



G1041

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## 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 (S), MAY 2019**

**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) Global energy resources   | (7)  |
|   | b) Benefits  | (3)  |
| 2 | a) schematic layout of thermal power plant – 4, working explanation – 3, Rankine cycle diagram - 3 | (10) |
| 3 | a) Three types (2marks each)   | (6)  |
|   | b) Four advantages (2) Four disadvantages (2)  | (4)  |
| 4 | a) Active – 2 marks, Passive – 2marks  | (4)  |
|   | b) Explanation   | (6)  |

#### PART B

*Answer any three full questions, each carries 10 marks.*

- |   |  |     |
|---|--|-----|
| 5 | a) Explanation of any 3 factors like high annual average wind speed, availability of anemometry data, altitude of the proposed site, terrain and its aerodynamics, local ecology, distance to roads or railways, etc.– (1 mark each, 3 x 1 = 3 marks ) | (3) |
|   | b) Classification criterion and classification based on the criteria – 2 Marks   | (7) |
|   | Construction listing all the components and their functions – 2 Marks  |     |
|   | Working – 1.5 Marks  |     |
|   | Diagram – 1.5 Marks  |     |
| 6 | a) Explanation of solar- wind hybrid systems – (3 marks)   | (5) |
|   | Block diagram – (2 Marks)  |     |
|   | b) Explanation of any 5 environmental impact of wind turbines like electromagnetic interference, noise, visual effects, wild life impact, impact on aviation, etc. – (1 Mark each, 5 x 1 = 5 Marks)  | (5) |
| 7 | a) Explanation of the biochemical methods like anaerobic digestion, fermentation, etc. – (3.5 Marks)   | (7) |
|   | Explanation of thermochemical methods of biomass conversion like pyrolysis,  |     |



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- liquefaction, gasification, etc. – (3.5 Marks)
- b) Comparison between biomass and biogas – (3 Marks) (3)
- 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) Four advantages of geothermal energy - One mark for each point (4)
- b) MHD power generation – Principle (4), sketch (2) (6)
- 10 a) Various components 5 marks (10)
- Explanation 5 marks
- 11 a) Four applications of fuel cells- One mark for each point (4)
- b) Hybrid power plant – components and working principle(4), sketch(2) (6)
- 12 a) Definition of global warming 3 marks (10)
- Reasons for global warming 7 marks
- 13 a) Environmental impact of utilizing hydro electric power- One mark for each point (4)
- b) Green house effect - causes (3), effects(3) (6)
- 14 a) Four sources of land degradation - One mark for each point (4)
- b) Six causes for the loss of biodiversity - One mark for each point (6)

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