PAPER ID-410722

Subject Code: RME071

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B.TECH
(SEM-VII) THEORY EXAMINATION 2021-22
POWER PLANT ENGINEERING

SECTION A

1. Attempt *any 07 parts* questions in brief. 7x2=14

a.	How load factor affects the cost per kWh in power plants?
b.	What are the elements that contribute to the cost of the electricity? How the cost of power generation can be controlled?
c.	Differentiate between boiler mountings and accessories with example
d.	Draw the general layout of steam power plant and label its important components.
e.	Differentiate between wet sump and dry sump lubrication system
f.	Why is the maximum cycle temperature of gas turbine plant much lower than that of diesel power plants?
g.	What is thermal neutron? Name some common nuclear fuels.
h.	Explain the run-off size of plant in context with hydro-electric power plants.
i.	Explain the importance of generator, transformer and bus bar in power plants
j.	Name the pollutants associated with power generation along with their source.

SECTION B

2. Attempt any *03 parts* of the following: 3x7=21

a.	The load requirements of a power station are as follows: **Time (hours)** | 0-6 | 6-12 | 12-14 | 14-18 | 18-24 **Load (MW)** | 30 | 90 | 60 | 100 | 50 (a) Draw the load curve (b) draw load duration curve (c) select suitable generating units to supply the load (d) calculate the load factor (e) calculate the capacity of the plant (f) calculate plant capacity factor.
b.	Analyze the effect of fitting preheater, superheater, economizer, reheater and feed water heater on the boiler performance. Justify your answers by plotting P-v, T-s and h-s diagrams.
c.	Compare the constructional details and working of steam and gas turbine power plants. Demonstrate the technique to create combined cycle (steam and gas) power plant.
d.	Classify different types of reactors used in India. Discuss the constructional details and working of Pressurized water reactor (PWR) and Boiling water reactor (BWR) with neat sketch.
e.	Explain the constructional details of a transformer. Also explain the method of cooling the transformer. What is the role of bus bar in electricity distribution?

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SECTION C

3. Attempt any *01* part of the following: 1x7=7

(a)	Enumerate the major and minor sources of energy. What are the main limitations of minor sources of energy? Why is electrical energy the most convenient form of energy?
(b)	Discuss the economics of power plant selection. Also explain the pros and cons of thermal, nuclear, solar, hydro, tidal, wind and geothermal power plants.

4. Attempt any *01* part of the following: 1x7=7

(a)	Explain with the help of neat sketch the constructional details and working of fluidized bed combustion (FBC). State the advantages of FBC combustion over conventional system
(b)	Differentiate between subcritical boiler and supercritical boiler. Also, explain the principle of supercharged boiler

5. Attempt any *01* part of the following: 1x7=7

(a)	Draw the schematic layout of Diesel power plant. Compare diesel power plant with steam power plant.
(b)	Mention any two drawbacks of stationary gas turbine power plants. Also, explain cogeneration

6. Attempt any *01* part of the following: 1x7=7

(a)	Explain the purpose of the following components used in nuclear reactors (a) reflector (b) control rods (c) biological shield (d) moderator
(b)	Discuss various factors that need to be considered while selecting the site for hydro-electric power plant. Examine the feasibility of using solar, wind, hydro-electric, geo-thermal and tidal power plant in place of steam power plant. Give suitable example to justify your explanation.

7. Attempt any *01* part of the following: 1x7=7

(a)	Explain the instrumentation system associated with power plant operation. Also explain the utility of control rooms.
(b)	What is acid rain? Enumerate its reasons and ways to control it. Also explain the contribution of power plants in GHG emissions and global warming.