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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*A Constituent Institution of Manipal University*

## III SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

## END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: THEORY OF AUTOMOTIVE ENGINES [AAE 2151]

**REVISED CREDIT SYSTEM**
**(25/11/2016)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

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

**1A.** With the help of a neat sketch, explain Cross scavenging system. **(02)**

**1B.** Explain briefly about the dry cylinder liners with the help of a neat sketch and mention its advantages and disadvantages. **(03)**

**1C.** With the help of a diagram explain valve timing diagram. **(05)**

**2A.** Explain Piston slap, with the help of a neat diagram. **(02)**

**2B.** Explain briefly about the piston rings and mention any four functions of the piston rings. **(03)**

**2C.** A test on a two-stroke engine gave the following results at full load. **(05)**
Speed = 350 rpm; Net brake load = 650 N; mean effective pressure = 3 bar ; Fuel consumption = 4 kg/h ; Jacket cooling water flow rate = 500 kg/h ; jacket water temperature at inlet = 20 C; jacket water temperature at outlet = 40 C; Test room temperature = 20 C; Temperature of exhaust gases = 400 C; Air used per kg of fuel = 32 kg; cylinder diameter = 22 cm; stroke = 28 cm; effective brake diameter = 1 m; Calorific value of fuel = 43 MJ/kg; Mean specific heat of exhaust gases = 1 kJ/kg –K. Find indicated power, brake power and draw up a heat balance for the test in kW and in percentage.

**3A.** Discuss the drawbacks of modern carburetor. **(02)**

**3B.** The venturi of a simple carburettor has a throat diameter of 35 mm and the coefficient of air flow is 0.85. The fuel orifice has a diameter of 2.3 mm and the coefficient of fuel flow is 0.66. The petrol surface is 5 mm below the throat. Find (a) the air-fuel ratio for a pressure drop of 0.07 bar when the nozzle lip is neglected. (b) the air-fuel ratio when the nozzle lip is taken into account. Take density of air-and fuel as 1.2 and 750 kg/m$^3$ respectively. **(03)**

**3C.** Explain common rail and unit injection system with the help of a neat sketch. Mention the advantages and dis advantages of common rail injection system. **(05)**

**4A.** Explain the necessity of cooling system in the vehicle. **(02)**

**4B.** Explain the working of a Hydraulic Governor with the help of a line diagram. **(03)**

**4C.** With the help of a neat sketch, explain the working of Thermostat cooling system and also mention four advantages and two disadvantages of water cooling system. **(05)**

**5A.** Explain the purpose of supercharging system. **(02)**

**5B.** Explain the working of Wankel engine, with the help of a neat diagram. **(03)**

**5C.** With the help of a line diagram, explain Two-stage turbocharger mention its advantages and disadvantages. **(05)**