PAPER ID-310957

Subject Code: KME076

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VII) THEORY EXAMINATION 2023-24
POWER PLANT ENGINEERING

TIME: 3 HRS **M.MARKS: 100**

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.
2. Use of Steam Tables is permitted

SECTION A

1. Attempt *all* questions in brief.

Qno.	Question	Marks	CO
a.	What are conventional and non-conventional power plants? Give examples.	2	1
b.	Differentiate between subcritical and supercritical boilers.	2	1
c.	Define surge tank. What is its function?	2	2
d.	Discuss intercooling and reheating in a gas turbine power plant.	2	2
e.	Explain the working principle of fast breeder reactors.	2	3
f.	Define solar thermal collectors. Give examples.	2	3
g.	How does a horizontal-axis wind turbine differ from a vertical-axis wind turbine?	2	4
h.	What is tidal energy? Name the essential components of a tidal power plant.	2	4
i.	Explain the function of a switchgear.	2	5
j.	Discuss peak load and base load power plants.	2	5

SECTION B

2. Attempt any *three* of the following:

a.	Draw the general layout of a modern coal-based thermal power plant. Explain the four main circuits in the steam power plant.	10	1
b.	Classify hydroelectric power plants. Explain the working of a pumped storage type hydropower plant	10	2
c.	Explain the working of a BWR with the help of a neat sketch. How is it different from a PWR?	10	3
d.	Illustrate the working principle of a fuel cell with the help of a diagram. Write their applications.	10	4
e.	Discuss various types of tariffs and explain any two of them.	10	5

SECTION C

3. Attempt any *one* part of the following:

a.	In a Rankine cycle, the steam at the inlet to the turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.2 bar. Calculate: (i) The pump work, (ii) The turbine work, (iii) The Rankine efficiency, (iv) The condenser heat flow, (v) The dryness at the end of the expansion. Assume a steam mass flow rate of 9.5 kg/s.	10	1
b.	Discuss the factors to be considered for site selection of a steam power plant.	10	1

4. Attempt any *one* part of the following:

a.	Draw the layout of the hydroelectric power plant with the help of a diagram. Describe briefly the functions of each component of the plant.	10	2
b.	What are combined cycle power plants? Explain the working of any one of them with neat sketch.	10	2

5. Attempt any *one* part of the following:

a.	Discuss the various parts of a nuclear power plant with the help of a neat sketch. Write their advantages and disadvantages.	10	3

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b.	Classify concentrating collectors. Discuss the advantages and disadvantages of concentrating collectors over flat plate collectors.	10	3

6. Attempt any *one* part of the following:

a.	Describe the working of a vapour-dominated geothermal system with the help of a schematic sketch. Write the advantages and disadvantages of the geothermal power plants.	10	4
b.	Explain Ocean Thermal Energy Conversion. Compare the working of open-cycle OTEC systems with closed-cycle OTEC systems.	10	4

7. Attempt any *one* part of the following:

a.	A generating station has the following daily load cycle: Time (Hours): 0—6 6—10 10—12 12—16 16—20 20—24 Load (MW): 40 50 60 50 70 40 Calculate (i) maximum demand (ii) units generated per day (iii) average load and (iv) load factor and draw the load curve.	10	5
b.	Write short notes on: (a) Pollution from thermal power plants and its control. (b) Protective electrical equipment in power plants.	10	5