



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/B.TECH (BT)/SEPARATE SUPPLE/SEM-7/BT-703B/2011**

**2011**

**RENEWABLE ENERGY TECHNOLOGY**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.  
Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP - A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following.

10 × 1 = 10

- i) Renewable energy is defined as energy which is
  - a) regenerated
  - b) exhaustible
  - c) never exhausted
  - d) easily available.
  
- ii) Which one of the following is not the component of ligno-cellulose material ?
  - a) Peptone
  - b) Cellulose
  - c) Hemicellulose
  - d) Lignin.



- iii) A methanogenic microorganism is
- a) *Pseudomonas fluorescens*
  - b) *Bacillus subtilis*
  - c) *Pseudomonas fragi*
  - d) *Methanococcus jannaschii*.
- iv) In radioactive decay the final product is
- a) Sn
  - b) Pb
  - c) Si
  - d) Al.
- v) A photosynthetic hydrogen producing strain is
- a) *Saccharomyces cerevisiae*
  - b) *Zymomonas mobilis*
  - c) *Escherichia coli*
  - d) *Rhodospirillum capsulatus*.
- vi) The composition of gasoline is
- a) Petrol
  - b) Petrol + 10% Ethanol
  - c) Petrol + 40% Ethanol
  - d) Petrol + 25% Ethanol.



- vii) A well known nuclear accident was
- a) Nine miles island accident
  - b) Bhopal accident
  - c) Chernobyl accident
  - d) Minamata accident.
- viii) Which of the following places has five wind-power units in West Bengal ?
- a) Frazerganj
  - b) Haldia
  - c) Shankarpur
  - d) Digha.
- ix) A proposed tidal power project in India is
- a) Kachchh Tidal Power Project
  - b) Thiruvananthapuram Tidal Power Project
  - c) Paradip Tidal Power Project
  - d) Puducherry Tidal Power Project.



- x) Which one of the following microorganisms is a metal-reducing bacteria applied in microbial fuel cell (MFC) ?
- a) *Shewanella putrefaciens*
  - b) *Geobacter sulfurreducens*
  - c) *Pyrococcus furiosus*
  - d) *Thermus aquaticus*.
- xi) Which one of the following is not a process for physicochemical pretreatment of lignocellulose for bioethanol production ?
- a) Acid catalysed steam explosion
  - b) Acid-freeze explosion
  - c) Alkaline wet oxidation
  - d) Hydrogenation.
- xii) One well-renowned place which has been allocated for Ocean Thermal Energy Conversion (OTEC) project in USA is
- a) New York
  - b) Hawaii
  - c) San Francisco
  - d) California.



**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

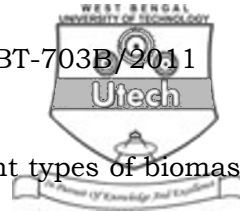
2. What are Biosurfactants ? Explain briefly the major application.
3. Define tidal and wave energy ? Discuss in brief the basic mechanism of tidal power generation.
4. What is Xanthan gum ? Briefly explain the chemistry, production and applications.
5. What is geothermal energy ? What are the technologies involved in geothermal energy process ?
6. Define wind energy ? Explain the mechanism behind it.

**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) What is biophotolysis ? Write in brief how hydrogen is produced by photosynthetic microorganism.



- b) What is gasification ? Explain different types of biomass gasifier with suitable diagram.
- c) Which are the natural sources for biodiesel production ? Write in brief how biodiesel is produced from oils and fats. 5 + 5 + 5
8. a) Mention three different types of sources of biomass.
- b) What are the constituents of biomass and how are they quantitatively determined ?
- c) Mention the biochemical methods for conversion of biomass to biofuel. 3 + 6 + 6
9. Write short notes on the following : 5 + 5 + 5
- a) Microbial recovery of petroleum
- b) Burner reactor
- c) Breeder reactor.
10. Briefly explain how solar energy can be used in case of
- a) Crop drying, b) Salt production and c) Photovoltaics. 5 + 5 + 5

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11. a) How is ethanol obtained from biomass ?
- b) Describe the role of industrial and domestic organic wastes for biomethane production.
- c) What are the advantages and disadvantages of biomass as biofuel ?
- 5 + 6 + 4

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