Code No: 137FT **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, December-2023/January-2024

POWER PLANT ENGINEERING

(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	List out the fuel handling equipments.	[2]
b)	Classify cooling Towers used in power plants.	[3]
c)	What are the various systems that form part of a diesel power plant?	[2]
d)	What is meant by a gas turbine with reheating arrangement?	[3]
e)	What is the need of spill ways?	[2]
f)	What is VAWT?	[3]
g)	What are fertile materials and fissile materials?	[2]
h)	What is meant by critical mass (of fuel) in a reactor?	[3]
i)	What is the need of load curves? Explain.	[2]
j)	How to control the pollution?	[3]

PART – B

(50 Marks)

2.a) Explain the basic FBC system with line diagram.

b) Draw line diagram and explain the working of hydraulic cooling tower. [5+5]

OR

3.a) With the help of line diagram, explain the central pulverized fuel handling system.

b) What for draught system is used and explain its significance. [5+5]

4.a) How to achieve the turbocharging of internal combustion engines? Explain them.

b) Explain the principle of operation of combined cycle power generation system and compare it with the stand-alone power generation units. [5+5]

OR

5.a) What are the various factors to be considered while selecting the site for diesel engine power plant?

b) What are the methods by which solar energy can be converted into electricity? [5+5]

6.a) Compare and contrast between storage and pondage.

b) Draw line diagram and explain how the low temperature solar power plant works. [5+5]

OR

7.a) Draw the line diagram and explain the working details of hydro power plant giving salient points.

b) Draw the general layout of tidal power plant and what are the limitations of that plant.[5+5]

8.a) Describe the principle of operation of sodium Graphite reactor used for the nuclear power generation and explain the corresponding chemical reactions.

b) What are different methods to dispose the radioactive waste to avoid environmental pollution? Explain. [5+5]

OR

9.a) What are different types of moderators used in the nuclear power plants? Explain the significance of moderators in the plants.

b) What do you understand by the gas cooled nuclear reactor and discuss the principle along with a neat sketch. [5+5]

10.a) Enumerate briefly various methods used to calculate the depreciation cost.

b) A generation station supplies the following loads 15MW, 12MW, 8MWand 0.5MW. The station has a maximum demand of 20MW and the annual load factor is 0.5. Find
i) Number of units supplied annually ii) Diversity factor. [5+5]

OR

11.a) Enumerate the latest pollution laws in existence in India.

b) The yearly duration curve of a certain plant can be considered as a straight line from 150 MW to 40 MW. The power is supplied with one generating unit of 100 MW and two units of 40MW each. Calculate installed capacity, load factor, Plant factor, utilization factor and Maximum demand. [5+5]

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