ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : MAY / JUNE 2010

REGULATIONS : 2007

THIRD SEMESTER : ELECTRICAL & ELECTRONICS ENGINEERING

070120032 - APPLIED THERMODYNAMICS

TIME : 3 Hours   Max.Marks : 100

PART - A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. State zeroth law of thermodynamics.

2. Define Phase.

3. Differentiate macroscopic and microscopic approach.

4. What are the formulations obtained from second law of thermodynamics?

5. What are the assumptions done during air standard cycle analysis?

6. Define mean effective pressure.

7. What are the differences between two stroke and four stroke engines?

8. What are the processes that formulate air-standard Brayton cycle

9. How boilers are classified?

10. What is fire tube and water tube boiler?

11. What is the function of economizer in steam power plant?

12. List any two difference between open cycle and closed cycle gas turbine power plants.

13. What is meant by compounding of steam turbines?

14. Why governing is needed in steam turbines?

15. Give the classification of compressors.

16. What is the condition to minimize compression work during two-stage compression?

17. Define tonnage of refrigeration.

18. Define COP.

19. Relative Humidity (RH)

20. Differentiate summer and winter air-conditioning.

PART – B

(5 x 12 ≈ 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. Explain application of first law of thermodynamics to open and closed systems.

22. Explain thermodynamic system, surrounding and universe. Differentiate among open system.

23. Give the constructional details of a two stroke IC Engine and explain the working principle.

24. An engine of 250 mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 0.00263 m3. The initial pressure and temperature are 1 bar and 50°C. If the maximum pressure is limited to 25 bar. Find
(1) The air standard efficiency of the cycle.
(2) The mean effective pressure for the cycle.

25. Discuss the generation of steam at constant pressure. Show various processes on temperature volume diagram.

26. 10 kg of wet saturated steam at 15 bar pressure is superheated to the temperature of 290°C at constant pressure. Find the heat required and the total heat of steam. Dryness fraction of steam is 0.85.

27. An air compressor compresses atmospheric air at 0.1MPa and 27^{0}C by 10 times of inlet pressure. During compression the heat loss to surrounding is estimated to be 5% of compression work. Air enters compressor with velocity of 40m/sec and leaves with 100m/sec. Inlet and exit cross section area are 100cm^2 and 20cm^2 respectively. Estimate the temperature of air at exit from compressor and power input to compressor.

28. Explain working of window air conditioning system with neat sketches

*****THE END*****