EME-702 **Roll No.** | | | | | | | | | | |

B.Tech
(SEM VII) ODD SEMESTER EXAMINATION 2015-16
AUTOMOBILE ENGINEERING

TIME: 3Hours **Max. Marks: 100**

NOTE: Attempt all questions. All questions carry equal marks.

Q.1 Attempt any **TWO** parts of the following 10x2=20

(a) What is meant by Synchro-mesh gearing? Sketch and explain the mechanism that is normally used to synchronise one pair of gears.
(b) Calculate (i) total resistance (ii) tractive efforts at the wheels (iii) torque at wheels (iv) torque at the propeller shaft and (v) acceleration of the vehicle, ascending the gradient of 1 in 20. The following data relates to the vehicle.
Speed of car ascending the gradient = 62 km/hr
Gross weight of vehicle = 12 KN, Frontal area of vehicle = $2m^2$
Coefficient of air resistance = 0.0018, Rolling resistance = 222N, Brake power of engine = 65 KW, Rear axle ratio = 5:1 Wheel radius = 0.3m, Transmission efficiency = 95%
(c) Discuss the selection of following during engine/vehicle design
(i) Use factor (ii) Engine size (iii) No. of cylinders

Q.2 Attempt any **TWO** parts of the following: 10x2 = 20

(a) Explain with a neat sketch the construction and operation of a Hotchkiss drive. Discuss how driving torque and braking torque reactions are nullified by this drive.
(b) Explain functions of differential in transmission system. Describe its construction and working with a neat sketch.
(c) Explain the following terms and discuss how do they affect the steering behavior.
(i) Camber (ii) Caster (iii) King pin inclination (iv) Toe-in and Toe-out.

Q.3 Attempt any **TWO** parts of the following 10X2=20

(a) A car weights 12500 N and has a wheel base of 2.5 m. The centre of gravity of car is 1-2m in the front of rear axle and 0.8 m above the ground. The car is having brakes on all wheels. The coefficient of adhesion between road and wheel in 0.5. If the car is moving up an incline, whose sin is 0.1, Calculate- (i) Load distribution between rear and front wheels (ii) the distance at which car can be stopped, while going at a speed of 50 km/hr, when only rear wheels are braked.
(b) Describe different kinds of loads experienced by the chassis frame. Make a neat sketch of chassis frame of a car, label each element, and suggest suitable sections for these elements.
(c) Draw the layout of a hydraulic brake system, name various components and describe how it works.

Q.4 Attempt any **TWO** parts of the following 10X2=20

(a) What is the function of a starting motor drive? Sketch and explain the working of standard Bendix drive (in board type).
(b) Explain principle of generation of emf in an alternator. Describe the construction of an alternator.
(c) Describe multipoint fuel injection for a petrol engine. Compare petrol injection and carburetor petrol supply system.

Q.5 Attempt any **TWO** parts of the following 10X2=20

(a) Draw the layout of the air conditioning system of a car and explain its working.
(b) Describe pump circulating water coding system of a IC engine. Why a thermostat and a pump are usually provided with such a cooling system..
(c) Describe preventive maintenance activities of the auto vehicles.