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ASSIGNMENT - 3 HEAT ENGINES

Q-1

For an standard otto cycle maximum and temperatures are 1350°c and 30 °c . Heat supplied 750 kj/ kg of air calculate compression ratio air standard efficiency , work done/kg of air ,ratio of maximum to minimum pressure .

Q- 2

A petrol engine has swept volume of 500 cm3 and clearance volume of 55 cm3 At suction pressure and temperature in the cycle is 1450 degree celcius calculate air standard efficiency and mean effective pressure of the cycle

Q-3

In diesel cycle the temperature at the beginning of compression is 87° c If r =14 find temperature at end of compression If the temperature at the and of compression if the temperature at the beginning and end of the expansion are 1796° c and 677°c respectively calculate thermal efficiency Of the cycle.

Q-4

An air standard Diesel cycle has a compression ratio of 16 The pressure and temperature AT the beginning of compression stroke is 1 bar and 20° ᶜ the maximum temperature is 1431° c . determine the thermal efficiency and mean effective pressure for this cycle.

Q-5

The compression ratio 0f an oil engine working on Diesel cycle is 15 cut off takes place at 12 ·/. of the working stroke . the air draws in to cylinder at 100 k Pa and 27°c Assume c_p=1.006 kj/kg K and c_v= 0.717 kj/ kg K calculate

   (1) Temperature at the end of compression

   (2) Pressure at the end of compression

   (3) Air standard efficiency of the cycle

Q-6

In air standard otto cycle the maximum and minimum temperatures are 1673 K and 288 k . The heat supplied per kg of air is 800 kj calculate

   (1) The compression Ratio

   (2) Efficiency

   (3) Maximum and minimum pressures

Take c_v =0.718 kj /kg K and   Y=1.4 For

Q-7

In an ideal Diesel cycle the end of compression are 57° c and 609°c respectively . the end of

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compression are 57°c and 603°c respectively the temperatures at beginning and end expansion are 1950°c and 870°c respectively Determine the ideal efficiency of the cycle if pressure at beginning is 1.0 bar calculate maximum pressure in the cycle.

Q-8

A four cylinder two stroke petrol engine with storke to bore ratio 1.2 develops 32 kw brake power at 2500 rpm The mean effective pressure in each cylinder is 9 bar and mechanical efficiency is 86%

Determine (1) Diameter and storke of each cylinder (2) brake thermal efficiency and indicated thermal efficiency and indicated thermal efficiency if the fuel consumption is 9 kg /hr having C.V =43000 kj/kg