



**B.E DEGREE END SEMESTER EXAMINATIONS, APR/MAY 2011**  
**MECHANICAL ENGINEERING**  
**SEVENTH SEMESTER**  
**ME 517 : NEW & RENEWABLE SOURCES OF ENERGY**  
**REGULATION : 2004**

Time : 3 h

Max Marks : 100

*Assume relevant data, if information provided is insufficient*

**Answer ALL Questions**

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**Part A**

**10 x 2 = 20**

1. Give some examples of non-conventional cum renewable energy source
2. List the major pros and cons of Indian coal
3. What is albedo?
4. Mention & justify the direction of wind observed during day & night time between hill slopes and land
5. Brief the term 'wake' with respect to wind turbines
6. Compare the merits and demerits of HAWT and VAWT
7. Give the value of equivalence ratio for combustion and gasification
8. What does B0 and B100 mean?
9. List at least 4 different manifestations of geothermal energy
10. Brief on the principle behind formation of tides

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**Part B**

**5 x 16 = 80**

11. (a) (i) Comment on the renewable energy potential and achievement of India in Wind, SHP, Biomass Power and Biomass Cogeneration (6)  
(ii) Compare the cost for producing 1000 kJ of heat energy from Diesel, Kerosene, Wood, LPG. Assume relevant landed cost of fuel, calorific value & conversion efficiencies (10)

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  12. (a) With a suitable sketch explain the working of a solar based vapour absorption refrigeration system. Present their merits over conventional vapour compression refrigeration system  
(or)  
(b) (i) Explain the working of a typical solar pond (6)  
(ii) With relevant schematic, enumerate the technologies available for power generation from solar pond
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13. (a) (i) Explain the following terms (as applied to wind mills) and do mention their significance : teetering, furling, stalling, yawing, tip speed ratio, coefficient of power, cut in speed and solidity

(or)

- (b) (i) Prove that the maximum efficiency of any wind mill will be obtained when exit velocity is  $1/3^{\text{rd}}$  of the inlet velocity.
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14. (a) (i) With a neat sketch explain the principle and working of an updraft Gasifier(12)  
(ii) Compare updraft and downdraft Gasifiers w.r.t efficiency & tar content

(or)

- (b) (i) Explain the process of biomethanation (8)  
(ii) List at least 8 factors influencing biomethanation process and do mention their optimum values (8)
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15. (a) (i) Prove: Overall efficiency of a OTEC plant will be less than 3%.  
(ii) Compare the merits and demerits of Claude Cycle and Anderson Cycle OTEC systems

(or)

- (b) (i) Explain with relevant sketches the energy sourcing avenues from liquid dominated hydrothermal systems of geothermal energy  
(ii) Present the advantages and disadvantages of bulb, rim and tubular type turbogenerators of tidal energy conversion systems
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