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Total Number of Pages: 01

M.TECH

HTPE101

1st Semester Back Examination – 2016-17
INTERNAL COMBUSTION ENGINES

BRANCH(S):

Time: 3 Hours

Max marks: 70

Q.CODE:Y922

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)
- a) Define brake thermal efficiency of an IC Engine.
 - b) What is the importance of specific fuel consumption?
 - c) What are the best metals for catalytic converter?
 - d) List few antiknock agent commonly used to petrol.
 - e) What is the order of efficiencies of Otto, Dual and Diesel cycles for same compression ratio and maximum pressure?
 - f) Compare air-standard and actual cycles.
 - g) What is exhaust blowdown?
 - h) Explain why rich mixture is required for idling.
 - i) The bore and stroke of single cylinder 4-stroke diesel engine are 80mm and 110mm respectively and the torque is 23.5Nm. Calculate the brake mean effective pressure of the engine.
 - j) What do you mean by multi fuel and dual fuel? Give examples.
- Q2 A spark ignition engine working on Otto cycle has the compression ratio 6. The initial pressure and temperature of air are 1 bar and 37 °C. The maximum pressure in the cycle is 30 bar. For unit mass flow calculate (i) p, V and T at various point of the cycle and (ii) the ratio of heat supplied to heat rejected. Assume $\gamma=1.4$ and $R=8.314\text{kJ/kmol K}$. (10)
- Q3 a) With neat sketch explain battery ignition system. (5)
b) Compare battery ignition system and magnetic ignition system. (5)
- Q4 a) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation. (5)
b) Explain with figure various types of combustion chambers used in CI engines. (5)
- Q5 a) Define indicated power and brake power. (5)
b) Draw and explain performance plot with respect to speed of an engine (5)
- Q6 a) Specify the main emissions from a multi cylinder passenger car CI engine. How is the air fuel ratio controlled so as to reduce emissions? (5)
b) What is a driving cycle? Discuss its significance with regard to emissions (5)
- Q7 What do you mean by supercharging? Explain different supercharging methods. (10)
- Q8 Write short notes on any two. (5 x 2)
- a) Fuel injection system in CI engines.
 - b) Wankel rotary combustion engine.
 - c) Cooling of engine.
 - d) Variable Valve timing engines.