Printed Page:- 03 **Subject Code:- AOE0361**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - THEORY EXAMINATION (2023-2024)

Subject: Energy Science & 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. What is the reason behind the fact that the absolute zero entropy value is not attainable? (CO1) 1

(a) because absolute zero temperature is not attainable in finite number of operations

(b) because theoretically absolute zero temperature has negative value of entropy and it is not possible

(c) Both a. and b.

(d) none of the above

1-b. Processes in Stirling cycle are _____ (CO1) 1

(a) Compression, Heat addition, Expansion, Heat removal

(b) Compression, Heat addition, Expansion

(c) Heat addition, Expansion, Heat removal

(d) None of the mentioned

1-c. In which of the following process are Neutrons emitted?(CO2) 1

(a) Inverse beta Decay

(b) Nuclear fission

(c) Spontaneous Fission

(d) Nuclear fusion

1-d. Who invented nuclear fission? (CO2) 1

(a) Rutherford

(b) Hans Bethe
(c) Otto Hahn
(d) Marie Curie

1-e. The Zenith Angle complement is _____. (CO3) 1

(a) Surface Azimuth Angle
(b) Slope
(c) Solar Altitude Angle
(d) Solar Azimuth Angle

1-f. In which collector the efficiency is maximum _____. (CO3) 1

(a) Flat Plate
(b) Line Focusing
(c) Evacuated Tube
(d) Paraboloid Dish

1-g. Which statement about hydroelectric power plant is wrong? (CO4) 1

(a) Efficiency of hydroelectric power plant does not reduce with age
(b) Its construction coast is very high and takes a long time for erection.
(c) It is very neat and clean plant because no smoke or ash is produced.
(d) Meeting rapidly changing load demands is not possible in hydroelectric power plant.

1-h. Which of the following statement is true about hydroelectric power plant?(CO4) 1

(a) Hydroelectric power plants are multipurpose.
(b) Due to non-uniform flow of water frequency control in such plants is very difficult.
(c) Hydroelectric power plant has high running cost
(d) Water is used as fuel in hydroelectric power plant

1-i. Which one of the following cause global warming? (CO5) 1

(a) Carbon dioxide
(b) Oxygen
(c) Nitrogen
(d) Hydrogen

1-j. Which one of the following is not considered to be a fossil fuel? (CO5) 1

(a) Bio gas
(b) uranium
(c) coal
(d) crude oil

2. Attempt all parts:-

2.a. Define Thermodynamic Equilibrium. (CO1) 2

2.b. What do you mean by Weak forces?(CO2) 2

2.c. What is solar constant? (CO3) 2

2.d.	Define energy conservation.(CO4)	2
2.e.	What are nuclear radiations?(CO5)	2
SECTION-B		30
3. Answer any five of the following:-		
3-a.	State The Third Law Of Thermodynamics. Give Its Limitations And Importance. (CO1)	6
3-b.	Define Force, Energy, Power and Pressure?(CO1)	6
3-c.	Explain the concept of Quantum Mechanics. (CO2)	6
3-d.	Explain the Process of nuclear chain reaction. (CO2)	6
3.e.	Describe the operation of a solar cell. What are the different types of solar cells.(CO3)	6
3.f.	Define Vertical Axis Wind Turbine (VAWT).(CO4)	6
3.g.	What is green energy? What are the benefits of green energy?(CO5)	6
SECTION-C		50
4. Answer any one of the following:-		
4-a.	What is a Heat Engine? Derive the efficiency of a Heat Engine by using a suitable example?(CO1)	10
4-b.	Explain the Working principle of Internal Combustion Engines? Explain the working of SI and CI engines. Also write the assumptions considered for standard air? (CO1)	10
5. Answer any one of the following:-		
5-a.	Briefly describes the structure of an atom.(CO2)	10
5-b.	Describe the principle of nuclear energy, and explain different types of nuclear reactions?(CO2)	10
6. Answer any one of the following:-		
6-a.	Compose the extraterrestrial and terrestrial solar radiation. (CO3)	10
6-b.	Write the important differences between renewable and non renewable source. (CO3)	10
7. Answer any one of the following:-		
7-a.	Estimate the power and energy in a single basin power system. (CO4)	10
7-b.	Explain continuous and batch processes (CO4)	10
8. Answer any one of the following:-		
8-a.	What is Life-cycle Assessment?(CO5)	10
8-b.	What is renewable energy and list at least three renewable energy sources?(CO5)	10