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**Question Paper Code: 41681**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Elective

Electronics and Instrumentation Engineering

14UIC903 - POWER PLANT INSTRUMENTATION

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- In which power plant, the thermal efficiency is quite low?
  - Diesel power plant
  - Steam power plant
  - Hydro power plant
  - Nuclear power plant
- The electrical output of a solar cell depends on the
  - Intensity of solar radiation
  - Heat component of solar radiation
  - Ultraviolet radiation
  - Infrared radiation
- \_\_\_\_\_ correction factor is needed in measurement of steam flow in power plant.
  - Volume
  - Pressure
  - Temperature
  - Mass
- \_\_\_\_\_ is used measure the radiation in power plant.
  - pH meter
  - Scintillation counter
  - Chromatography
  - Spectrometer
- The fuels are required to be analyzed mainly
  - to reduce the usage
  - to reduce the initial cost
  - to check the quality of the oil
  - for combustion efficiency calculation

6. \_\_\_\_\_ is used to measure the oxygen level of flues gases in power plant.
- (a) dissolved oxygen analyzer      (b) paramagnetic analyzer  
(c) IR gas analyzer      (d) all the above
7. Pressure inside the furnace draft is
- (a) Slightly below the atm pressure      (b) Vacuum pressure  
(c) Slightly above the atm pressure      (d) Atmospheric pressure
8. The attemperator is also called as
- (a) contact type      (b) spray type  
(c) contact shell type      (d) non-contact shell type
9. \_\_\_\_\_ is required to receive steam from all boilers in operation and distribute to all turbo alternators in operations.
- (a) collectors      (b) summer  
(c) steam header      (d) closed loop control
10. \_\_\_\_\_ is used to monitor the speed in turbine.
- (a) Magnetic pickup      (b) Rota meter  
(c) Revolution counters      (d) Accelerometer

PART - B (5 x 2 = 10 Marks)

11. List the importance of instrumentation in power plant.
12. Why correction factors are needed when measuring flow rate of steam?
13. Mention the impurities present in the steam and feed water.
14. Interlocks are ensuring the safety of boiler. Justify?
15. Compare condenser and cooling tower.

PART - C (5 x 16 = 80 Marks)

16. (a) With neat diagram explain the operation of thermal power plant and mention the important parameters to be monitored in each block. (16)

Or

- (b) Discuss in detail about the operation of the following plants:
- (i) Solar power plant (8)
  - (ii) Wind mill (8)
17. (a) List the methods used to measure steam pressure and steam flow measurement and explain with suitable diagrams. (16)
- Or
- (b) Describe any two methods of drum level measurement with relevant diagrams. (16)
18. (a) (i) Explain in detail about the analysis of impurities in feed water. (6)
- (ii) Explain in detail about any dissolved oxygen analyzer. (10)
- Or
- (b) Define chromatography and explain how the chromatography is used in power plants to measure pollutants. (16)
19. (a) (i) Justify with neat diagrams three element control is better than two element control in boiler drum level measurement. (8)
- (ii) Explain in detail about the implementation of DCS in power plant. (8)
- Or
- (b) Explain about different control schemes of steam temperature control in power plant. (16)
20. (a) (i) Discuss briefly about Steam pressure control with clear diagram. (10)
- (ii) Elaborate in detail about Shell temperature monitoring and control with neat diagram. (6)
- Or
- (b) (i) Describe the cooling systems in thermal power plants with neat diagrams. (6)
- (ii) List the different types of cooling towers. Discuss about any two methods. (10)
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