

Ex/PW 32CJ93/2005

B. POWER ENGG. PART-I EXAMINATION, 2005

(2nd Semester )

POWER PLANT LAYOUT AND  
MATERIAL HANDLING

Time: Three hours

Full Marks : 100

( 50 marks for each part )

PART—I

Answer question no 1 and any *four* from the rest.

1. (a) What are the major input data required for developing layout of a power plant ? 3
- (b) Estimate the area requirement for the following for a  $2 \times 250$  MW coal fired thermal power plant  
(i) Coal stock pile  
(ii) Raw water reservoir assuming 7 days' storage.  
[ Assume data as appropriate ] 3
- (c) What is a wind rose diagram ? Why this diagram is essential for developing power plant layout ? 3
- (d) Name various equipment and facilities that constitute the 'Main point' in a coal fired thermal power plant. 3

[ Turn over

( 2 )

- (e) What is rear mill arrangement in boiler house ?  
What are its advantages and disadvantages ? 3
- (f) What are the major factors to be considered for  
developing the main connection between generator  
and transformer ? 3
2. (a) What is an intake pump house ? 2
- (b) What study is required to select the location of  
intake pump house ? 3
- (c) What are the different types of pumps used in  
intake pump house ? 3
3. (a) What are the different types of cooling tower used  
in power plant ? 3
- (b) What are the criteria for locating the cooling  
tower in a power station ? 5
4. (a) Name various categories of piping in a power  
station. 2
- (b) Indicate various components which constitute a  
piping system in thermal power plant. 6
5. (a) Why fuel oil storage and handling system is essen-  
tial in a coal fired power plant ? 2
- (b) What are the common types of fuel oil used in  
power plant ? 2
- (c) Why heating is essential for handling heavy grade  
fuel oil ? 2

( 3 )

- (d) What are the types of pumps used in fuel oil system for transfer and unloading of fuel oil ? 2
6. (a) Describe various types of coal unloading system in a coal fired thermal power plant, 4
- (b) Indicate various types of crushing employed in coal handling system. 4
7. (a) What are clarifiers ? Why are they used in power plant ? 4
- (b) What is seal pit ? Name the reasons of providing seal pit. 4

PART—II

Answer question no. 8 and any *four* from the remaining.

8. (a) Name 6 types of surface handling equipment with a typical application for each type. 3
- (b) Draw a sketch for horizontal and ascending conveyor showing various components of belt conveyor. 3
- (c) Estimate capacity of a coal handling plant of  $4 \times 250$  MW coal fired thermal power plant. 3

Assume : Calorific value of coal: 2500 Kcal/kg

Heat rate of the plant : 2200 Kcal/KWh

[ Turn over

( 4 )

- (d) Name various types of feeders used in a pneumatic handling system. 3
- (e) Name various factors on which transition velocities related to hydraulic flow regime depend. 3
- (f) Name some possible uses of power plant ash. 3
9. (a) Explain the following terminalogres related to crane :
- (i) Span
  - (ii) Creep Speed
  - (iii) Runway
  - (iv) Crab. 4
- (b) Name at least 4 types of rotary crane with a typical application for each. 4
10. Name various types of gas/solid separators used in pneumatic handling system and explain their operation. 8
11. Name various systems employed for bottom ash handling.  
Describe the systems briefly. 8
12. (a) Define homogeneous and heterogeneous flow. 4
- (b) What is dilute phase and dense phase slurry transport ? Indicate advantages/disadvantages of each type. 4

( 5 )

13. (a) What is angle of repose and angle of surcharge ? 4
- (b) What are the advantages of a belt conveyor that makes it so popular ? 4
14. (a) Write short notes on :
- (i) Idlers
- (ii) Pulleys. 2×2
- (b) If a belt is designed as NN 630/4, what is the allowable tension that the belt can take if the belt width is 1600 mm ? What does 'NN' stand for? 4
-