GURU NANAK INSTITUTE OF TECHNOLOGY

An Autonomous Institute under MAKAUT

2022

POWER PLANT ENGINEERING

EE505D

TIME ALLOTTED: 3Hours **FULL MARKS:70**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable

GROUP – A

(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

		Marks	CO No.
1. i)	Economiser is used to heat a. Air b. feed water c. flue gases d. all above	1	CO1
ii)	Which of the following is a type of power plant? a. Thermal power plant b. Nuclear power plant c. Hydropower plant d. All of the mentioned	1	CO2
iii)	Since Coal has a low calorific value in a modern coal thermal station, efficiency is increased by additional processes that use of oil firing such as_____. a. Deionising b. Pulionising c. Re-ionising d. Pulverising	1	CO2
iv)	Which of the following is the cheapest plant in operation and maintenance? a. Thermal power plant b. Nuclear power plant c. Hydropower plant d. All of the mentioned	1	CO3
v)	In fuel cell, the _____ energy is converted into electrical energy. a. mechanical b. chemical c. heat d. sound	1	CO3

vi) Fuel cell converts chemical energy to electrical energy using a reaction that _____ 1 CO2

a. eliminates combustion of fuel
b. requires combustion of fuel
c. requires no ignition of fuel
d. fuel is not required

vii) A moderator, in nuclear power plants, is a medium introduced into the fuel mass in order to _____ 1 CO1

a. control the reaction
b. reduce the temperature
c. extract heat from nuclear reaction
d. slow down the speed of fast moving neutrons

viii) Which of the following are the components of a Steam Power Plant? 1 CO2

a. Boiler, Turbine, Condenser, Pump
b. Boiler, Turbine, Pump, Expansion valve
c. Evaporator, Condenser, Boiler, Turbine
d. Evaporator, Condenser, Boiler, Expansion valve

ix) A power plant giving least running cost of production of electrical power is 1 CO2

a. Steam power plant
b. Gas turbine power plant
c. Hydro electric power plant
d. Nuclear power plant

x) Which of the following contributes to the improvement of efficiency of Rankine cycle in a Thermal Power Plant? 1 CO1

a. use of high pressures
b. reheating of steam at intermediate stage
c. regeneration use of steam for heating Boiler feed water
d. all of the mentioned

xi) What is the ranging capacity of the diesel plant? 1 CO3

a. 50 – 750 Kw
b. 100 – 1175 kW
c. 75 – 3750 kW
d. 150 – 4575 kW

xii) Artificial draught is produced by 1 CO1

a. induced fan
b. forced fan
c. induced and forced fan
d. all of the above

GROUP – B
(Short Answer Type Questions)
(Answer any *three* of the following) **3 x 5 = 15**

		Marks	CO No.
2.	With a neat sketch explain the working of cyclonic dust collector.	5	CO2
3. a.	What are the most commonly used starting systems used in diesel power plants? Explain them briefly.	3	CO2
b.	Explain briefly the methods available to improve thermal efficiency of gas turbine plant.	2	CO2
4. a.	Discuss briefly with schematic diagram, integration of gas turbine plant with steam power plant.	3	CO3
b.	What is flow duration curve? What are the uses of flow duration curve?	2	CO3
5.	What are the discrete advantages of combined operation power plants? Explain briefly working of exhaust gas analyzer.	5	CO1
6.	What are the different types of engines used in a diesel electric plant? Discuss briefly.	5	CO3

GROUP – C
(Long Answer Type Questions)
(Answer any *three* of the following) **3 x 15 = 45**

		Marks	CO No.
7. a)	Discuss briefly the effects of supercharging on performance of Diesel power plant with relevant sketches.	5	CO2
b)	Describe about modified Rankine cycle.	4	CO3
c)	Explain with a simple sketch, working of pumped storage plant.	6	CO3
8. a)	What factors are to be considered in choosing a diesel engine as a prime mover?	5	CO1
b)	Explain with a simple block diagram working of a nuclear power station.	10	CO3
9. a)	Briefly discuss on cost analysis of any power plant.	10	CO2
b)	Prepare a rough heat balance sheet for a steam power station consuming 0.5kg of coal per kwh output. Take calorific value of a coal as 5000 kcal per kg. Assume boiler efficiency as 80% and electrical efficiency as 90%.	5	CO3
10.a)	Explain the pump storage plant in combination with steam and nuclear power plant.	5	CO1
b)	What is meant by auto - ignition? Why is excess air always used in a C.I engine?	5	CO2
c)	Discuss about load sharing and transfer of load between power stations.	5	CO3
11.	Write short notes on any *three* of the following:	3x5=15	
a)	Super Critical Boiler	5	CO1
b)	FBR (Fast Breeder Reactors)	5	CO2
c)	Principles of wind Power system	5	CO1
d)	Photovoltaic cell	5	CO3
e)	Maintenance and plant layout of a diesel electric station	5	CO2