

26/4/13

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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2013

MECHANICAL ENGINEERING

VII Semester

10

ME 9022 NEW AND RENEWABLE SOURCES OF ENERGY

(Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Which instrument is used for measurement of global radiation?
2. How temperature difference is maintained in shallow solar pond
3. Brief the term 'wake' with respect to wind turbines
4. Compare the merits and demerits of horizontal and vertical axis wind mill
5. Define equivalence ratio
6. Mention any 2 advantages of using ethanol as a fuel for IC engines
7. What does the term "range" in tidal power plant refer to
8. Give any 4 environmental issues associated with hydrothermal power plants
9. Gist on the concept of cogeneration as practised in fuel cells
10. List the demerits of hydrogen as a fuel source

Part – B (5 x 16 = 80 marks)

11. (i) Compare the pros and cons of solar flat plate and concentrating collectors
(ii) Analyze the merits and demerits of power generation using solar thermal route and solar photovoltaic route
12. a) With a neat sketch explain the working of a horizontal axis mills. Do mention the various control mechanisms adopted for improving the plant load factors in windmills

OR

- b) Derive the Betz limit for horizontal axis wind mills

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13. a) (i) Compute the stoichiometric air for a biofuel whose ultimate analysis reveals:

C=45%, H₂=35%, O₂=18%, N₂ = rest

- (ii) Design a floating drum biogas plant for a family of 4 adults, herding 10 cows and 2 oxen

OR

- b) (i) Explain the chemistry of biomass gasification process
(ii) Compare up, down and cross draught gasifiers with respect to efficiency, SPM, tar content and producer gas temperature

14. a) (i) With a neat sketch, explain the working of open and closed cycle OTEC system. Do compare their relative merits and demerits.

- (ii) Why efficiency of OTEC systems is less than 5%?

OR

- b) (i) Explain the technical reason behind origin of geothermal energy and tides
(ii) Enumerate on the technologies available for recovering energy form liquid dominated hydrothermal geothermal systems.

15. a) Detail on the technologies available of hydrogen production

OR

- b) Compare the technology, construction, working, merits & demerits of Polymer Electrolyte Membrane and Direct Methanol Fuel Cells