21.11.2023 4020340 TE-I

Register No.:

750

October 2023

Time – Three hours
(Maximum Marks: 100)

[N.B. 1. Answer all questions under Part-A. Each question carries 3 marks.
2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART – A

1. State second law of thermodynamics.
2. What is throttling process?
3. List out any three air standard assumptions.
4. List out any three properties of radiation.
5. What is fuel injector? State the types of nozzles.
6. What is the function of oil pump? List out its types.
7. What is the use of Orsat apparatus? List out the absorber and absorbent used in the apparatus.
8. Define mechanical efficiency.
9. List out the types of refrigeration systems.
10. List out any six psychrometric properties.

PART – B

11. (a) (i) Derive the general expression for the change in entropy during a process.(7)
(ii) Derive the expression for work done during Isothermal process.(7)

(Or)

[Turn over.....

(b) The initial volume of 0.18 kg of a certain gas is $0.15m^3$ at a temperature of 15^0C and pressure of 100 kN/m^2. After adiabatic compression to $0.056m^3$, if the pressure is found to be 400 kN/m^2, find (i) Ratio of specific heat (ii) Changes in internal energy.

12. (a) Derive an expression for air standard efficiency of Otto cycle.

(Or)

(b) The compression ratio and cut of ratio of a diesel engine is 14 and 2.2 respectively. Pressure and temperature at the beginning of compression are 0.98 bar and 300 K respectively. Obtain the values of pressure and temperature at all salient points of the cycle.

13. (a) Draw and explain valve timing diagram of four stroke petrol and diesel engines.

(Or)

(b) Explain the working of magneto coil ignition system with a neat sketch.

14. (a) Explain the procedure for finding the calorific value of Bomb calorimeter.

(Or)

(b) A six cylinder four stroke petrol engine has a compression ratio of 4.5:1. The clearance volume is 100 cc per cylinder. The engine consumes 10 kg of fuel per hour whose calorific value is 42000 kJ/kg. The engine runs at 2400 rpm. Assume the relative efficiency as 60%. Estimate average indicated mean effective pressure developed.

15. (a) Explain vapour compression refrigeration system with a neat sketch.

(Or)

(b) Explain the working of room air conditioning with a neat sketch.
