Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (OPEN ELECTIVE)

END SEMESTER EXAMINATIONS, APRIL/MAY 2017

SUBJECT: AUTOMOBILE ENGINEERING [AAE 3283]

REVISED CREDIT SYSTEM
(02/05/2017)

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. Write a short note on Internal combustion engines with a neat sketch. **(03)**

1B. Explain the working of a 4-stroke cycle and show the valve timing diagram. **(04)**

1C. The mean effective pressure for a single cylinder, spark ignition engine is 40 bar. The engine cylinder has bore diameter of 80 mm and the displacement from top dead center to bottom dead center is 110 mm. Compute the indicated power for idling RPM of 600 and maximum RPM of 4000. **(03)**

2A. A single plate dry disc clutch having both sides effective, is to be designed for a car engine rated at 13.3 kW giving a maximum torque of 122 Nm. The coefficient of friction is 0.35, axial pressure should not exceed 83 kPa and the external radius of the friction surface is 1.25 times the internal radius. Find the dimensions of the friction lining and the total axial pressure that should be exerted by the spring. **(04)**

2B. Explain the working of a cone clutch with a neat sketch. **(03)**

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

3A. What are the different parameters for selection of an automobile battery? **(02)**

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

3C. Describe the working of a telescopic type shock absorber with a neat sketch. **(04)**

4A. What are coil springs? Classify different types of coil springs. **(02)**

4B. Define the following terminology used in steering geometry with relevant sketches: **(04)**

i. Camber
ii. Caster
iii. Toe
iv. Steering axis inclination

4C. A car with a wheelbase 2.45 m has pivot centers 1.1 m apart. The front track is equal to 1.2 m. If the angle of outer wheel lock is 28º and track width is 900 mm, determine the turning radius of all four wheels. **(04)**

5A. Describe the Macpherson strut type independent suspension with a neat sketch. **(03)**

5B. With a neat sketch, explain the working of single leading type shoe brake. **(03)**

5C. The wheelbase of a vehicle is 5 m and its centre of gravity is 1 m above the ground level. The total weight of the vehicle is 20 kN and coefficient of adhesion between the road and wheels is 0.52. If the vehicle is moving at a speed of 60 km/hr down an incline of 20º and brakes are suddenly applied, determine **(04)**

(i) Reactions for front and rear wheels
(ii) Deceleration and stopping distance