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**Reg. No. :**

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**Question Paper Code: 59708**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Elective

Mechanical Engineering

15UME908- RENEWABLE SOURCES OF ENERGY

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. It is the vertical angle between the projection of the sun rays on the horizontal plane and the direction of sun rays CO1- R  
(a) Altitude angle      (b) Zenith angle      (c) Hour Angle      (d) Solar angle
  
2. Maximum efficiency is obtained in Max CO1- R  
(a) Flat plate collector      (b) Evacuated tube collector  
(c) Linefocusing collector      (d) Paraboloid dish collector
  
3. The wind intensity can be described by CO2- R  
(a) Reynolds number      (b) Mach number      (c) Beaufort number      (d) Froude number
  
4. Turbines blades have \_\_\_\_ type cross section to extract energy from wind. CO2- R  
(a) Aerofoil      (b) Elliptical      (c) Rectangular      (d) All of the above

5. The main constituent of CNG is CO3- R  
(a) Methane                      (b) Butane                      (c) Ethane                      (d) Propane
6. What chemical reaction makes biodiesel? CO3- R  
(a) Sublimation              (b)Transesterification      (c) Fermentation              (d) Polymerization
7. The centre of earth is estimated to have a high temperature of about CO4- R  
(a) 1,000 K                      (b) 4,000 K                      (c) 6,000 K                      (d) 10,000 K
8. A body of water which rushes through narrow bay during rise of high tide is called CO4- R  
(a) Tidal Average              (b)Tidal Range                      (c)Tidal Bore                      (d)Tidal Energy
9. The fuel cell is considered a battery in which \_\_\_ is continuously replaced. CO5- R  
(a) fuel only    (b) oxidizer  
(c) both fuel and oxidizer                              (d)Hydrogen
10. The main issue about hydrogen as an alternative energy source is: CO5- R  
(a) Its destructive capacity                      (b) Process of separating it from other elements  
(c) The cost of refinement                      (d) Its large mass

PART – B (5 x 2= 10Marks)

11. List the advantages of concentrating solar collector over flat plate collector CO1- R
12. Define tip speed ratio CO2- R
13. Mention the advantages of gasifier CO3- R

14. Write down the difficulties in tidal power developments CO4- R
15. Define electrolysis CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Discuss the basic photovoltaic system integrated with power grid with neat sketch and list out the applications CO1- U (16)

Or

- (b) Explain the types of concentrating solar collectors with its illustrations CO1- U (16)

17. (a) Summarize the applications of Wind energy with neat sketch CO2- App (16)

Or

- (b) Wind at 1 standard atmospheric pressure and 15°C has velocity of 15 m/s calculate CO2- Ana (16)
- (i) the total power density in the wind stream
  - (ii) the maximum obtainable power density
  - (iii) a reasonably obtainable power density
  - (iv) the total power
  - (v) the torque and axial thrust

18. (a) List down the factors affecting biodigestion and explain in detail. CO3- U (16)

Or

- (b) Describe the steps involved in production of Ethanol from wood by acid hydrolysis CO3- U (16)

19. (a) Enumerate the methods of Ocean Thermal Electric Power Generation CO4- U (16)

Or

- (b) Illustrate the concept of hybrid geothermal –fossil fuel systems and explain the arrangement CO4- Ana (16)

20. (a) Discuss the methods Hydrogen production by Hybrid CO<sub>2</sub>- U (16)  
processes

Or

(b) List down the main components and explain the principle of CO<sub>2</sub>- U (16)  
operation of a Fuel Cell