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TME-801

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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0480

Roll No.

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**B.Tech.**(SEM VIII) EVEN SEMESTER THEORY EXAMINATION,  
2009-2010**POWER PLANT ENGINEERING**

Time : 3 Hours

Total Marks : 100

- Note :** (i) Attempt *ALL* questions.  
(ii) All questions *carry equal marks*.  
(iii) Assume suitably any missing data.-

**1. Attempt any two parts of the following : (2×10=20)**

- (a) (i) A power plant has following annual factors :

Load factor = 70%, capacity factor = 50%, use factor = 60%. If the maximum demand is 20 MW, capital investment = Rs. 8000 per kW, rate of interest and depreciation = 10%, fuel cost = Rs. 2000/- per ton, fuel consumption = 0.8 kg/kWh. Find :

- (A) reserve capacity of the plant  
(B) hours during which plant is not in operation per year  
(C) cost of generation/kWh.  
(ii) Draw the typical daily load curves for winter and summer season for municipal load and single shift industry.

- (b) (i) Define the diversity factor and explain how it affects the load factor of the plant.
- (ii) Compare industrial production and power generation.
- (iii) Explain the principal of economic scheduling the load among the different units of a power plant.
- (c) Discuss the following :
- (i) load duration curve and energy load curves.
- (ii) Proximate analysis of coal.

2. Attempt any two parts of the following : (2x10=20)

- (a) Draw and explain general layout of thermal power plant. Also make typical material (water, coal, air etc.) requirement for 100 MW coal fired thermal power plant.
- (b) Write short notes on :
- (i) Ash handling
- (ii) Flange heating
- (c) (i) Explain the working of ESP with neat sketch.
- (ii) What are the major draw backs of conventional FBC (fluidized bed combustion) and what changes are suggested to overcome these drawbacks?

3. Attempt any two parts of the following : (2x10=20)

- (a) (i) Name the essential components of diesel electric plant. Why these plants are preferred as peak load and stand-by plants ?
- (ii) Name different lubrication system used in diesel engine. Discuss the function of lubricants in diesel engine and why cleaning of lubricant is needed ?
- (b) (i) Compare closed cycle and open cycle gas turbine plant.
- (ii) Discuss the construction of combustion chamber for gas turbine plant.
- (c) Write short notes on :
- (i) Starting system of gas turbine plant
- (ii) Diesel fuel injection system

4. Attempt any two parts of the following : (2x10=20)

- (a) (i) What is the importance of rainfall and runoff data in the design of hydroelectric power plant ? What factors affect the runoff data at particular site ?
- (ii) State different factors to be considered while selecting the site for hydroelectric plant.
- (b) (i) Explain difference between fast and thermal neutron. Why thermal neutron can cause fission of  ${}_{92}\text{U}^{235}$  but not of  ${}_{92}\text{U}^{238}$  ?
- (ii) Explain the working of BWR reactor with neat sketch.

(c) Write short notes on :

- (i) Geothermal energy
- (ii) Moderators in reference to nuclear power plant.

5. Attempt any two parts of the following : (2x10=20)

- (a)
  - (i) Discuss the principal and working of piezoelectric pressure transducers.
  - (ii) Discuss the different methods of transformer cooling.
- (b) List the various gaseous pollutants from thermal power plant. What are their adverse effect and how will you control these pollutants ?
- (c) Write short notes on following :
  - (i) Pollution from nuclear power plants
  - (ii) Working of Orsat apparatus for exhaust gas analysis

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