Printed Page:- 04 **Subject Code:- AOE0361**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - CARRY OVER THEORY EXAMINATION - AUGUST 2023

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 relation between COP of heat pump and refrigerator? (CO1) 1

(a) COP of pump=COP of refrigerator – 1

(b) COP of pump=COP of refrigerator + 1

(c) COP of pump=COP of refrigerator – 2

(d) COP of pump=COP of refrigerator + 2

1-b. The efficiency of a Carnot engine depends on (CO1) 1

(a) Working substance

(b) Design of engine

(c) Size of engine

(d) Temperatures of source and sink

1-c. Why is it necessary to accelerate positively charged nuclei to high kinetic energies to cause fusion? (CO2) 1

(a) To overcome electrical repulsive forces

(b) To result in high amount of energy in short period of time

(c) To get the isobars and isotopes

(d) To get a sustainable reaction

1-d. Fusion reactions are called _____ (CO2) 1

(a) Thermonuclear

(b) Thermoduric

(c) Thermo Uric

(d) Compound reactions

1-e. The single solar cell voltage is about _____ (CO3) 1

(a) 0.2 V

(b) 0.5 V

(c) 1.0V

(d) 2.0V

1-f. The solar heater function is to convert the solar energy in to _____ (CO3) 1

(a) Radiation

(b) Electrical Energy

(c) Thermal Energy

(d) None of the above

1-g. How much is the average temperature at depth of 10 km of earth surface? (CO4) 1

(a) 200°C

(b) 900oC

(c) 650oC

(d) 20oC

1-h. What happens when the land near the earth's equator is heated? (CO4) 1

(a) All the oceans gets heated up

(b) Small wind currents are formed

(c) Rise in tides

(d) Large atmospheric winds are created

1-i. Natural Gas contains? (CO5) 1

(a) 95-99% methane

(b) 95-99% Ethane

(c) 95-99% methane & ethane mix

(d) None

1-j. The most efficient energy conversion occurs in solar panels (CO5) 1

(a) TRUE

(b) FALSE

2. Attempt all parts:-

2.a. What are IC Engines? (CO1) 2

2.b. Write the nuclear reaction equation for Fusion. (CO2) 2

2.c. What is Solar radiation? (CO3) 2

2.d. Mention some organic materials used in bio-mass plant. (CO4) 2

2.e. Where do we find Secondary sources of energy? (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. Explain the following : a) Kinetic energy b) Work and potential energy (CO1) 6

3-b. How is heat energy converted into mechanical energy? (CO1) 6

3-c. Explain the reactions occurring in the Sun.(CO2) 6

3-d. How is Stable Uranium(238) important? How can we convert it for nuclear reactors? (CO2) 6

3.e. What is solar thermal energy? (CO3) 6

3.f. Explain the working of a Seebeck effect thermocouple. (CO4) 6

3.g. Which is better: a recycled material or a natural material? (CO5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. How can we increase the efficiency of a boiler. Explain the concepts of boiler mountings and boiler accessories? (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 <u>one</u> of the following:-

5-a. What are the main four fusion reactions, which are considered for use in fusion reactors? Which one is the most favourable reaction? (CO2) 10

5-b. What do you understand by an isotope? What are the isotopes of hydrogen? (CO2) 10

6. Answer any <u>one</u> of the following:-

6-a. What is a solar cell array? Draw a basic block diagram for a solar photovoltaic 10

power plant. (CO3)

6-b. Describe about solar radiations with neat sketches.(CO3) 10

7. Answer any <u>one</u> of the following:-

7-a. Explain direct energy conversion with any three example. (CO4) 10

7-b. Explain how local winds are created during daytime and night.(CO4) 10

8. Answer any <u>one</u> of the following:-

8-a. How is economic growth linked to energy consumption? (CO5) 10

8-b. Though Plant Respiration and Decomposition release more than ten times CO2 released by human activities, explain why CO2 is regarded as a potential threat to the planet.(CO5) 10