Paper Code: ME-702	**Roll No.**									

B. TECH.
SEVENTH SEMESTER EXAMINATION, 2016-17
AUTOMOBILE ENGINEERING

[Time: 3 Hours] [Total Marks: 100]

Note: Attempt all questions. All questions carry equal marks**.**

1. Attempt any two parts of the following: - **(10x2=20)**

(a) How do exhaust valves differ from inlet valves? Show valve timing diagram for inlet and exhaust valves. Explain necessity of valve overlap.

(b) What is the difference between traction and tractive effort? Derive expression for (i) tractive effort and (ii) relationship between engine rpm (N) and vehicle speed (v) in km/hr.

(c) A four speed gear box is to have the following gear ratios: 1.0, 1.5, 2.47 and 3.92. The center distance between lay shaft and main shaft is 73.11 mm and the smallest pinion is to have at least 12 teeth with a diametrical pitch of 3.25 mm. Find the number of teeth of the various gears. Find exact gear ratios.

2. Attempt any two parts of the following: - **(10x2=20)**

(a) Discuss functions of spring and shock absorber in suspension system. Explain the effect of shackle position on the front leaf springs of front axle, on the wobbling of wheels.

(b) Discuss a steering linkage for vehicle with independent suspension system.

(c) What is a free wheel? Discuss its importance in the transmission system with help of a neat sketch.

3. Attempt any two parts of the following: - **(10x2=20)**

(a) A passenger car with all wheel brakes weighing 14000 N makes an emergency stop at 96 km/hr. The combined rolling and air resistance at 96 km/hr is 804 N. The coefficient of adhesion is 0.5. Calculate total retarding force, if brakes are applied on all 4-wheels. Also calculate heat flow per minute at each wheel at the beginning of braking.

(b) Explain with a neat sketch, vacuum servo-brakes.

(c) Explain principle and working of a telescopic type shock absorber.

4. Attempt any two parts of the following:- **(10x2=20)**

(a) Draw the layout of four basic circuits in the electrical system of a modern automobile. Briefly describe the purpose served by each.

(b) Discuss advantages of multi-cylinder engine. Explain firing order of in-line 4-cylinder engine. Explain the preferred firing order and provide reason for preferred choice.

(c) Draw a neat diagram of Bosch helix type bypass pump for diesel injection. Explain its working.

5. Attempt any two parts of the following:- **(10x2=20)**

(a) What is the importance of lubrication system in I.C. engines? Sketch and explain wet sump high pressure lubrication system.

(b) Discuss the necessity of engine cooling. Sketch and explain forced pump circulation system and its advantages.

(c) Describe periodic maintenance and break down maintenance.