



B.E (full time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2012

MECHANICAL ENGINEERING BRANCH

7th SEMESTER

ME 9022 NEW AND RENEWABLE SOURCES OF ENERGY

REGULATIONS : 2008

75

Time : 3 h

Max Marks : 100

Assume relevant data, if information provided is insufficient

Answer ALL Questions

Part A

10 x 2 = 20

1. Differentiate : global and diffused radiation
2. Give the typical values of insolation range prevailing in India
3. Mention the need for hybrid energy systems
4. Present the drawbacks of depending on wind as an energy resource
5. Why proximate analyses of wood are carried out?
6. List the modifications to be carried out in an IC engine for using gasohol as a fuel
7. Present the governing factors in selection of turbine for a SHP
8. Gist the environmental issues associated with geothermal energy
9. What are the major drawbacks of fuel cells?
10. List any 2 salient features of using hydrogen as an alternate energy source

Part B

5 x 16 = 80

11. (a) (i) With relevant sketch, explain the working of a solar desalination system. Do detail on the techniques adopted for increasing their overall efficiency
 - (ii) With suitable block diagram, explain the working of a solar photovoltaic power plant.
 12. (a) (i) Explain the different concepts being suggested on formation of wind (8)
 - (ii) Comment technically on the direction of wind flow during day and night time between land & sea and hill & land (4)
 - (iii) What is Beaufort scale and what does it represent? (4)
- (or)**
- (b) (i) Explain the control systems adopted in a horizontal axis wind mill with relevant block diagram
 - (ii) Mention the salient features of wind as an energy conversion system

13. (a) (i) Explain the working of any one type of biomass gasification system (13)
(ii) Comment on the composition of flue gas emanating upon combustion of biomass under the following scenarios:
equivalence ratio < 1, equivalence ratio = 1 and equivalence ratio > 1

(or)

- (b) Design a floating drum biogas plant for a family of 6 people (all adults) herding the following animals:
Cow = 6, Buffalo = 2 and Goat = 20
14. (a) Detail on the various technological options available for generating power from geothermal energy

(or)

- (b) With a neat schematic compare the working, merits, and demerits of open cycle and closed cycle OTEC plants. Also comment on their typical operating efficiencies
15. (a) Explain the technologies available for
(i) Producing hydrogen
(ii) Storing hydrogen

(or)

- (b) Compare the principle, construction, working, advantages and drawbacks of PEMFC and SOFC