Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (OPEN ELECTIVE)

MAKEUP EXAMINATION, JUNE 2017

SUBJECT: AUTOMOBILE ENGINEERING [AAE 3283]

REVISED CREDIT SYSTEM
(23/06/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Use of thermodynamic data hand book is permitted.

1A. Define the following terms in an automotive engine: **(03)**
(i) Compression ratio
(ii) Mean effective pressure
(iii) Frictional power

1B. Explain the working of 4-stroke Diesel or Compression ignition engine with neat diagrams. **(05)**

1C. If the compression ratio of a given spark ignition engine is 11:1, what is the clearance volume if bore of the engine is 104 mm and stroke is 113 mm? **(02)**

2A. A car engine uses a single plate friction clutch that develops a maximum torque of 150 Nm. If the external diameter of the clutch plate is 1.2 times the internal diameter, determine the dimensions of the clutch plate and the axial load applied by the springs. Given: Maximum allowable pressure intensity is 100 kPa and coefficient of friction is 0.3. Consider the case of uniform wear rate. **(04)**

2B. Describe the different factors affecting the torque transmitted by a clutch. **(03)**

2C. Describe the torque tube drive with a neat sketch. **(03)**

3A. Show the construction of an ignition coil. **(02)**

3B. Explain constant mesh type gearbox with a neat labeled diagram. **(04)**

3C. Describe the working of a double wishbone type suspension with the aid of a neat sketch. **(04)**

4A. Write a short note on leaf springs. **(02)**

4B. Explain the following rear suspension: **(04)**
(i) De Dion type
(ii) Trailing link type

4C. A motor car has a wheel base of 2.743 m and pivot centers 1.065 m apart. The front and rear wheel track is 1.217 m. Calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels when the angle of inside lock is 40^0 . **(04)**

5A. Illustrate the working of an anti-roll bar with a neat sketch. **(03)**

5B. With a neat sketch, explain the working of disc brakes **(04)**

5C. A car has a wheel base equal to six times the height of its center of gravity from ground level. The car is travelling on a horizontal road. If the coefficient of friction between the car tyres and the road is 0.5, determine the ratio of the reaction at the front wheel to that of the rear wheel. Assume that the horizontal distance of the centre of gravity from either wheel are equal to each other. **(03)**