



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. $3 \times 5 = 15$

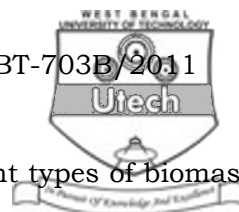
2. What are Biosurfactants ? Explain briefly the major application.
3. Define tidal and wave energy ? Discuss in brief the basic mechanism of tidal power generation.
4. What is Xanthan gum ? Briefly explain the chemistry, production and applications.
5. What is geothermal energy ? What are the technologies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



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
