

Mechanical/Automobile

QP Code : **31122**

(3 Hours)

[Total Marks: 80

- NB: 1) Question number **one** is compulsory
2) Attempt any **three** questions from remaining questions
3) Assume suitable data wherever necessary and state it clearly
4) Figures to the right indicates maximum marks

- Q1 Attempt any five of the following (20)
- Differentiate between 4- Stroke and 2-Stroke Engine
 - What are the requirements for spark plug
 - What is Dissociation? What are its effects?
 - Explain stages of combustion in CI engines.
 - Explain any one type of cooling system in engine with its advantages.
 - What are the limitations of simple carburetor?
- Q2 a) What are the functions of lubrication? State required properties of lubricating oil. (08)
- b) In a Trial of single cylinder diesel engine the following observations were made: Calorific value of fuel = 43890 kJ/kg, Oil consumption = 10.2 kg/h, Speed = 1900 rpm, Air consumption = 3.8 kg/min, compression ratio = 15, Torque = 186 Nm, Quantity of cooling water used = 15.5 kg/min, Temp. rise = 36°C, Exhaust gas temp. = 410°C, Room Temp. = 20°C, Cp of exhaust gases = 1.17 KJ/kg k
Calculate: i) B.P ii) BSFC iii) Heat Balance sheet on minute basis. (12)
- Q3 a) Explain with sketch working of battery ignition system with its advantages and dis-advantages. (10)
- b) A perfect gas at 1 bar and 290 K undergoes ideal diesel cycle. The maximum pressure of the cycle is 50 bar. The volume at the beginning of compression is 1m³ and after constant pressure heating is 0.1m³. Determine the temperature at all salient points of the cycle and also find out the efficiency of the cycle. Take $\gamma = 1.4$ for the gas. (10)
- Q4 a) What is super charging and turbo charging? Describe in brief the methods of turbo charging. (10)
- b) The dimensions of carburetor are as follows. (10)
Venturi throat diameter is 20 mm with coefficient of discharge of 0.85, Fuel orifice diameter is 1.25 mm with coefficient of fuel flow of 0.66, the fuel surface is 5 mm below the throat. Compute
1) air fuel ratio for depression of 0.07 bar when nozzle lip is neglected
2) Air-fuel ratio when nozzle lip is considered

[TURN OVER

- Q5 a) Derive the efficiency of Air standard Otto Cycle. (10)
- b) What is scavenging? Explain various types of scavenging. (10)
- Q6 Write short note on (Any four) (20)
- a) Valve timing diagram for four stroke SI engine.
- b) Wankel engine.
- c) Alternate fuels in I.C. engines.
- d) Exhaust gas recirculation
- e) Different types of nozzle in Diesel fuel injection systems.
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