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Paper Code: EME-801	**Roll No.**									

B.Tech.
(SEM VIII) EVEN SEMESTER EXAMINATION, 2015-16
POWER PLANT ENGINEERING

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- Attempt All Questions. All Questions carry equal marks.

Q.1 Answer any **two** of the following. **[10x2=20]**

(a) Discus load curve, laod duration curve and energy load curve. Also draw these curves for the case of street lighting and single shift industry type of power consumption pattern.

(b) The estimated total annual cost of two units are as follows:-

Annual cost for unit A = Rs 600000 + 3 kW + 0.015 kWh

Annual cost for unit B = Rs 750000 + 5 kW + 0.014 kWh, where kW & kWh represent the capacity and total energy output of the plant respectively. The plants are to be used for supplying the load to a system whose annual load duration curve is a straight line with maximum load of 5 MW and minimum load of 1 MW. What plant should be used to supply the base load and what should be its installed capacity for economic operation of the plant. Also find the load factor and use factor for the plants used as base load and peak load plant.

(c) The following data relates to a steam power station of 120 MW capacity which takes 100 MW peak demand at 80% load factor
Capital investment = Rs 25000 per kW installed, interest & depreciation = 10% per year,
fuel cost = Rs 2000 per tone, calorific value of fuel = 25 MJ/kg, overall efficiency of the plant = 28%, operating cost excluding fuel = Rs $2x10^7$ per year, annual maintenance cost = Rs $2x10^6$ (fixed) and Rs $4x10^6$ (variable). Find the annual energy generated and cost of generation for one unit of electricity.

Q.2 Answer any **two** of the following. **[10x2=20]**

(a) Draw a general layout of thermal power plant. Discuss the effect of volatiles and ash content in coal on the furnace design.

(b) Answer the following.
(i) Discuss the hot lime-soda process for feed water treatment.
(ii) Why the coal storage is needed at plant site? How the coal is stored in heaps?

(c) Write short notes on the following
(i) Fluidized bed combustion
(ii) Flange heating

Q.3 Answer any **two** of the following. **[10x2=20]**

(a) Draw a general layout of diesel engine power plant showing all the systems. Discuss different methods used for starting diesel engines.

(b) Discuss the selection of compressor and the construction of combustion chamber for gas turbine power plant.

(c) Discuss combined cycle power plant in detail.

Q.4 Answer any **four** of the following **[5x4=20]**

(a) Discuss the different methods used to find the average rain fall.

(b) List the different factors to be considered for selecting the site for hydroelectric power plant.

(c) Make comparison between PWR and BWR nuclear reactor.

(d) How the nuclear reactors are classified?

(e) Define runoff. What factors affect the runoff data at particular site.

(f) Discuss the working of double basin tidal power plant with neat sketch.

Q.5 Answer any **two** of the following. **[10x2=20]**

(a) Answer the following
(i) Explain the working of air circuit breaker.
(ii) Discuss hydrogen cooling method of cooling large capacity generators.

(b) Answer the following
(i) Discuss the principal and working of piezoelectric transducers for pressure measurements.
(ii) Classify the various temperature measuring instruments and discuss the working of radiation pyrometer.

(c) List the various gaseous pollutants from thermal power plant. What are their adverse effects and how will you control these pollutants.