

B.E. Power Engineering, 4th Year, 1st Semester, 2019

Power Plant Auxiliaries & Material Handling

Time: Three Hours

Full Marks: 100

Group-A

1. Answer the following questions briefly (any five) Marks: 5 X 4=20
- i) Write down sequentially the processes which are involved for the production of Demineralised (DM) Water from raw water in DM plant.
 - ii) What is the purpose of HP LP Bypass system in steam turbine?
 - iii) What are the different types of cranes used in the industry?
 - iv) How the coal is piled in stockyard of coal handling plant for safe storage?
 - v) Discuss the general arrangement of a belt conveyor system showing the different parts of it.
 - vi) Write down the factors that affect the performance of the Milling Plant?
 - vii) What are the different methods for controlling the air flow requirement in Forced Draft Fan?
 - viii) What is the function of 'Windbox' in furnace? What is the pressure inside the windbox?

Group-B (Answer any three questions)

Marks: 3 X 15=45

2. (a) What is the purpose of using seal oil in turbo-generator system?
 (b) Explain the function of different components of seal oil systems.
 (c) Describe briefly the lubrication system used in turbo generator system.
 (d) What is the function of 'Centrifuge' in turbine oil System? Discuss the factors influencing its performance. Marks: 2+5+5+3
3. (a) What is NPSH in boiler feed pump (BFP)? What are the different methods used to increase the NPSH to BFP?
 (b) Discuss about the different systems provided in BFP to minimise the axial thrust.
 (c) Explain briefly the function of Hydraulic coupling system along with scoop tube mechanism in BFP. Marks: 5+5+5
4. (a) What are the different types of fans used in power plant?
 (b) Show the secondary air pressure and flue gas pressure distribution along the different section of furnace up to the chimney.
 (c) What are the different methods employed to control the secondary air flow in FD Fan?
 (d) Explain the phenomenon of 'Stalling of Fan'.
 (e) Why the forward curved blading is used in ID fans? Marks: 3+3+3+3+3

5. (a) What is the difference between direct firing system and indirect firing system?
- (b) What are the advantages of Bowl Mill over other mills?
- (c) Mention the different components of Bowl Mill.
- (d) Explain the Pulversier coal sampling procedure and the significance of Dirty Air flow test in Mill.

Marks: 2+3+5+5

Group-C (Answer all questions)

Marks: 12

6. Following are the readings obtained during APH performance test:

- | | | |
|---|---|--------------|
| a) Air temperature at Air Preheater inlet | : | 25°C |
| b) Air temperature at Air Preheater outlet | : | 302°C |
| c) Flue gas temperature at Air Preheater inlet | : | 346°C |
| d) Flue gas temperature at Air Preheater outlet | : | 140°C |
| e) Flue gas oxygen at Air Preheater inlet | : | 4% |
| f) Flue gas oxygen at Air Preheater outlet | : | 6% |
| g) Specific heat of air & gas | : | 1.005 kJ/kgK |

Find the i) Seal leakage of Air Preheater, ii) APH Gas Side Efficiency, iii) X Ratio of Air Preheater

Marks: 7

7. During a test in regenerative Feed Water Heater, the following readings are obtained: Feed Water inlet & outlet temp.=198°C & 243°C. Heater shell steam pressure: 35.8 bar & corresponding saturation temp is 242.7°C. Drip temp.=208°C. What is the TTD & DCA of the FW Heater? How many zones are in heater?

Marks: 5

Group-D (Answer any one question)

Marks: 1 X 15=15

8. (a) Draw a lay out of coal handling plant of thermal power plant, showing the location of different components in the system.
- (b) Write down the functions of i) Paddle feeder, ii) Stacker reclaimer, iii) Transfer Point (TP) in coal handling plant.
- (c) What is the size of coal particle at crusher house inlet, crusher house outlet and coal mill outlet?

Marks: 6+6+3

9. (a) Describe briefly about the different material handling principles.
- (b) What are the different classifications of Materials Handling Equipments?
- (c) What are the different types of Belt Conveyors?
- (d) Describe about the constructional features of Flat Belt Conveyors.

Marks: 5+3+3+4

Group-E (Answer any two questions)

Marks: 2 X 4=8

10. Describe the methods adopted to monitor the coal fineness in coal mill.
11. Describe about the different zones in regenerative feed water heater system and also discuss about the variables that are used to monitor the efficiency of feed water heater.
12. What are the different chemical properties are to be monitored for Demineralised(DM) Water?