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Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: V - THEORY EXAMINATION (2024 - 2025)

Subject: Thermal Power Plant Engineering

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. In regenerative cycle feed water is heated by (CO1, K1) 1

(a) Exhaust Gases

(b) Heaters

(c) Draining Steam From The Turbine

(d) All Above

1-b. An air preheater is installed (CO1,K1) 1

(a) Between The Economiser And Chimney

(b) Before The Superheater

(c) Before The Economiser

(d) None Of The Mentioned

1-c. What is the use of reheat cycle in steam turbines? (CO2, K1) 1

(a) To Increase Steam Pressure

(b) To Remove The Moisture From The Steam

(c) To Increase The Steam Temperature

(d) None Of The Mentioned

1-d. Steam turbine governing can be defined as (CO2,K1) 1

(a) Controlling The Flow Rate Of Steam

(b) Increasing The Steam Speed

(c) Adjusting The Governors For Particular Speeds

(d) None Of The Mentioned

1-e. Power is produced when the working fluid does some work on the? (CO3,K1) 1

(a) Shaft
(b) Fins
(c) Blades
(d) None Of The Mentioned

1-f. What does HRSG stand for? (CO3, K1) 1

(a) Heat Recovery Stem Generator
(b) Heat Recovery Steam Generator
(c) Heat Recuperating Steam Generator
(d) Heat Regenerative Steam Generator

1-g. On the basis of long-term availability, resources are classified into____ (CO4,K3) 1

(a) Conventional And Non-Conventional Resources
(b) Renewable And Non-Renewable Resources
(c) Primary And Secondary Resources
(d) Commercial And Non-Commercial Resources

1-h. Which of these is the major contributor to world pollution? (CO4,K1) 1

(a) Commercial Resources
(b) Non-Commercial Resources
(c) Renewable Resources
(d) Nuclear Energy

1-i. What are the main parts of an AC Generator? (CO5, K1) 1

(a) Stator
(b) Rotor
(c) Both 1 & 2
(d) None Of These

1-j. AC Generator converts (CO5, K1) 1

(a) Mechanical Energy To Electrical Energy
(b) Electrical Energy To Mechanical Energy
(c) Electro Energy To Mechanical Energy
(d) Chemical To Electric Energy

2. Attempt all parts:-

2.a. Enlist all the accessories of steam thermal power plant. (CO1, K2) 2

2.b. Besides lubrication, which are two functions of lubricating oil in some turbines? (CO2, K2) 2

2.c. Name the Components of Gas Turbine Power plants. (CO3, K2) 2

2.d. What are limitations of solar energy? (CO4, K2) 2

2.e.	Why pollution monitoring instruments are necessary in power plants? (CO5,K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Discuss the Rankine cycle in detail. (CO1, K2)	6
3-b.	Explain the working of Electrostatic precipitator with neat sketch.(CO1,K2)	6
3-c.	What are the uses of ash and dust? (CO2, K2)	6
3-d.	What are the various impurities present in untreated or natural water? (CO2, K2)	6
3.e.	Why air filteration required only in gas power plant ? (CO3, K2)	6
3.f.	With the help of a schematic diagram , Explain the working of solar water heating? (CO4, K3)	6
3.g.	What are the fucntion of gaskets and valves in pipe fitting. (CO5, K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	What are the various reasons of corrosion in a boiler and how it is control? (CO1, K2)	10
4-b.	Steam at 20 bar and 400^{o}C expansion a turbine to .1 bar. Calculate turbine work, pump work and cycle efficiency. (CO1, K2)	10

5. Answer any one of the following:-

5-a.	With neat sketch explain the working of water treatment plant used in thermal power plant. (CO2,K2)	10
5-b.	Which plants are used as a back-up in thermal power plant during peak load or under maintenance condition? Explain one in brief. (CO2, K2)	10

6. Answer any one of the following:-

6-a.	Discuss the sequence of LP, HP compressor and LP, HP turbine in gas turbine power plant rotor. (CO3, K2)	10
6-b.	Explain the working of open cycle and closed cycle Gas turbine power plant and discuss its advantages and disadvantages. (CO3, K2)	10

7. Answer any one of the following:-

7-a.	Differentiate between flat plate and evacuated-tube type collector. (CO4, K3)	10
7-b.	Define absorptivity, reflectivity and transmissivity of black, white and grey body. (CO4, K3)	10

8. Answer any one of the following:-

8-a.	What are the different types of stress developed in the pipe during the servics? Discuss all of them. (CO5,K2)	10
8-b.	What are the different pressure measuring instrument use in power plant? Explain one of them. (CO5,K2)	10