B.E./B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATION, April/May 2014
Mechanical Engineering Branch
Seventh Semester- REGULATIONS 2004/2008

ME482/ME9401 – POWER PLANT ENGINEERING

Time : Three hours   Maximum : 100 marks

Answer ALL questions
Part A – (10 × 2 = 20 marks)

1. What is Heliostat?

2. Why cogeneration system efficiency will be higher?

3. What is 'minimum fluidization velocity' in fluidized bed combustion (FBC)?

4. What is a CANDU type reactor?

5. What is the need of draft tubes in hydro power plant?

6. What is the role of membrane in PEM fuel cell?

7. What is calorimeter?

8. What are the various flow meters employed for measuring flow rates in power plant?

9. What are the benefits of load curve?

10. What are the reasons identified for poor performance of thermal power stations?

Part B – (5 × 16 = 80 marks)

11. (i) Give the layout of diesel engine power plant. What are the advantages and disadvantages of diesel power plants?   (10)
    (ii) Discuss the methods to improve the performance of the gas turbine power plant.   (6)

12.a) (i) Describes the boiling water reactor with the help of neat sketch.   (10)
    (ii) Explain how the Rankine cycle efficiency is improved by the following:
        1. Increasing the pressure of steam and
        2. Lowering the condenser pressure   (6)

(Or)

b) What are the different types of pulverizing mills? Explain with its neat sketch.

13.a) Draw a flow diagram of a typical hydroelectric power plant by consisting of its essential elements and describe the function of essential elements.

(Or)

b) (i) Explain the functional method of Geo-thermal power plant with a neat sketch.
(8)
(ii) With sketches explain how wind energy can be tapped in different ways for our energy requirements.
(8)

14.a) (i) Explain the procedure for measuring CO_2 content in the exhaust flue gas. (8)
(ii) Explain the working of strain gauge pressure transducer. (8)

(Or)

b) What do you understand by paramagnetic effect? How it is used to measures O_2 in the exhaust gases? Explain the working of O_2 meter with a neat sketch

15.a) What are the elements which contribute to the cost of the electricity? and how can the cost power generation be reduced?
(Or)

b) The following data relate to a 10 MW power station:

Cost of plant	=	Rs 1200 per kW
Interest, insurances, and taxes	=	5% per annum
Depreciation	=	5%
Cost of primary distribution	=	Rs. 5,00,000
Interest, insurances, taxes and depreciation	=	5%
Cost of coal including transportation	=	Rs. 4.4 / kN
Operating cost	=	Rs. 5,00,000
Plant maintenance cost		
(i) Fixed	=	Rs. 20,000 per annum
(ii) Variable	=	Rs. 30,000 per annum
Installed plant capacity	=	10,000 kW
Maximum demand	=	9,100 kW
Annual load factor	=	0.5
Consumption of coal	=	2,55,000 kN

Determine the following:
(i) Cost of power generation per kW per year
(ii) Cost per kWh generated