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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Third Semester, B.E. - Electrical and Electronics Engineering
Semester End Examination; March - 2021
Power Plant Engineering

Time: 3 hrs   Max. Marks: 100

Course Outcomes

The Students will be able to:
CO1: Understand the conceptual working principles of conventional source of electric power generation.
CO2: Explain the detail descriptions of hydroelectric plants, nuclear power plants and gas power plants.
CO3: Analyze the power generation using non-conventional energy sources.
CO4: Understand the concept of load curves, and different tariff.
CO5: Understand the concept of ground and power factor.

Note: **I) PART - A** *is compulsory.* **Two** *marks for each question.*
II) PART - B: *Answer any* **Two** *sub questions (from a, b, c) for Maximum of* **18 marks** *from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I: PART - A	**10**			
1 a.	Mention the factors selection of site for a thermal station.	2	L2	CO1	PO2
b.	Write any four advantages of nuclear power station.	2	L1	CO2	PO2
c.	Define micro generation.	2	L1	CO3	PO2
d.	Define plant capacity factor and plant use factor.	2	L1	CO4	PO2
e.	What are the methods adopted for grounding system?	2	L1	CO5	PO2
	II: PART - B	**90**			
	UNIT - I	**18**			
1 a.	How the hydel plans are classified? Discuss briefly.	9	L2	CO1	PO2
b.	Briefly describe the main parts and the working of a steam power station.	9	L3	CO1	PO2
c.	Write short notes on; i) Penstock ii) Water hammer and Surge tank iii) Hydroelectric generator	9	L2	CO1	PO2
	UNIT - II	**18**			
2 a.	What are the classifications of the nuclear reactors? Describe briefly.	9	L2	CO2	PO2
b.	Explain with simple block diagram working of a nuclear power station.	9	L2	CO2	PO2
c.	Describe briefly the main components of a diesel electric plant.	9	L3	CO2	PO2
	UNIT - III	**18**			
3 a.	Describe briefly the various non-conventional methods of power generation.	9	L3	CO3	PO2
b.	Draw a neat typical geo thermal power plant block diagram and write a brief note on geothermal power and mention the advantages and disadvantages.	9	L3	CO3	PO2
c.	With a neat diagram, write a brief note on harnessing the tidal energy.	9	L2	CO3	PO2

UNIT - IV		**18**		

4 a. A generating station supplied the following loads:

150 MW, 120 MW, 85 MW, 60 MW and 5 MW. The station has a maximum demand of 220 MW. The annual load factor of the station is 48%. Calculate; | 9   L4   CO4   PO2

  i) The number of units supplied annually

  ii) The diversity factor

  iii) The demand factor

b. A power supply is having the following loads:

Type of load	Maximum demand (MW)	Diversity of Group	Demand Factor
Domestic	15000	1.25	0.7
Commercial	25000	1.2	0.9
Industrial	50000	1.3	0.98

9   L4   CO4   PO2

If the overall system diversity factor is 1.5, determine;

  i) The maximum demand

  ii) Connected of each type

c. The capital cost of a hydro-power station of 100 MW capacity is ` 1,000 per kW. The annual depreciation charges are 15% of the capital cost. A royalty of ` 2 per kW per year and ` 0.03 per kWh generated is to be paid for using the river water for generation of power. The maximum demand on the power station is 70 kW and annual load factor of 60%. Annual cost of salaries, maintenance charges etc is ` 10,00,000. If 20% of the expense is also chargeable as fixed charges, calculate the generation cost in two parts form. | 9   L4   CO4   PO2

UNIT - V		**18**		

5 a. Explain briefly the following:

  i) Arcing ground | 9   L2   CO5   PO3

  ii) Harmonic suppressors

b. Explain the resistance grounding system and neutral grounding system. | 9   L2   CO5   PO3

c. Describe the earthing transformer with a neat diagram. | 9   L3   CO5   PO3

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