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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

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

Course Code: MET445

Course Name: RENEWABLE ENERGY ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|--|-----|
| 1 | Briefly explain the significance of renewable energy source & list any three sources | (3) |
| 2 | Explain the terms (i) Zenith angle (ii) Tilt angle | (3) |
| 3 | Describe the working of a solar pond | (3) |
| 4 | Differentiate between parabolic trough & parabolic dish solar collector | (3) |
| 5 | State Betz's law with regard to a wind turbine. | (3) |
| 6 | Define (i) Tip speed ratio (ii) Solidity of turbine | (3) |
| 7 | Explain the principle of operation of an OTEC system | (3) |
| 8 | List any three geothermal energy sources | (3) |
| 9 | Compare the advantages & disadvantages of biomass energy sources | (3) |
| 10 | Explain the gasification process involved in biomass energy conversion | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

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|----|--|-----|
| 11 | a) Explain how energy resources are classified | (7) |
| | b) List any three greenhouse gases & discuss their impact on environment | (7) |

OR

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|----|--|------|
| 12 | a) With the help of neat sketches, explain the working of pyranometer & pyr heliometer | (10) |
| | b) Define (i) Solar hour angle (ii) Solar constant | (4) |

Module II

- | | | |
|----|---|-----|
| 13 | a) Explain the working of solar air heaters with simple sketches | (7) |
| | b) With the help of a neat sketch explain the working of a parabolic trough solar collector | (7) |

OR

- 14 a) Explain the construction and working of a box type solar cooker (7)
b) Explain how sensible heat energy storage system works? (7)

Module III

- 15 a) With the help of a schematic diagram explain the components of a WECS (Wind energy conversion system) (10)
b) Explain power performance curve in wind turbines. (4)

OR

- 16 a) With simple sketches explain different configurations of wind turbines. (9)
b) Derive the equation for power available in wind. (5)

Module IV

- 17 a) Explain the concept of geothermal energy & explain geothermal gradient (7)
b) With the help of neat sketch, explain closed cycle OTEC system (7)

OR

- 18 a) With the help of neat sketch, describe the working of a vapour dominated geothermal power plant (7)
b) Explain any two methods to harness wave energy from ocean. (7)

Module V

- 19 a) With a neat sketch, describe the working of fixed dome biogas plant (10)
b) Define the terms (i) Life cycle cost (ii) Payback period (4)

OR

- 20 a) Explain how electricity is generated from gasification of biomass (6)
b) Explain any four biomass resources in detail. (8)
