference between rear wheel drive (RWD) and front wheel drive (FWD).
- f) What is bendix drive ? Explain briefly.
- g) Why a cut-out relay is used in battery generator circuit.
- h) Explain the function of booster coil in the ignition system.
- i) Discuss the function of a catalytic converter.
- j) What is caster angle and Camber angle?

Q2 a) What are the factors affecting specific gravity of battery electrolyte? (3)

- b) A car has a mass 1360 kg. The rolling resistance is 100N per 1000 kg. The air resistance is given by $0.0017 AV^2$, where A is the frontal area in m^2 and V is car speed in km/h. The frontal area of the vehicle is 2.3 m^2 and car speed is 47.8 km/h. Calculate the power required to propel the vehicle on a level road. If the tractive effort available at the wheels is 1860 N, determine the maximum gradient which the vehicle can climb. (7)**

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- Q3 a)** State the purpose of antilock brake system(ABS). Explain the basic operation of ABS. **(5)**
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- b)** The angle between the axes of two shafts connected by Hooke's joint is 18° . Determine the angle turned through by the driving shaft when the velocity ratio is maximum and unity. **(5)**
- Q4** A four forward speed gear box is to be prepared for gear ratio of 1.0, 1.5, 2.3 and 3.9. The diametral pitch of each gear is 3.5 mm and the smallest pinion has to be at least 12 teeth. The centre distance between main shaft and counter shaft is 63 mm. Determine the number of teeth on each gear and the exact gear ratios. **(10)**
- 210 210 210 210 210 210 210 210
- Q5 a)** Explain the difference between Hotchkiss and torque tube drive with the help of neat diagram. **(5)**
- b)** What is fluid coupling and where is it used ? Explain the working of fluid coupling with help of neat sketch. **(5)**
- 210 210 210 210 210 210 210 210
- Q6** Explain the necessity of a differential in an automobile. With the help of neat sketch discuss in detail the construction and operation of differential. **(10)**
- Q7 a)** What is a torque converter? Sketch and explain the construction and working of a torque converter. **(6)**
- 210 210 210 210 210 210 210 210
- b)** Write down the advantages in using Wheel motors. **(4)**
- Q8 Write short notes on any two:** **(5 x 2)**
- a)** Solar powered vehicles.
- b)** Free wheel.
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- c)** Construction feature of an Alkaline battery.
- d)** How bleeding is done in hydraulic brakes.
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