6th Semester Regular / Back Examination 2018-19
AUTOMOBILE ENGINEERING
BRANCH : MECH
Time : 3 Hours
Max Marks : 100
Q.CODE : F744
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Short Answer Type Questions (Answer All-10)**   **(2 x 10)**
  a) Differentiate 2-s and 4-s engine.
  b) State the function of master cylinder in hydraulic brake?
  c) State the difference between a live axle nd dead axle?
  d) What are the different types of live axles?
  e) How does positive camber differ from negative camber?
  f) Why are the wheels set for toe-in when they are aligned?
  g) Why are universal joints required on propeller shaft?
  h) Name the parts of a power steering gear?
  i) Why are slip joints necessary?
  j) What is the purpose of a voltage regulator in the charging system?

Part- II

Q2 **Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**   **(6 x 8)**
  a) Describe the flow of power from engine to the rear wheel?
  b) Explain the principle of operation of hydraulic brake?
  c) What are the difference between Hotchkiss and torque tube drive?
  d) Why slip joints are necessary? Explain how they perform their functions?
  e) A motor car has a wheel base of 2.743m and pivot centre of 1.065m. The front and rear wheel track is 1.217m. Calculate the correct angle of outside lock and turning circle radius of the outer front and rear wheels when the angle of inside lock is 40^0.
  f) A car weighing 21336.75N has astatic weight distribution on the axle of 50:50. The wheel base is 3m and the height of centre of gravity above ground is 0.55m. If the coefficient of friction on the highway is 0.6, calculate the advantage of having rear wheel drive rather than front wheel drive as far as gradiability is concerned, if engine power is not a limitation.
  g) How does kingpin inclination help to provide directional stability?
  h) What is an over drive? Explain the construction and discuss its working, explaining also the methods of controls.
  i) State the advantages of unibody construction and also spell out the advantages of separate body and chasis construction?
  j) The input shaft of an epicyclic type gear box has two sun wheels each with 25 teeth splined to the shaft. Their corresponding annuli have 100 teeth each. The output shaft has a sun running free on that shaft with 40teeth, while the corresponding annulus has 80 teeth. Calculate the first, second and reverse gear ratios.
  k) What are the difference between Ackerrmansteering gear and Davis steering gear?
  l) State the additional advantages of an alternator over a generator? What method is used to control alternator output?

Part-III

Long Answer Type Questions (Answer Any Two out of Four)

Q3 What causes a difference in wheel speed? How do the differential pinion gears carry driving torque from the ring gear to the drive axle? What is mean by a speed averaging device and a torque divider as applied to a differential? **(16)**

Q4 A motor car has a wheel base of 3.64m, the height of its centre of gravity above ground is 0.61m and it is 1.12 m in front of the rear axle. If the car is travelling at 40KM/hr on a level track, determine the minimum distance in which the car may be stopped, when : **(16)**

a) the rear wheels are braked
b) the front wheels are braked
c) all the wheels are braked

The coefficient of friction between tyre and road may be takenas 0.6.

Q5 An automotive gear box gives three forward speeds and reverses with a top gear of unity and bottom reverse gear ratio of approximately 3.3:1. The centre distance between the shafts is to be 110mm approximately. Gear teeth of module 3.25mm are to be employed. **(16)**

Sketch the layout of a typical constant mesh gear box for these conditions giving the number of teeth for the various gear wheels and showing closely how the different ratios are obtained?

Q6 **Write short notes on :**

a) Solar powered vehicle **(8)**
b) Fuel cell **(8)**