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Code No. : 21705

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**M.E. (EEE: CBCS) I-Semester Main Examinations, January-2018**  
(Power Systems & Power Electronics)

**Renewable Energy Sources**

Time: 3 hours

Max. Marks: 60

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

**Part-A (10 × 2 = 20 Marks)**

1. What is fuel cell? Define the conversion efficiency of fuel cell.
2. Write any two advantages and disadvantages of fuel cells.
3. At the inclination angle of  $30^\circ$ , what will be the magnitude of Zenith angle?
4. Define the following:  
a) Beam and diffuse solar radiation      b) The hour angle.
5. List the main environmental effects due to a wind turbine.
6. What are the advantages and disadvantages of wind power?
7. Differentiate the spring and neap tides.
8. Mention the problems in construction of barriers for tidal conversion.
9. Write the steps involved in process of photosynthesis.
10. Give any four factors affecting the performance of bio-gas digester.

**Part-B (5 × 8 = 40 Marks)**

11. a) Discuss the following: [5]  
i) Obstacle to the implementation of renewable energy sources.  
ii) Advantages of renewable energy sources.  
b) Explain the principle of operation of fuel cell with reference to  $H_2 - O_2$  cell. [3]
12. a) Classify and briefly explain the solar energy storage. [4]  
b) Calculate the angle made by beam radiation with the normal to a flat plate collector, pointing due south location in New Delhi ( $28^\circ 38'N, 77^\circ 17'E$ ) at 9:00 hr, solar time on December 10, 2017. The collector is tilted at an angle of  $36^\circ$  with the horizontal. [4]
13. a) State the essential considerations of a probable site for a wind farm. [3]  
b) Discuss the schemes for wind electric generation and control. [5]
14. a) Explain the working of liquid dominated total flow system. Draw a neat diagram showing different components of this system. [5]  
b) Describe the operation of single basin arrangement in tidal power generation. [3]
15. a) Explain the steps involved in the generation of bio energy from agriculture waste. [4]  
b) With a neat sketch explain the floating drum type bio-gas plant. [4]
16. a) With neat sketch, explain the operation of Regenerative fuel cell. [4]  
b) Compare focus type and Non-focus type solar collectors. [4]
17. Answer any *two* of the following:  
a) Using Betz model of a wing turbine, derive the expression for power extracted from wind. [4]  
b) Explain how ocean tides are generated and how the power can be tapped? [4]  
c) Explain the process of production ethanol from bio mass [4]

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