

Total No. of Questions : 12]

SEAT No. :

P3126

[Total No. of Pages : 4

B.E. (Mechanical)
POWER PLANT ENGINEERING
(2008 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer any three questions from each section.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of Calculator is allowed.*
- 6) *Use of steam table is allowed*
- 7) *Assume Suitable data if necessary*

SECTION - I

UNIT I

- Q1)** a) Explain present status of power generation in India and Maharashtra. Comment on impact of power generation on economical development of nation. **[8]**
- b) A diesel power plant consists of two units of 500 KW capacities and one unit of 200 KW. The fuel used has calorific value of 40,000KJ/Kg and fuel consumption is 0.25 Kg/Kwh. Determine quantity of fuel required for a month of 30 days and its cost if fuel cost is Rs.4000/ton. Take capacity factor of plant as 50% and also find overall efficiency of plant. **[8]**

OR

- Q2)** a) Discuss relative merits and demerits of thermal, hydraulic and nuclear power plant. **[8]**
- b) Explain performance and operating characteristics of power plant using terms input output curve, efficiency, heat rate and incremental heat rate. **[8]**

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P.T.O.

UNIT II

- Q3) a)** Comment on COM, CWM, and CMM fuels as a replacement to conventional coal as a fuel for thermal power plant. [6]
- b) In a cogeneration plant, 25 Kg/s steam enters turbine at 40 bar and 400°C. 20% of steam is withdrawn for process heating at 3 bar and remaining continues to expand in turbine up to condenser pressure of 0.08 bar. Neglect pump work. Represent cycle on T-S diagram. [12]
- Find
- Thermal efficiency of cycle
 - Capacity of power plant in MW
 - Effectiveness of cogeneration

OR

- Q4) a)** Explain construction and working of impact mill and ball mill for pulverization of coal. [8]
- b) The steam at 70 bar and 500°C is supplied to the steam turbine. Steam is expanded in high pressure turbine isentropically till it is dry saturated. The steam is reheated to 400° C passing to reheater. Expansion after reheating is carried to condenser pressure up to 0.2 bar. Find efficiency of cycle and work output if flow of steam is 10 Kg/sec. consider pump work. Represent cycle on TS and hS plot and sketch flow diagram. Find [10]
- Reheating pressure
 - Dryness fraction of steam at low pressure turbine outlet.
 - Thermal efficiency of cycle
 - Work ratio

UNIT III

- Q5) a)** Explain the term runoff, hydrograph and flow duration curve for hydroelectric power plant. [6]
- b) In a gas turbine power plant air enters in compressor at 20° C and 1 bar. The maximum temperature of cycle is limited to 700° C and maximum pressure ratio is limited to 6. The effectiveness of regenerator is 0.7.

Assuming following data find

[10]

- i) A: F ratio.
- ii) Thermal efficiency of cycle.

Calorific value of fuel used 35000 KJ/Kg. C_p of air 1 KJ/KgK and $\gamma = 1.4$. Sketch the flow diagram and represent cycle on TS plot.

OR

- Q6) a) Explain with neat sketch various functional elements of hydroelectric power plant. [8]
- b) What is combined power plant? What are its advantages over conventional power plant? Sketch gas and steam combined power plant. [8]

SECTION II

UNIT IV

- Q7) a) Describe in brief with neat sketch construction and working of gas cooled reactor. [8]
- b) Explain construction and working of diesel power plant. [8]

OR

- Q8) a) Sketch and explain pressurized water reactor. [8]
- b) Explain performance operating curves for diesel power plant. [8]

UNIT V

- Q9) a) Explain with neat sketch, construction and working of power transformer. [8]
- b) Explain with neat sketch, construction and working of central receiver solar power plant. [10]

OR

- Q10) a) Explain with neat sketch, construction and working of fuel cell and MHD. [10]
- b) State function of electrical equipment in power plant engineering [8]

UNIT VI

- Q11)** a) Discuss causes and effects of oxides of sulphur, nitrogen and carbon generated in power plant emission. [8]
- b) Explain noise pollution caused by thermal power plant and its control. [8]

OR

- Q12)** a) Write short note on [8]
- i) Acid precipitation
 - ii) Thermal pollution.
- b) Write short note on [8]
- i) Green house effect.
 - ii) Global warming.

