

**B.TECH/BT/8<sup>TH</sup> SEM/BIOT 4241/2021**  
**RENEWABLE ENERGY TECHNOLOGY**  
**(BIOT 4241)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group – A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Biofuels obtained from non-food crops are known as
    - (a) 1<sup>st</sup> Generation biofuels
    - (b) 2<sup>nd</sup> Generation biofuels
    - (c) 3<sup>rd</sup> Generation biofuels
    - (d) 4<sup>th</sup> Generation biofuels
  - (ii) Carbonization is a part of which pyrolysis process
    - (a) Slow
    - (b) Fast
    - (c) Flash
    - (d) All of these
  - (iii) High quality oil is comprised of
    - (a) High sulphur content and low weight
    - (b) Low sulphur content and high weight
    - (c) High sulphur content and high weight
    - (d) Low sulphur content and low weight
  - (iv) Main mechanisms of MEOR are
    - (a) Increasing the porosity and permeability of the media in the reservoir
    - (b) Lowering oil viscosity
    - (c) Reducing the interfacial tension at the oil-water interface
    - (d) All of the above
  - (v) Planet Solar is the largest solar powered \_\_\_\_\_ in the world
    - (a) Aircraft
    - (b) Boat
    - (c) Bus
    - (d) Bicycle
  - (vi) Which of the following country generate all their electricity using renewable energy?
    - (a) Iceland
    - (b) England
    - (c) USA
    - (d) China

- (vii) \_\_\_\_\_ % of the sun's energy is absorbed by the Earth.  
(a) 50% (b) 0%  
(c) 40% (d) 10%
- (viii) The following is indirect method of Solar energy utilization  
(a) Wind energy (b) Biomass energy  
(c) Wave energy (d) All of the above
- (ix) In a hydro power plant  
(a) Potential energy possessed by stored water is converted into electricity  
(b) Kinetic energy possessed by stored water is converted into potential energy  
(c) Electricity is extracted from water  
(d) Water is converted into steam to produce electricity
- (x) Following country met more than 40% of its electricity demand from wind energy  
(a) Denmark (b) Portugal  
(c) Ireland (d) Spain

**Group – B**

2. (a) Describe the different areas where Renewable Energy can be used?  
(b) What do you mean by Biomass? What are the different sources of Biomass?  
 $4 + (2 + 6) = 12$
3. (a) What do you mean by Proximate analysis of a fuel?  
(b) What do you mean by Heat of combustion in a Biomass? What role does it play in combustion of biomass? How can you determine the Heat of combustion in a Biomass?  
 $2 + (2 + 2 + 6) = 12$

**Group – C**

4. (a) Describe the different stages of biochemical processes of Biogas production.  
(b) Explain the factors for Biogas production.  
 $6 + 6 = 12$
5. (a) What are the different processes of Biohydrogen production?  
(b) How can you produce Biohydrogen by Microbial Electrolytic Cell?  
(c) What is the need of Biohydrogen?  
 $2 + 8 + 2 = 12$

**Group – D**

6. (a) How does a Nuclear reactor work? Describe the mechanism behind working of a fuel cell.

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- (b) What is the main principle behind working of Solar ponds. Distinguish between convecting and non-convecting solar ponds.

**(3 + 3) + (3 + 3) = 12**

7. (a) Distinguish between the three types of solar cells along with its efficiency.  
(b) Give an account of the three types of Solar ponds. (i.e. BHUJ SOLAR POND, El PASO SOLAR POND And PYRAMID HILL SOLAR POND)

**6 + 6 = 12**

**Group – E**

8. (a) What are the different types of Geothermal energy sources?  
(b) What are chain reactions of nuclear energy and how it can be contained.

**6 + (3 + 3) = 12**

9. (a) How tidal energy can be used for electricity production? What are its advantages and disadvantages?  
(b) Distinguish between the three modes of wave power design.

**(3 + 3) + 6 = 12**

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