



Name :

Roll No. :

Invigilator's Signature :

CS / B.TECH (ICE) / SEM-8 / IC-801C / 2011

2011

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.*

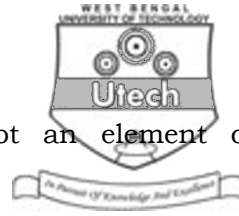
GROUP – A

(Multiple Choice Type Questions)

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

$10 \times 1 = 10$

- i) The energy meter used for domestic power consumption indicates consumption of
 - a) active power
 - b) apparent power
 - c) reactive power
 - d) active & reactive power.
- ii) A thermistor is used to control
 - a) heat
 - b) temperature
 - c) temperature gradient
 - d) both (b) and (c).
- iii) In thermal power plant, maximum energy loss occurs in
 - a) furnace
 - b) boiler drum
 - c) condenser
 - d) conveyer belt.



- iv) Which one of the following is not an element of hydroelectric power plant ?
- a) Cooling tower b) Catchment area
c) Tunnel d) Dam.
- v) A full tidal cycle is of the duration of
- a) 24 hours b) 12 hours
c) 12 hours 25·2 minutes d) 6 hours.
- vi) The furnace temperature can be measured by using
- a) RTD b) Pyrometer
c) Thermometer d) Thermocouple.
- vii) Air velocity in ducts is measured by
- a) Venturimeter b) Pitot tube
c) Velocity meter d) Straboscope.
- viii) Removal of dissolved gases from boiler feed water is called
- a) Degasification b) Deaeration
c) Deoxidation d) Osmosis.
- ix) The most economical power plant in terms of Rs/kWh is
- a) Hydroelectric b) Thermal
c) Nuclear d) Solar.
- x) The function of a flue gas analyser is to indicate
- a) fuel / air ratio burned in the furnace
b) temperature of the flue gas
c) grade of fuel being used
d) all of these.



- xi) In steam circuit of a thermal power plant, the value of pH to be maintained is
- below 7
 - between 8 & 10
 - between 7 & 8
 - above 10.
- xii) In wind power mill, the generator used is
- Induction motor
 - Synchronous motor
 - D.C. shunt motor
 - Stepper motor.

GROUP – B

(Short Answer Type Questions)

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

- Explain in brief the application of LVDT in power plant instrumentation.
- Briefly discuss with relevant diagram, the principle of operation of balanced draft system of a boiler.
- Write the function of Economiser & Air preheater in a power plant.
- Discuss different types of interlocks used in a power plant for the safety of boiler.
- What are the roles of a cooling tower & Electrostatic precipitator in a power plant ?

GROUP – C

(Long Answer Type Questions)

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

- Draw a schematic diagram of thermal power plant with different functional parts as blocks. Explain the function of different blocks.
 - How does excess air affect the combustion of coal in thermal power plant ?

$10 + 5$



8. a) What are the important local measuring points in a boiler ?
- b) Explain with suitable diagram & instrument for measurement of —
- i) boiler body temperature
 - ii) furnace temperature
 - iii) steam pressure of the boiler
 - iv) quality of water in a boiler.
9. a) Why is vibration measurement essential in turbine control of a power plant ?
- b) Explain the principle of measurement of vibration.
- c) What is the function of governor in a power plant ?
- 4 + 8 + 3
10. a) What are the measured & manipulated variables in 3-element boiler drum level control system ?
- b) How are swelling & shrinking problems taken care by 3-element drum level control ?
- c) Explain with neat sketch, the alarm announcement system of a boiler in thermal power plant. 2 + 7 + 6
11. Write short notes on any *three* of the following : 3 × 5
- a) Nuclear reactor temperature control
 - b) Coal handling plants
 - c) Water treatment in thermal power plant
 - d) Flue gas analyser.

=====