Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

III SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)
MAKE UP EXAMINATIONS, DEC 2016/ JAN 2017
SUBJECT: THEORY OF AUTOMOTIVE ENGINES [AAE 2151]
REVISED CREDIT SYSTEM
(28/12/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. Explain the demerits of scavenging process. **(02)**

1B. Sketch and explain port timing diagram. **(03)**

1C. How automotive engines are classified based on location of valves. **(05)**

2A. With a neat sketch explain fully floating piston pin. **(02)**

2B. Explain briefly about the wet cylinder liners with the help of a neat sketch and mention its advantages and disadvantages. **(03)**

2C. A single cylinder four stroke cycle I.C. engine when tested, the following observations available: Area of indicator diagram = 3 sq.cm, Length of indicator diagram = 4 cm, Spring constant = 10 bar/cm, Speed of engine = 400 rpm, Brake drum diameter = 120 cm, Dead weight on brake = 380 N, Spring balance reading = 50 N, Fuel consumption = 2.8 kg/hr., *Cv* = 42000 kJ/kg, Cylinder diameter = 16 cm, Piston stroke = 20 cm. Find : (i) F.P., (ii) Mechanical efficiency, (iii) bsfc, and (iv) Brake thermal efficiency. **(05)**

3A. Discuss the functions of a carburetor. **(02)**

3B. A spark ignition engine on test consumes 5 kg / h of petrol when running on an air-fuel ratio of 16 : 1. The engine uses a single-jet carburettor having a fuel orifice area of 2 sq mm and the tip of the jet is 5 mm above the level of petrol in the float chamber, when the engine is not running. Calculate the depression in the venturi throat to maintain the required fuel flow rate through the carburettor. Assume specific gravity of petrol as 0.75 and the coefficient of discharge of the fuel orifice as 0.8. What area of venturi throat will be required to maintain the desired flow rate? Density of air is 1.20 kg /m^3 and the coefficient of discharge for venturi throat is 0.8. Neglect compressibility of air. **(03)**

3C. List the functions of a diesel injection system and explain pintle nozzle with the help a neat sketch. Mention its advantages and disadvantages. **(05)**

4A. List any four purpose of lubrication system **(02)**

4B. Explain the working of Dry sump lubrication system with the help of a neat sketch. **(03)**

4C. Explain the working of a Mechanical Governor with the help of a neat sketch and mention its advantages and disadvantages. **(05)**

5A. List the Limitations of Turbocharging system. **(02)**

5B. Explain the roots blower compressor used in the supercharging system with the help of a neat diagram. **(03)**

5C. With the help of the P-V and T-S diagram, explain the working principle of stirling engine. **(05)**