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Reg. No.

Question Paper Code

11932

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Fifth Semester

Electrical and Electronics Engineering

20EEEL501 - ELECTRICAL ENERGY GENERATION SYSTEMS

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|---|-------------------------------|
| 1. List the factors to be considered while choosing a site for steam power station. | 2,K1,CO1 |
| 2. Distinguish between Forced draught and induced draught. | 2,K2,CO1 |
| 3. Draw the P-V diagram of dual cycle. | 2,K2,CO2 |
| 4. Name the various "gas power cycles". | 2,K1,CO2 |
| 5. Why pressurized heavy water reactor is the preferred reactor one in India? | 2,K2,CO3 |
| 6. What is function of pressurizer in PWR? | 2,K1,CO3 |
| 7. List the types of conventional energy sources and non-conventional energy sources. | 2,K1,CO4 |
| 8. What is fuel cell? State the advantages. | 2,K1,CO4 |
| 9. Mention the various cost included in fixed cost. | 2,K1,CO5 |
| 10. What is a load duration curve? Mention its use. | 2,K1,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Examine the effect of preparing coal for complete combustion and write the principle involved. 13,K2,CO1
- OR**
- b) Explain the following with neat diagram:
- (i) Benson boiler. 7,K2,CO1
- (ii) Any one type of cogeneration power plant. 6,K2,CO1
12. a) What is Brayton cycle? Using a schematic of closed cycle gas turbine engine, discuss the thermodynamic processes of Brayton cycle and then derive the efficiency expression. 13,K2,CO2
- OR**
- b) (i) Outline the working of gas turbine cycle with regenerator using suitable sketches. 7,K1,CO2
- (ii) Discuss briefly on integrated gasification combined cycle and its benefits. 6,K1,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

11932

13. a) (i) List the desirable properties of a moderator and a coolant. 6,K1,CO3
 (ii) Draw a schematic of a direct-cycle BWR plant and discuss its function. 7,K1,CO3

OR

- b) (i) What is CANDU Type Reactor? Explain with a neat sketch its main features. 7,K1,CO3
 (ii) Name the 4 reactions involving Deuterium in a fusion reactor. Which one is achieved quite early? 6,K1,CO3

14. a) (i) List the various advantages and disadvantages of hydro-electric power stations. 7,K1,CO4
 (ii) What is low head hydro power plant? Explain its function. 6,K1,CO4

OR

- b) Explain the principle of working and construction of solar power plant using suitable sketches. State their advantages, disadvantages and applications. 13,K1,CO4

15. a) (i) Enlist and explain the types of power tariffs. 7,K1,CO5
 (ii) Compare the operation and capital cost of Thermal and Nuclear power plants. 6,K1,CO5

OR

- b) A power station has to supply load as follows: 13,K1,CO5
 Time (hours) 0-6 6-12 12-14 14-18 18-24
 Load (MW) 30 90 60 100 50
 a) Draw the load curve, b) Draw the load duration curve, c) Select suitable generating units to supply the load, d) Calculate the load factor, e) Calculate the capacity of the plant and the plant capacity factor.

PART - C (1 × 15 = 15 Marks)

16. a) A steam generator comprises a boiler, a super heater, an economizer and an air preheater. The feed water enters the economizer at 140° C and leaves as saturated liquid. Air is preheated from a temperature of 25° C to 250° C. Steam leaves the boiler drum at 60bar, 0.98 dry and leaves the super heater at 450° C. When using coal with a C.V. of 25.2MJ/kg, the rate of evaporation is 8.5kg steam per kg coal and the air fuel ratio is 15:1 by mass. Neglecting heat losses and pressure drops, estimate the heat transfer per kg fuel in each component and the efficiency of the steam generator. What are the percentages of the total heat absorption taking place in the economizer, boiler and the super heater, respectively? Assume Cp of air and water as 1.005 and 4.2 kJ/kg K respectively. 15,K4,CO1

OR

- b) How winds are formed? Explain the components involved in the construction of Wind Turbine and operation the same with necessary diagrams. 15,K2,CO4