QPC: RJ20MTECH051 AR 19 Reg. No | | | | | | | | | | |

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester – Regular) Examinations, June – 2021

MPETE 1031 – THERMAL AND NUCLEAR POWER PLANT

(Heat Power and Thermal Engineering)

Time: 2 hrs Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A **(2 x 10 = 20 Marks)**

Q.1. Answer ***ALL*** questions

a. Define heat rate and steam rate.
b. What are the advantages of reheat cycle over simple ranking cycle?
c. What is an HTGR? Why is it called magnox?
d. Define the term TTD? Under what case it is positive and negative?
e. What is Steam Trap and state its Function?
f. How a fly ball governor is used with ahydraulic control?
g. Define bleeding in steam power plant?
h. What are the desirable properties of agood moderator?
i. What are the advantages of gas cooled reactor nuclear power plant?
j. What do you mean by radioactive decay?

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks

2. What do you mean by cogeneration? What are the reasons for promoting cogeneration in decentralized environment- discuss. (6)

3. A textile factory requires 10 ton/h of steam at 37 bar and 345^{0}C for process heating at 3 bar saturated and 1000 KW of power for which a back pressure turbine of 70% internal efficiency is to be used. Find the steam condition at the exit of the turbine. (The enthalpy of steam at 3 bar saturated condition is 2725.3 kj/kg and at 37bar 345^{0}C, the enthalpy is 3085.3 kj/kg). (6)

4. Steam at 20 bar and 300^{0}C is supplied to a turbine in a cycle and is bled at 4 bar. The bled-steam just comes out saturated. This steam heats water in an open heater to its saturation state. The rest of the steam in the turbine expands to a condenser pressure of 0.1 bar. Assuming the turbine efficiency to be the same before and after bleeding, find: a) the turbine η and the steam quality at the exit of the last stage; b) the mass flow rate of bled steam 1kg of steam flow at the turbine inlet; c) power output / (kg/s) of steam flow; and d) overall cycle η. (6)

5. With neat sketch describe different types of super heater used for boilers. (6)

6. What are the different types of stokers used in a thermal power plant? Explain one with neat diagram? (6)

7. Explain the working principle of heavy water metal cooled reactor. (6)

8. Write short notes on: (i) Feed water treatment (ii) CANDU reactor (6)

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