

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (R,S) (FT/WP) (S5 PT) Examination November 2025 (2019 Scheme).

Course Code: EET435**Course Name: RENEWABLE ENERGY SYSTEMS****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

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| 1 | Classify energy sources based on availability with examples. | (3) |
| 2 | Differentiate between concentrating and non concentrating type solar collectors with example. | (3) |
| 3 | What do you mean by biofouling? | (3) |
| 4 | List out the advantages and disadvantages of a tidal power plant. | (3) |
| 5 | Explain the components and function of yaw mechanism used in wind turbine of wind energy conversion system. | (3) |
| 6 | Calculate the power density of wind for a speed of 8m/s. | (3) |
| 7 | Discuss the future of biomass in India. | (3) |
| 8 | List and explain the three steps involved in biogas production with the help of anaerobic digestion. | (3) |
| 9 | Explain micro hydel plants, mini hydel plants and small hydel plants in term of their plant capacity. | (3) |
| 10 | Hydrogen is referred as future energy. Justify. | (3) |

PART B*Answer any one full question from each module, each carries 14 marks.***Module I**

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| 11 | a) | Explain with neat diagram how solar radiation is converted into heat by flat plate collectors. Give one advantage and disadvantage of the collector. | (8) |
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- b) Compare conventional and non-conventional energy sources. (6)

OR

- 12 a) Compare the components and working of a standalone and grid connected PV system using neat schematic diagram. (8)
- b) Define (i) Open Circuit Voltage (ii) Short circuit Current and (iii) Fill factor of the solar cell. (6)

Module II

- 13 a) What is meant by single basin system of tidal power plant? With the help of diagrams explain single ebb cycle system, single tide cycle system and double cycle system. (10)
- b) List the site selection criteria for tidal power plants. (4)

OR

- 14 a) With the help of diagrams compare the working of open cycle and closed cycle OTEC system. (10)
- b) List advantages of OTEC power plants. (4)

Module III

- 15 a) If the wind velocity at inlet is V_1 , and outlet V_2 for an air duct model of wind turbine, prove that V_2/V_1 is $1/3$ and thereby obtain the value of Betz coefficient. (8)
- b) With neat diagrams explain wind power curve. Explain the terms cut in speed and cut out speed. (6)

OR

- 16 a) Draw and explain variable speed wind energy conversion system. Give one advantage and disadvantage. (8)
- b) Draw and explain upwind turbine and down wind turbine. (6)

Module IV

- 17 a) Discuss in detail the production process of ethanol from biomass with the help of necessary chemical equations. (10)

- b) What are the factors that affect biogas generation? Explain. (4)

OR

- 18 a) Compare the construction and performance of floating drum type and fixed dome type biogas plants with the help of neat sketches (10)
- b) Write a brief note on Bio diesel. (4)

Module V

- 19 a) Which are the two types of hydro turbines used? Differentiate them with examples. (9)
- b) How fuel cells are classified according to the electrolyte used? List any five. (5)

OR

- 20 a) What are the different methods used for the production and storage of hydrogen (9)
- b) Write down five applications of hydrogen energy. (5)
