Hi-Tech Institute of Engineering & Technology (220)

Sub Code: KME 076

B.TECH.

(SEM VII) THEORY EXAMINATION 2023-24

POWER PLANT ENGINEERING

Time: 3 Hours **Total Marks: 100**

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt all questions in brief.

Q No.	Question	Marks	CO
a.	What are the selection criteria of power plant unit?	2	1
b.	What do you understand by moderation?	2	3
c.	Define specific speed of hydraulic turbine.	2	2
d.	Differentiate between fission reaction and fusion reaction with suitable examples.	2	3
e.	Explain the principle of fuel cell in brief.	2	4
f.	Explain the function of Solar thermal collector.	2	3
g.	What are advantages of nuclear power plant?	2	3
h.	Define air cooling system.	2	1
i.	What are methods of ash handling?	2	1
j.	What is air fuel ratio (AFR) in power plant.	2	2

SECTION B

2. Attempt any three of the following:

Q No.	Question	Marks	CO
a.	Explain the working of BWR with neat sketch. Also compare BWR with PWR.	10	3
b.	Define the working principle of Geo thermal power plant? Explain it with help suitable diagram.	10	4
c.	Explain the function of all the components of wind turbine.	10	4
d.	Steam is supplied to a turbine at 30 bar and 350°C. The turbine exhaust pressure is 0.08 bar. The main condensate is heated regeneratively in two stages by steam bled from the turbine at 5 bar and 1.0 bar respectively. Calculate masses of steam bled off at each pressure per kg of steam entering the turbine and the theoretical thermal efficiency of the cycle.	10	1
e.	Discuss in details the significance of reheating, inter-cooling and regeneration on the performance of gas turbine by making suitable layout and T-s diagram.	10	2

SECTION C

3. Attempt any one part of the following:

Q No.	Question	Marks	CO
a.	Explain the function of Wilcox boiler. Also detail the working of Fluidized bed combustion.	10	1
b.	Discuss the load estimation and load curve for power plant calculation in detail.	10	5

4. Attempt any one part of the following:

Q No.	Question	Marks	CO
a.	With the help of neat sketch explain the general arrangement of all the major components of Hydroelectric power plant.	10	2
b.	A gas turbine plants consists of two stage compressor with perfect intercooler and a single stage turbine. If the plants work between the temperatures limits 300 K and 1000 K and 1 bar and 16 bar. Find the net power of the plant per kg of air. Take specific heat at constant pressure 1 KJ/kgK. Explain the working principle of a power transformer with the help of neat sketch.	10	2

5. Attempt any one part of the following:

Q No.	Question	Marks	CO
a.	With the help of neat sketch explain the function of CANDU. Also compare thermal neutron with un-moderated neutron.	10	3
b.	Why is supercharging necessary in diesel power plant? What methods are used for supercharging the diesel engine.	10	3

6. Attempt any one part of the following:

Q No.	Question	Marks	CO
a.	What are different methods to convert bio energy into useful energy? Explain biogas plant with neat sketch.	10	4
b.	Explain construction of solar cell. Also explain PV based power system with neat sketch showing all its components	10	3

7. Attempt any one part of the following:

Q No.	Question	Marks	CO
a.	Explain the working of wind power plant with neat sketch along with its limitation.	10	4
b.	Discuss purpose and classification of instrumentation. Also discuss different type of recorder and their use.	10	5