PAPER ID-411149

Subject Code: BOE404

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM IV) THEORY EXAMINATION 2023-24
ENERGY SCIENCE & ENGINEERING

TIME: 3 HRS **M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a.	Comment on the statement: "The entropy of the universe tends to be maximum."
b.	Discuss the function of control rods in nuclear chain reaction.
c.	Write short notes on V-I characteristics of solar cell.
d.	Define the following terms as per wind power system- a) Tip speed ratio b) Pitch angle
e.	Review the energy scenario in India in brief.
f.	What are the alternatives to deal with energy crisis?
g.	Differentiate between intrinsic semiconductor and extrinsic semiconductor.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Describe in details about Phase Energy conversion mechanism in the field perspective over the surroundings.
b.	With a neat sketch, explain pressurized water reactor (PWR), highlighting its merits and demerits.
c.	Explain the difference between direct radiation and diffuse radiation with the help of suitable diagram.
d.	State the present status of tidal power plants in India. Why is the tidal energy not being utilized?
e.	Integrate the concept of a) Energy conservation & various principles involved in energy conservation. b) LEED Ratings c) Concept of Green Building and Green Architecture.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a)	Draw the layout diagram of steam power plant (coal fired base plant). Also discuss the process of Rankine cycle with the help of P-V & T-S Diagram.
(b)	Outline how internal combustion engines work? Compare between 4-stroke petrol and diesel engine.

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4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain the concept of a) Nuclear chain reaction b) Working principle of Quantum mechanics relevant for Nuclear physics. c) Radioactivity & types of Radioactive decays d) Nuclear energy scales and structure e) Half life of a radioactive element
(b)	Explain Nuclear force and Binding energy process happening in Nuclear fission. Explain the working of fission with the suitable example.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Outline the concept of basic physics of semiconductors, Carrier transport, generation and recombination in semiconductors and semiconductor junction.
(b)	Determine LAT and declination at Ahmedabad (longitude $72^0 40^I$ E, latitude $23^0 00'$ *N*) corresponding to 1430 hrs IST on December 15. (Given E=5'13'')

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Classified the OTEC system. Describe in detail about Ocean thermal Energy Conversion with neat sketch.
(b)	Illustrate the concept of a) Fluid dynamics in wind energy conversion. b) Betz law to receive Maximum Energy. c) Effect of number of rotor blades on performance efficiency.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	What do you mean by "Energy Awareness Campaign?" How does it help in energy conservation program?
(b)	What is embodied energy analysis, and how is it used to measure sustainability in building materials?