

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Programme Name: B. Tech. (PSE)

Semester : V

Course Name : Steam Generator, its Auxiliaries & BOP

Time : 03 hrs

Course Code : PSEG 310

Max. Marks: 100

Nos. of page(s) : 2

Instructions: All questions are compulsory

SECTION A

S. No.		Marks	CO
Q1	Explain the following: a) Volumetric Coal Feeder b) Gravimetric Coal Feeder	4	CO1
Q2	The daily output of a steam power station is 18 x 10 ⁵ KWh. If the coal consumption is 700 Tons/ Day, calculate the thermal efficiency of power station. (Note: 1 KWh = 860 Kcal)	4	CO2
Q3	Discuss the advantage & dis-advantage between 'Single Acting' & 'Double Acting' Air Compressor.	4	CO2
Q4	Explain the function of Air Receiver in a Compressed Air system.	4	CO3
Q5	Explain the two primary function of Primary Air Fan (PA Fan) in Boiler Mill operation.	4	CO1

SECTION B

Q6	With the help of a Single Line Diagram (SLD), explain the general scheme of Water Treatment Plant for a 2 x 500 MW coal based Thermal Power Plant drawing its' raw water from the sea.	10	CO4
Q7	Explain with Single Line Diagram (SLD) the arrangement of the "External CHP (Coal Handling Plant)" of a 2 x 500 MW Thermal Power Plant using imported coal along with the major equipment that is applicable. Consider uncrushed coal storage facility of 1 month in the external CHP as well.	10	CO3
Q8	Discuss the factors to be considered while designing the 'Ash Handling system (AHP) for a Thermal power plant.	10	CO2
Q9	With the help of neat diagram, explain 'Boiler Start-up Fuel Oil Handling' system for a Coal fired Thermal Power plant. OR With the help of neat diagram, explain 'Boiler Support Fuel Oil Handling' system for a Coal fired Thermal Power plant.	10	CO3

SECTION-C

Q10	A) Using the Single Line Diagram (SLD), explain the techniques used for “Boiler Fly Ash disposal” along with all the major equipment used in a) Lean Phase Fly Ash Evacuation system b) Dense Phase Fly Ash Evacuation system B) Enumerate five major utilization of Boiler Fly Ash when disposed in dry form.	20	CO3
Q 11	A) Design the capacity of the ‘Receiver Tank’ of a Compressed Air System required for operating the power cylinders of the Air & Flue gas duct dampers of a Boiler with the following data: Air requirement of the duct dampers = 55 M ³ /min Initial pressure in the Receiver = 1 Kg/ cm ² (g) Final pressure in the Receiver = 20 Kg/cm ² (g) Compressor pumping time = 7 min Temperature of air in the Receiver = 309 Deg. Kelvin Ambient Air temperature = 303 Deg. Kelvin B) Explain “Instrument Air- Compressed Air System” along with SLD (Single Line Diagram). What are the additional features available in Instrument Air Compressor system? Give reasons for your answer.	20	CO4

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Programme	:	B. Tech. (PSE)					
Semester	:	V					
Name of the Course	:	Steam Generator, its Auxiliaries & BOP					
Course Code	:	PSEG 310					
Name of Question Paper Setter	:	Amarnath Bose					
Employee Code	:	40001146					
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SECTION A

S. No.		Marks	CO
Q1	Discuss along with figure 'Boiler Start-up Fuel' firing system. What special feature are there in the storage system of 'Boiler Start-up Fuel'.	4	CO1
Q2	Enumerate four major application of Compressor(s) in Coal based Thermal Power Plants (TPP).	4	CO2
Q3	A steam power plant uses coal 5000 Kg/ Hr. The heat conversion efficiency is 30% and the calorific value of coal is 7000 Kcal/ Kg. Calculate the electric energy produced per day. (Note: 1 KWh = 860 Kcal)	4	CO2
Q4	Discuss along with figure 'Boiler Supporting Fuel' firing system along with its two primary attributes.	4	CO3
Q5	Explain the two primary importance of Steam Drum in a 'Natural Circulation Boiler'.	4	CO1

SECTION B

Q6	Explain with the help of Single Line Diagram (SLD), the arrangement of the 'Internal Coal Handling Plant' for 2 x 600 MW capacity pulverized coal fired thermal Power Plant using indigenous coal.	10	CO4
Q7	Explain the following terms (w.r.t Water Treatment Plant of a TPP) a) WBA b) SBA c) WAC d) SAC e) ACF	10	CO3
Q8	Discuss the five most important factors to be considered while designing the 'Coal Handling system (CHP) for a Thermal power plant.	10	CO2
Q9	With the help of neat diagram, explain 'Water Treatment Plant' system for a Coal fired Thermal Power plant having 'Air Cooled Condenser'. OR With the help of neat diagram, explain 'Boiler Coal Feeding system' for a 'Fluidized Bed Combustion Boiler'.	10	CO3

SECTION-C

Q10	A) With reference to Boiler Bottom Ash Evacuation system, explain (with the help of SLD) the difference between the following: a. Bottom Ash Evacuation using ‘Scraper Chain Conveying’ system b. Bottom Ash Evacuation using ‘Jet Pump Evacuation’ system B) Explain in detail the major advantages & disadvantages of “High Concentration Slurry Disposal System (HCSD)” over “Lean Slurry Ash Disposal System?”	20	CO4
Q 11	A) Calculate the Free Air Delivery (FAD) of an Isothermal Compressor with receiver capacity of 0.5 M ³ . The initial air pressure in the receiver is 2 Kg/ cm ² (abs) & the final pressure is 16 Kg/cm ² (abs). The compressor pumping time is 5.0 min. B) Explain inter-stage cooling in Compressed Air System along with its advantages & dis-advantages.	20	CO3