



Name :

Roll No. :

Invigilator's Signature :

CS / B.TECH(EIE) / SEM-8 / EI-801A / 2012

2012

POWER PLANT INSTRUMENTATION

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Steam is an important medium of producing
 - a) Mechanical energy b) Thermal energy
 - c) Solar energy d) Nuclear energy.
- ii) Steam power plant basically works on
 - a) Dual cycle b) Otto cycle
 - c) Rankine cycle d) None of these.
- iii) ESP is used to control
 - a) CO in air b) CO₂ in air
 - c) spm in air d) SO_x and NO_x in air
 - e) None of these.



- iv) Power plant simulation software is
 - a) Simulink
 - b) MATLAB
 - c) ProSim
 - d) LABVIEW.
- v) In three element feedwater control which one of the following is considered as a feedforward Signal ?
 - a) Stem flow
 - b) Feedwater flow
 - c) Drum level
 - d) Boiler drum pressure.
- vi) Economiser is placed
 - a) Before boiler drum
 - b) After boiler drum
 - c) Before BFP
 - d) After condenser.
- vii) The amount of excess air for the combustion of coal is around
 - a) 5%
 - b) 10%
 - c) 15%
 - d) 20%
 - e) none of these.
- viii) Which power plant is economical ?
 - a) Thermal
 - b) Nuclear
 - c) Hydraulic
 - d) Gas power.
- ix) Superheater is used in boiler for
 - a) Water heating
 - b) Economizing
 - c) Dryness of steam
 - d) None of these.
- x) What is the advantage of a modulating burner control ?
 - a) Inexpensive
 - b) Simple
 - c) Able to tolerate the large and fluctuating loads
 - d) All of these.



- xi) For suction of the flue gas we used
- a) ID fan
 - b) FD fan
 - c) none of these
 - d) all of these.
- xii) Attenuator unit is used to control
- a) Flow
 - b) Pressure
 - c) Temperature
 - d) Level.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write a short note on the boiler drum level. What type of instrument is used normally ?
3. Write the function of the economizer and the air pre-heater.
4. Explain the Hydropower generation scheme.
5. What is Excess air ? How does it affect the combustion of coal in a steam power plant. $1 + 4$
6. Compare Impulse and Reaction turbines used in a power generation plant.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Describe the various steps involved in Coal Handling Plant (CHP) with suitable diagrams. 10
b) Describe the pressure distribution system for balanced system. 5
8. Draw the block diagram of a generalized DAS and explain the function of different parts. $5 + 10$

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9. a) What are the components affecting the boiler drum water level ? 5
- b) With a neat sketch, explain 3-element drum level control system. 10
10. Explain the different components of nuclear power plant and safety instrumentation. 8 + 7
11. Write short notes on any *three* of the following : 3 × 5
- a) Air pollution measurement and control.
 - b) ESP.
 - c) Air-fuel ratio control of a furnace.
 - d) Furnace draught control.
 - e) Efficiency of thermal power plant.
 - f) Sodium Analyser.

