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Question Paper Code	12705
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Sixth Semester

Electronics and Instrumentation Engineering

20ICEL601 - POWER PLANT INSTRUMENTATION

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | Marks | K-
Level | CO |
|--|-------|-------------|-----|
| 1. Identify the role of instrumentation in power generation. | 2 | K2 | CO1 |
| 2. What are the advantages of nuclear power? | 2 | K1 | CO1 |
| 3. Outline the importance of drum level measurement. | 2 | K2 | CO2 |
| 4. Name any four air pollution monitoring instruments. | 2 | K1 | CO2 |
| 5. Compare induced draught and forced draught. | 2 | K2 | CO3 |
| 6. List the factors affecting combustion efficiency of boiler. | 2 | K1 | CO3 |
| 7. Why interlocks are important in power plant boilers? | 2 | K1 | CO4 |
| 8. List any four advantages of using DCS in Power plants. | 2 | K1 | CO4 |
| 9. Why shell temperature measurement is needed in a turbine? | 2 | K1 | CO5 |
| 10. Why hydrogen is used at 2 bar pressure in hydrogen cooling system? | 2 | K1 | CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

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|---|----|----|-----|
| 11. a) Explain the two methods of producing power using solar energy. | 13 | K2 | CO1 |
| OR | | | |
| b) Illustrate the hydro power plant with neat sketch. | 13 | K2 | CO1 |
| 12. a) Illustrate the steam temperature and pressure measurements with neat sketch. | 13 | K2 | CO2 |
| OR | | | |
| b) Explain the working principle of any two oxygen analyzers in flue gas with neat sketch. | 13 | K2 | CO2 |
| 13. a) Summarize about the various combustion control system adapted in power plant. Explain the principle and operation of cross-limited combustion control system with necessary diagram. | 13 | K2 | CO3 |

OR

b) Explain the importance of air/fuel ratio control in a boiler and the methods of controlling the air/fuel with necessary diagram. 13 K2 CO3

14. a) Illustrate the two-element drum level control and three-element boiler drum level control with neat sketch. 13 K2 CO4

OR

b) Explain the structure of modern Distributed Control System used in thermal power plant with automation hardware stations. 13 K2 CO4

15. a) Explain the monitoring and control of turbine speed and vibration with neat sketch. 13 K2 CO5

OR

b) i) Illustrate the three control loops in lubricant oil temperature control system. 7 K2 CO5

ii) Summarize the three methods of cooling in turbo alternator process. 6 K2 CO5

PART - C (1× 15 = 15 Marks)

16. a) Draw a P&I diagram for a boiler process and explain about SAMA, ISA using P&I symbols. 15 K4 CO1

OR

b) Analyze the effects of feed water impurities in boiler and explain the methods of measurement of impurities in feed water and steam. 15 K4 CO4