Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2013 Onwards) (Sem.–3)

INTERNAL COMBUSTION ENGINES

Subject Code : BTAE-303/401

Paper ID : [A3270]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1. Answer briefly :

a. Draw the p-v and T-s diagram for diesel cycle.

b. Explain the factors affecting the delay period in C.I. engines and summarize those.

c. Explain stages of combustion in CI engines.

d. Name different methods of petrol engine fuel supply systems.

e. What are the functions performed by a carburetor?

f. Explain the effect of spark retardation on engine performance.

g. What are the requirements of a diesel injection system?

h. Explain briefly dry sump method of lubrication.

i. Name the various parts of a water pump with the help of a sketch.

j. What are the limitations of turbo charging?

SECTION-B

Q2. Differentiate between a four stroke petrol engine and a four stroke diesel engine.

Q3. What is the function of a piston? Describe the piston with the help of a diagram.

Q4. Describe clearly the phasing of the fuel injection pump.

Q5. Explain the importance of lubricating an engine. Discuss viscosity rating. What does SAE 10W-30 mean?

Q6. What are the various methods of engine cooling? Explain the air cooling system with the help of a diagram.

SECTION-C

Q7. Compare *'Knocking'* in SI and CI engine with reference to the following engine variable-

a. Compression ratio.

b. Self ignition temperature of fuel.

c. Delay period of fuel.

d. Inlet temperature and pressure.

Q8. a. Derive the efficiency of an air standard Otto cycle.

b. Describe the working principle of an electronically controlled fuel injection system.

Q9. In a test on a single cylinder 4- stroke diesel engine with bore 400mm and stroke 450mm, the following observations were made: Duration of test : lhr, Fuel consumption: 7.5 Kg, C.V. of fuel : 44500kJ/Kg, Total Revolution : 12000/hr, Indicated mean effective pressure = 3.75 bar, Net brake load: 1500 N, Brake drum diameter = 180 cm, Rope drum diameter = 3cm, Jacket cooling Water = 600 Kg, Rise in cooling water Temp.= 42°C, Total air consumption: 560 Kg, Exhaust gas Temp.= 300°C, Room Temp.= 20°C, Specific Heat of exhaust gases = 1.01 kJ/Kg-K. Determine

a. Mechanical η

b. Indicated and brake thermal η

c. Draw up heat balance sheet on minute basis