Printed Pages : 4

Roll No.

337512(37)

BE (5th Semester)
Examination, Nov.-Dec., 2018

(Old Scheme)

Internal Combustion Engines

Time Allowed : 3 hours | *Maximum Marks* : 80
Minimum Pass Marks : 28

Note : (*i*) Part (*a*) of each question is compulsory. Attempt any **one** part of (*b*) and (*c*). Assume suitable data if necessary.

(*ii*) The figures in the right-hand margin indicate marks.

1. (*a*) What is external combustion engine? [2]

(*b*) Explain valve time diagram for two-stroke C.I. engine. [14]

(*c*) Two engines are operating on ideal Otto and ideal Diesel cycle for which the following informations are available :

Maximum temperature = 1277 °C, Exhaust temperature = 447 °C, Ambient conditions

= 0.1 MPa and 37 °C, Air consumption = 2 kg/min. Estimate : [14]

(*i*) Compression ratio

(*ii*) Air-standard efficiency

(*iii*) Power outputs

Take C_p = 1.005 kJ/kg-K

C_v = 0.7175 kJ/kg-K

2. (*a*) Define volatility. [2]

(*b*) Explain the effect of volatility on engine performance. [14]

(*c*) Describe and explain octane number, critical compression ratio, HUCP, cetane number and dopes. [14]

3. (*a*) What is petrol injection? [2]

(*b*) The diameters of venturi throat and fuel nozzle of a carburetor are 8 cm and 5 mm respectively. The coefficients of discharge of air and fuel are 0.9 and 0.7 respectively. Assum density of air 1.3 kg/m^3 and density of fuel 700 kg/m^3.

(*i*) Find the velocity of air and mass flow of air through carburetor.

(*ii*) Find the velocity of fuel and mass flow of fuel through carburetor.

(*iii*) Find A : F ratio supplied by carburetor. Neglect the nozzle lip and air compressibility and head causing the flow is 100 cm of water.

(*iv*) If the nozzle lip is 5 mm, then find air to fuel ratio for above given data.

(*v*) If the head causing the flow during idling is 2 cm of water, then find A:F ratio considering the lip. Comment on results. [14]

(*c*) Explain in detail petrol injection system with advantages and disadvantages. [14]

4. (*a*) What is governing? [2]

(*b*) Describe in detail the injection system of a Diesel engine. [14]

(*c*) Describe lubricating systems of I.C.E's with figures. [14]

5. (*a*) What is Morse test for? [2]

(*b*) Explain any three characteristics of S.I. engine with reference to their performance. [14]

(*c*) A single-cylinder 4-stroke oil engine works on Diesel cycle. The following readings were taken when the engine was running at full load :

Area of indicator diagram = 3 cm^2, length of diagram = 4 cm, spring constant = 10 bar/cm, speed of engine = 400 rpm., load on the brake = 380 N, spring reading = 50 N, Diameter of the brake drum = 120 cm, fuel consumption = 2.8 kg/hr, C.V. of fuel = 42000 kJ/kg, diameter of cylinder = 16 cm, stroke of piston = 20 cm

From the above data, find : [14]

(*i*) F.P. of engine

(*ii*) Mech. efficiency

(*iii*) Brake thermal efficiency

(*iv*) Brake mean effective pressure

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