GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, November – 2021

(Seventh Semester)

BELPE7041/BEEPE7041– POWER STATION ENGINEERING AND ECONOMY

(EE & EEE)

Time: 3 hrs   Maximum: 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   (2 x 10 = 20 Marks)

Q.1. Answer *ALL* questions   [CO#]   [PO#]

a. Which of the following is the essential requirement of peak load plant?   CO 1   PO 1
(i) It should run at high speed   (ii) It should produce high voltage
(iii) It should be small in size   (iv) It should be capable of starting quickly

b. Load factor of a power station is defined as   CO 1   PO 3
(i) Maximum demand/average load   (ii) Average load × maximum demand
(iii) Average load/maximum demand   (iv) Average load – maximum demand

c. In case of _____ the transportation of fuel is the major problem.   CO 4   PO 2
(i) Gas power plants   (ii) Nuclear power plants
(iii) Hydroelectric power plants   (iv) Thermal power plants

d. Which of the following is the disadvantage due to low power factor?   CO 1   PO 1
(i) Poor voltage regulation   (ii) Increased transmission losses
(iii) High cost of equipment for a given load   (iv) All of the above

e. Load factor of a power station is generally   CO 1   PO 3
(i) Equal to unity   (ii) Less than unity
(iii) More than unity   (iv) Equal to Zero

f. Load curve helps in deciding   CO 2   PO 3
(i) Total installed capacity of the plant   (ii) Sizes of the generating units
(iii) Operating schedule of generating units   (iv) All of the above

g. The area under a load curve gives   CO 2   PO 3
(i) Average demand   (ii) Energy consumed
(iii) Maximum demand   (iv) None of the above

h. Reflectors of a nuclear reactors are made of........   CO 2   PO 1
(i) Boron   (ii) Cast iron
(iii) Beryllium   (iv) Steel

i. The function of a surge tank is........   CO3   PO 1
(i) To supply water at constant pressure   (ii) To produce surges in the pipe line
(iii) To relieve water hammer pressures in the penstock pipe   (iv)none of the above

j. Which of the following plants is almost inevitably used as base load plant?   CO 3   PO 2
(i) Gas power plants   (ii) Nuclear power plants
Hydroelectric power plants   (iv) Pumped Storage plant

PART – B: (Short Answer Questions)   (2 x 10 = 20 Marks)

Q.2. Answer *ALL* questions   [CO#]   [PO#]

a. What do you understand by the load curve? What information is conveyed by a load curve?   CO 1   PO 2

b. What do you understand by (i) base load and (ii) peak load of a power station?   CO 2   PO 3

c. Discuss the different classifications of costs of electrical energy   CO 2   PO 3

d. What are the flow circuits of a thermal Power Plant?   CO 4   PO 2

e. What is Forced Draught?   CO 4   PO 2

f. What are the main disadvantages of BWR plants   CO 2   PO 1

g.	Explain about safety rod and shim rod in a nuclear reactor core	CO 2	PO 1
h.	What are the functions of draft tubes?	CO 3	PO 2
i.	What is a catchment area? Why is a reservoir required?	CO 2	PO 2
j.	Write the advantages of Hydro-electric power plants?	CO 2	PO 3

PART – C: (Long Answer Questions)　　　　　　(15 x 4 = 60 Marks)

Answer *ALL* questions

			Marks	[CO#]	[PO#]
3. a.	A generating station has a maximum demand of 25MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. Find (i) the reserve capacity of the plant (ii) the daily energy produced and (iii) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded.	8	CO 1	PO 3
b.	Explain the significance of the load factor and how load factor influence the cost of power generation	7	CO 1	PO 1

(OR)

c.	A power station has a maximum demand of 15000 kW. The annual load factor is 50% and plant capacity factor is 40%. Determine the reserve capacity of the plant.	7	CO 1	PO 3
d.	What is depreciation and explain any one method to calculate the depreciation value of a plant.	8	CO 2	PO 3
4. a.	What are the main functional differences between PWR and BWR?	8	CO 2	PO 1
b.	Illustrate the function of Nuclear reactor with a neat diagram	7	CO 2	PO 3

(OR)

c.	Explain the main features for choice of site selection of Thermal power plant	7	CO 3	PO 1
d.	Draw the Schematic diagram of a Thermal power station and explain about the steam circuit.	8	CO 3	PO 2
5. a.	What are the factors to be considered in selecting the site of a hydro-electric power plant ?	7	CO 4	PO 2
b.	A hydro-electric generating station is supplied from a reservoir of capacity 5×10^6 cubic meters at a head of 200 meters. Find the total energy available in kWh if the overall efficiency is 75%.	8	CO 4	PO 2

(OR)

c.	Explain about the Electrostatic precipitator with neat diagram		CO 3	PO 1
d.	What are the differences between Jet Condensers and Surface Condensers		CO 3	PO 1
6. a.	Explain the various types of hydro power plants	7	CO 4	PO 2
b.	Water for a hydro-electric station is obtained from a reservoir with a head of 100 meters. Calculate the electrical energy generated per hour per cubic meter of water if the hydraulic efficiency be 0·86 and electrical efficiency 0·92.	8	CO 4	PO 3

(OR)

c.	Calculate the average power in kW that can be generated in a hydro-electric project from the following data Catchment area = 5×10^9 m^2 ; Mean head, H = 30 m Annual rainfall, F = 1·25 m ; Yield factor, K = 80 % Overall efficiency, $\eta_{overall}$ = 70 % If the load factor is 40% , what is the rating of generators installed ?	8	CO 4	PO 3
d.	Find the specific speed of a turbine of 10MW capacity working under a head of 500m and having the normal working speed of 300 RPM.	7	CO 4	PO 3

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