Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

ELECTRICAL AND ELECTRONICS ENGINEERING

2nd Semester

ME 8253 POWER PLANT ENGINEERING

(Regulation 2012)

Permitted to use steam tables

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is a super critical boiler?
2. List the advantages of cogeneration systems
3. Depict the p-v plot of a Otto cycle
4. Represent the working of a combined cycle power plant in a T-S plot
5. Give any 2 examples of nuclear fissile materials
6. List any 4 ideal characteristics to be possessed by control rods
7. What is Betz limit?
8. Gist on the term "ring of fire" with respect to a renewable energy source
9. Compute the life cycle cost of a 40 W incandescent lamp
10. Mention the applications of load curves

Part – B (5 x 16 = 80 marks)

11. In a single heater regenerative cycle the steam enters the turbine at 30 bar, 400°C and the exhaust pressure is 0.1 bar. The feed water is a direct contact type one which operates at 5 bar. Find
    a) Efficiency & steam rate of the cycle
    b) Decrease in mean temperature of heat addition, efficiency and steam rate as compared to rankine cycle without regeneration

12. a) For a gas turbine power plant operating between 30°C and 900°C determine the following:
        (i) R_p for zero work
        (ii) R_p for maximum net work
        (iii) Brayton cycle efficiency

(OR)

b) (i) With a neat sketch explain the working of a diesel cycle power plant

(ii) Compare the thermodynamic process, merits and demerits of Rankine vis-à-vis Brayton cycle power plants

13. a) Compare the merits and demerits of PWR, BWR, CANDU and Liquid Metal Cooled nuclear power plants

(OR)

b) (i) Brief on a nuclear fission reaction (4)

(ii) With a neat sketch explain the role of various components employed in a typical nuclear reactor (12)

14. a) (i) Explain the biomethanation process adopted for recovering energy from wastes

(ii) Compare floating drum and fixed dome biomethanation plants

(OR)

b) (i) Explain the working of a horizontal axis wind energy conversion system with all its control systems (12)

(ii) Compare the merits and demerits of vertical axis and horizontal axis wind mills (4)

15. a) A power station has to supply load as follows

Time (hours)	0 – 6	6 – 12	12 – 14	14 – 18	18 – 24
Load (MW)	30	90	60	100	50

(i) Draw the load curve and load duration curve

(ii) Select suitable generating units to supply the load

(iii) Calculate the load factor

(iv) Calculate the capacity of the plant and the plant capacity factor

(OR)

b) A promoter is considering a power project requiring an investment of Rs 50 crores. Life of the project is 10 years and has insignificant salvage value. The estimated cash flows are given as follows.

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Cash inflow in crores	10	11	14	15	25	27	30	30	30	30

Compute the following

(i) Payback Period (ii) ARR

(iii) IRR (iv) NPV @ 10 % discount rate