



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH(EIE)/SEP.SUPPLE/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) Which power plant is economical ?
 - a) Thermal
 - b) Nuclear
 - c) Hydroelectric.
- ii) ESP is used to control
 - a) Co in air
 - b) SPM in air
 - c) SO_x / NO_x in air
 - d) none of these.
- iii) For suction of flue gas we use
 - a) ID fan
 - b) FD fan
 - c) none of these
 - d) all of these.



- iv) The drum level is measured in terms of
 - a) temperature
 - b) level
 - c) humidity
 - d) differential pressure.
- v) Power plant simulation software is
 - a) Simu-Link
 - b) Mat lab
 - c) Lab view
 - d) Prosim.
- vi) Attenuator unit is used to control
 - a) flow
 - b) level
 - c) temperature
 - d) pressure.
- vii) Economizer is placed
 - a) before boiler drum
 - b) before BFP
 - c) after boiler drum
 - d) after condenser.
- viii) Super-heater is used in boiler for
 - a) water heating
 - b) dryness of steam
 - c) economizing
 - d) none of these.
- ix) Throughout the steam circuit pH to be maintained
 - a) below 7
 - b) between 7 and 8
 - c) between 8 and 10
 - d) above 12.
- x) The amount of excess air for combustion of coal is around
 - a) 5%
 - b) 10%
 - c) 15%
 - d) 20%
 - e) none of these.
- xi) Air velocity in ducts is measured by
 - a) Venturimeter
 - b) Pitot tube
 - c) Orifice plate
 - d) Stroboscope
 - e) none of these.



- xii) Conductivity of boiler water in thermal power plant, measurement is done to determine
- impurities ion in water
 - dissolved oxygen
 - total dissolved solid
 - all of these.

GROUP – B

(Short Answer Type Questions)

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

- Explain in brief the applications of LVDT in measurement of pressure.
- What is the role of conductivity measurement in thermal power plant ? How is the conductivity of superheated steam measured ? $2 + 3$
- With a neat sketch, describe the control philosophy for a spray desuperheater.
- Explain the different components of nuclear power plant.
- With neat diagram, describe the hot well level control for a steam power plant.

GROUP – C

(Long Answer Type Questions)

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

- Mention different pollutant emissions from fossil fuel based power plant. Describe the control technique for reducing NO_x and SO_x emissions. Describe one online method to measure CO and CO₂ emission. $2 + 8 + 5$



8. Draw the block diagram of a generalized Data Acquisition system and explain the functions of different parts. 5 + 10
9. List the various parameters to be monitored in feed water. Also explain the method of dissolve oxygen content. 6 + 9
10. Why is vibration measurement essential in turbine control ? Explain its measurement. 5 + 10
11. Write short notes on any *three* of the following : 3 × 5 = 15
 - a) Air pollution measurement and control
 - b) Air-fuel ratio control of a furnace
 - c) Shrink-Swell phenomenon
 - d) Fuel gas analyzer
 - e) Feed forward type temperature control system of main steam.

=====