

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Scheme for Valuation/Answer Key

Scheme of evaluation (marks in brackets) and answers of problems/key

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: ME403

Course Name: ADVANCED ENERGY ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

- | | | Marks |
|---|--|-------|
| 1 | a) List of renewable energy source (2)
Importance (3) | (5) |
| | b) sketching of power plant- 3 marks, description – 2 marks | (5) |
| 2 | a) Sketch – 1 marks, Calculation of annual energy, reserve capacity and hours (3 marks each) | (10) |
| 3 | a) Explanation (4) sketches (2) | (6) |
| | b) Explanation (2) Sketches(2) | (4) |
| 4 | a) Classification of solar power plants - 4 marks
Methods of conversion – 6 marks | (10) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|--|-----|
| 5 | a) Explanation of lift principle – 2 Marks
Explanation of drag principle- 1.5 Marks
Diagram – 1.5 Marks | (5) |
| | b) Advantages – 2.5 Marks
Disadvantages – 2.5 Marks | (5) |
| 6 | a) Definition of vertical axis wind turbines with examples (Darrieus, Savonius, etc.) – (2 Marks)
Constructional details * - (2 Marks)
Working * - (1.5 Marks)
Sketches * - (1.5 Marks)
* - any one vertical axis wind turbine | (7) |
| | b) Any 3 Advantages of vertical axis wind turbines over horizontal axis wind turbines (1 mark each , 3 x 1 = 3 marks) | (3) |
| 7 | a) Explanation of biomass as a form of solar energy including photosynthesis – (2 Marks) | (2) |

- b) Explanation of 3 categories of biomass resources – traditional solid mass, non-traditional liquid form, biogas – (1 Mark each, 3 x 1 = 3 Marks) (5)
- c) Definition of bio-fuels. (1.5 Marks) (5)
 Explanation of the classification of bio-fuels – solid, liquid and gaseous bio fuels with examples – (3.5 Marks)
- 8 a) Explanation of constructional details – (2.5 Marks) (6)
 working – (1.5 Marks)
 Labelled Sketch – (2 Marks)
- b) Advantages – (2 Marks) (4)
 Disadvantages – (2 Marks)

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) Impact of tidal energy power plants in the environment - One mark for each point (4)
- b) Four types of Geothermal energy sources – 1.5 marks for each source (6)
- 10 a) Sketching of fuel cell 3 marks (10)
 Working principle of fuel cell 5 marks
 Application 2 marks
- 11 a) Four methods of hydrogen storage - One mark for each point (4)
- b) Wave energy conversion device - sketch (2), working principle(4) (6)
- 12 a) Acid rain - harmful effects (2), cause(2) (4)
- b) Wastewater treatment process (4) neat sketches(2) (6)
- 13 a) Four measures to control ozone layer depletion – One mark for each point (4)
- b) Three methods for controlling air pollution by thermal power plants – 2 mark for each method (6)
- 14 a) Four air pollutants and their effects - One mark for each point (4)
- b) Eutrofication – causes (3), effects(3) (6)
