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B.TECH.

(SEM VI) THEORY EXAMINATION 2018-19

NON-CONVENTIONAL ENERGY RESOURCES & UTILIZATION

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. What are the conventional and non-conventional energy sources?
b. Distinguish between global radiation and diffuse radiation.
c. What is photosynthesis?
d. What is the local apparent time (LAT)?
e. What are the factors which affect the generation of Biogas?
f. How many types of semiconductors or solar cell used to fabricate PV cells or modules?
g. What is hot spring?
h. Explain magnus effect?
i. What is geopressured deposit?
j. What are difficulties in tidal power developments?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 3

a. Describe the principle of solar photovoltaic energy conversion with block diagram. Also write the advantage and disadvantages of photovoltaic solar energy conversion.
b. Explain the following solar thermal power plants:
   (i) Solar distributed collector power plant
   (ii) Solar central receiver power plant
c. What are the criteria for site selection of a wind mill farm? Discuss advantages of vertical axis wind mill over horizontal type.
d. Explain the working of single basin and double basin tidal system. Also write their advantages and limitations.
e. Discuss different systems used for generating the power using geothermal energy, in brief and also explain how geothermal power plant is differ from thermal power plant.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

a. Which type of non-conventional energy source is the best suitable for rural and agricultural applications and why? Explain in detail.
b. Explain the following angle used in solar radiation analysis:
   (i) Latitude of location
   (ii) Hour Angle
   (iii) Declination Angle
   (iv) Altitude Angle
   (v) Zenith Angle

4. Attempt any *one* part of the following: 10 x 1 = 10

a. What is solar collector? How the performance of a flat plate solar collector evaluated? Also explain the applications of flat plate collectors.
b. Write the short notes on the following:
   (i) Grid-connected Photovoltaic system
   (ii) Stand-alone Photovoltaic system

5. Attempt any *one* part of the following: 10 x 1 = 10

a. How does biomass conversion take place? Name various models of biogas plant & describe any one of them.

b. What methods are used to overcome the fluctuating power generation of a windmill? Discuss their merits and demerits.

6. Attempt any *one* part of the following: 10 x 1 = 10

a. What is fuel cell? Describe the basic principle of fuel cell with reference to $H_2 - O_2$ cell. How fuel cell is the future option for our energy needs? Justify your answer.

b. What are the sources of hydrogen? Briefly describe the different methods for hydrogen production. What are the problems with hydrogen as a fuel?

7. Attempt any *one* part of the following: 10 x 1 = 10

a. Explain the following:
(i) Seeback effect
(ii) Peltier effect
(iii) Thomson effect
(iv) Thermoelectric effect

b. (i) Explain the principle of open cycle OTEC system with suitable diagram.
(ii) Determine the overall efficiency of an ocean thermal energy conversion plant if the temperature of warm water in the surface layer is 30°C and temperature of cold water in the depth of the tropical ocean is 8°C. It can be assumed that the relative efficiency factor EF of the power plant is 0.5.