Printed Page:- 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 (2021 - 2022) (ONLINE)

Subject: Energy Science & Engineering

Time: 02:00 Hours Max. Marks: 100

General Instructions:

1. *All questions are compulsory. It comprises of two Sections A and B.*

- *Section A - Question No- 1 has 35 objective type questions carrying 2 marks each.*
- *Section B - Question No- 2 has 12 subjective type questions carrying 3 marks each. You have to attempt any 10 out of 12 question.*
- *No sheet should be left blank. Any written material after a Blank sheet will not be evaluated/checked.*

SECTION A 35 x 2 = 70

1. Attempt ALL parts:-

1.1.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

1.1.b When two vapor cycles are coupled in series and heat rejected by one is absorbed by another, the cycle is called as 1

(a) Dual vapour cycle

(b) Binary vapour cycle

(c) Coupled vapour cycle

(d) none of the above

1.1.c Which of the following statements regarding the Gibbs free energy change for a reaction is false? 1

(a) The Gibbs free energy change is the proportion of the enthalpy change of a reaction that is used to increase the entropy.

(b) If the Gibbs free energy change for a reaction is negative, the reaction happens spontaneously.

(c) The Gibbs free energy is represented by the symbol G

(d) A reaction with a negative Gibbs free energy change of reaction is called an exergonic reaction.

1.1.d Processes in Stirling cycle are _____ 1

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

(b) Compression, Heat addition, Expansion

(c) Heat addition, Expansion, Heat removal

(d) None of the mentioned

1.1.e The reason for supercharging in any engine is to 1

(a) Increase efficiency

(b) Increase power

(c) Reduce weight and bulk for a given output

(d) For better fuel economy

1.1.f Kelvin-Planck's and Clausius' statements are 1

(a) not connected to each other

(b) virtually two parallel statements of second law

(c) violation of one doesn't violate the other

(d) none of the mentioned

1.1.g Entropy may decrease locally at some region within the isolated system. How can this statement be justified? (CO1) 1

(a) this cannot be possible

(b) this is possible because entropy of an isolated system can decrease.

(c) it must be compensated by a greater increase of entropy somewhere within the system.

(d) none of the mentioned

1.2.a In which of the following process are Neutrons emitted? 1

(a) Inverse beta Decay

(b) Nuclear fission

(c) Spontaneous Fission

(d) Nuclear fusion

1.2.b What happens when a neutron is absorbed by a nucleus of an atom of U235? 1

(a) Mass number of atom increases

(b) One electron is let out

(c) U236 isotope is formed

(d) Nucleus becomes unstable

1.2.c Who invented nuclear fission? 1

(a) Rutherford

(b) Hans Bethe

(c) Otto Hahn

(d) Marie Curie

1.2.d Atoms of different chemical elements that have the same number of nucleons are called as? 1

(a) Isobars

(b) Isotones

(c) Isomers

(d) Isotopes

1.2.e What type of Reaction takes place in sun? 1

(a) Nuclear fusion

(b) Nuclear fission

(c) Spontaneous fission

(d) Double beta decay

1.2.f How many number of nuclei of hydrogen fuse in a series of reaction involving other particles that continually appear and disappear? (CO2) 1

(a) 1

(b) 2

(c) 3

(d) 4

1.2.g Fusion reactions are called _____ 1

(a) Thermonuclear

(b) Thermoduric
(c) Thermo Uric
(d) Compound reactions

1.3.a The Zenith Angle complement is _____ 1

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

1.3.b How many types of solar cells? (CO3) 1

(a) One
(b) Two
(c) Three
(d) Four

1.3.c The solar cell efficiency is about _____ 1

(a) 0.25
(b) 0.15
(c) 0.48
(d) 0.63

1.3.d The solar heater function is to convert the solar energy in to _____ 1

(a) Radiation
(b) Electrical Energy
(c) Thermal Energy
(d) None of the above

1.3.e The solar heater life span is around _____ (CO3) 1

(a) 4-5 years
(b) 2-6 years
(c) 1-2 years
(d) 6-7 years

1.3.f The energy which is stored as latent heat is called as _____ energy 1

(a) Mechanical energy
(b) Electrical energy
(c) Thermal energy
(d) None of the above

1.3.g The solar energy directly used for _____ 1

(a) Drying
(b) Water heating
(c) Distillation
(d) All of the above

1.4.a Which of the following is the correct equation for the electrical power generated by the hydroelectric power plant? 1

(a) 75×0.736 wQHη Watt
(b) (7.5/0.736) × wQHη Watt
(c) 0.845 ×wQHη Watt
(d) 9.81 ×wQHη

1.4.b 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.

1.4.c Which of the following statement is true about hydroelectric power plant? 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

1.4.d How is height of wave determined? 1

(a) By wind speed
(b) By force of wave
(c) By a immersion scale
(d) By a floating device

1.4.e How much is the average temperature at depth of 10 km of earth surface? 1

(a) 200C
(b) 900oC
(c) 650oC
(d) 20oC

1.4.f What is hot molten rock called? 1

(a) Lava
(b) Magma
(c) Igneous rocks
(d) Volcano

1.4.g What does Heating and cooling of the atmosphere generates? 1

(a) Thermo line circulation
(b) Radiation currents
(c) Convection currents
(d) Conduction currents

1.5.a Which one of the following cause global warming? 1

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

1.5.b 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

1.5.c By the year 2022, the Climate Change Action plan of Government of India aims at installing: 1

(a) 20,000 MW of wind power
(b) 25,000 MW of wind power
(c) 20,000 MW of solar power
(d) 10,000 MW of solar power

1.5.d What is the order of waste management hierarchy, from most to least favoured? (CO5) 1

(a) Prevention- Recycle-Reuse- Disposal
(b) Prevention-Reuse-Disposal-Recycle

(c) Prevention-Disposal -Reuse-Recycle
(d) Prevention-Reuse-Recycle-Disposal

1.5.e Winds having the following speed is suitable to operate wind turbines. 1

(a) 5 – 25m/s
(b) 10 – 35m/s
(c) 20 – 45m/s
(d) 30 – 55m/s

1.5.f Where is the largest Wind Farm located in India? 1

(a) Jaisalmer Wind Park, Rajasthan
(b) Muppandal Wind Farm, Tamil Nadu
(c) Vaspet Wind Farm, Maharashtra
(d) Chakala Wind Farm, Maharashtra

1.5.g The _____ is used as the agricultural fertilizer. 1

(a) Bio ethanol
(b) Bio ethane
(c) Bio methanol
(d) Digestrate

SECTION B 10 X 3 = 30

2. Answer any TEN of the following:-

2.1.a	Write varies types of energies.	2
2.1.b	State Law Of Conservation Of Energy?	2
2.2.a	How many neutrons are released when Ba and Kr are formed? (CO2)	2
2.2.b	Write the nuclear reaction equation for Fusion.	2
2.2.c	Why do we use CO2 for cooling of fuel rods?	2
2.3.a	How can we store the energy obtained from solar cells? (CO3)	2
2.3.b	What are p-type semiconductors?	2
2.3.c	Write names of PV cell materials.	2
2.4.a	How tides are generated?	2
2.4.b	What are the main types of OTEC power plants	2
2.5.a	How do we manage nuclear waste?	2
2.5.b	Where do we find Secondary sources of energy?	2