

Name :

Roll No. :

Invigilator's Signature :

CS / B.TECH (ICE-N) / EIE (O) / SEM-8 / EE-802g / 2011

2011

NON-CONVENTIONAL ENERGY SOURCES

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) The energy payback period of a single crystal silicon cell is
 - a) 6 months to 1 year b) 1 to 2 years
 - c) 10 to 20 years d) 3 to 5 years.
- ii) Extra terrestrial insolation is
 - a) 1000 w/m² b) 1353 w/m²
 - c) 100 w/m² d) 1453 w/m².
- iii) The efficiency of a commercial solar cell lies in the range
 - a) 0% -10 % b) 10% -20 %
 - c) 20% -30 % d) 50% -60 %.

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GROUP – B

(Short Answer Type Questions)

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

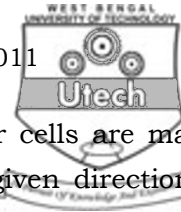
2. Why is coal not considered as biomass energy source though it is originated from biomass ?
3. Explain electricity generation from Municipal Solid Waste (MSW).
4. What is understood by geothermal energy ? What are geothermal fields ? $1 + 4$
5. Define the following parameters used in rotor design :
 - a) pitch angle
 - b) solidity
 - c) tip speed ratio.
6. Prove that Bct₃ limit is 59.3%.

GROUP – C

(Long Answer Type Questions)

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

7.
 - a) How are the tidal power plants classified based on their operation ?
 - b) Explain with sketches the arrangement and operation of different types of tidal power plants. $3 + 12$
8.
 - a) Describe the fabrication process of silicon single crystal solar cell starting from SiO₂.
 - b) Draw a sketch & label the following parts : encapsulation, anti-reflecting coating current collecting figures-*n* junction with depletion layer & the bottom electrode.



- c) Why series-parallel connection of solar cells are made & diodes put in the series link in a given direction ? Explain. 5 + 5 + 5
9. a) What are the major steps involved in the biomethanation of organic residues.
- b) With probable chemical equations describe gasification of solid biomass in an up-draft gasifier.
- c) What are the different process parameters which affect the rate of biogas production inside a biogas digester ? 5 + 7 + 3
10. a) Why a number of manipulations with wind data are required ?
- b) State and explain the different methods of wind data processing for estimating the energy output of a given wind machine. 3 + 12
11. Write short notes on any *three* of the following : 3 × 5
- a) Down-Draft Gasifier
- b) Vapour dominated geothermal system
- c) Site selection of wind power station
- d) Shadowing effect on solar cell
- e) Wind electric generator.

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