

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
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

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|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1 | a) What are the renewable energy resources? Discuss their importance in India's power requirement contest. | (5) |
| | b) Sketch the layout of a steam power plant. Explain briefly. | (5) |
| 2 | a) A central power plant has annual factors as load factor 65%, capacity factor 50% use factor 45%. Power station has a maximum demand of 15000kW. Determine (i) Annual energy production (ii) Reserve capacity (iii) Hours per year not in service. | (10) |
| 3 | a) Explain different types of solar collectors | (6) |
| | b) Explain the difference between passive and active solar energy systems with neat sketches | (4) |
| 4 | a) How solar thermal power plants classified. List the methods for converting solar energy into electric power | (10) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 5 | a) Explain the basic principle of wind energy conversion. | (5) |
| | b) Discuss the advantages and disadvantages of wind energy conversion systems. | (5) |
| 6 | a) What are vertical axis wind turbines? Explain the construction and working of any one type of vertical axis wind turbine with the help of neat sketches | (7) |
| | b) Discuss the advantages of vertical axis wind turbines over horizontal axis wind turbines. | (3) |
| 7 | a) 'Biomass can be considered as a form of solar energy'. Discuss | (2) |
| | b) Explain the category of biomass resources. | (3) |
| | c) What are bio-fuels? Explain the classification of bio-fuels. | (5) |
| 8 | a) Explain the constructional details and working of a floating gas holder digester with the help of a neat sketch. | (6) |
| | b) What are the advantages and disadvantages of a floating drum biogas plant? | (4) |

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PART C

Answer any four full questions, each carries 10 marks.

- 9 a) Mention the impact of tidal energy power plants in the environment (4)
b) Explain any four types of geothermal energy sources (6)
- 10 With the help of a neat diagram explain the working principle and applications of fuel cells. (10)
- 11 a) Explain any four methods of hydrogen storage (4)
b) With a neat sketch explain the working principle of any one type of wave energy conversion device (6)
- 12 a) What are the harmful effects of acid rain? How does it cause? (4)
b) Describe the wastewater treatment process with neat sketches. (6)
- 13 a) List four measures to control ozone layer depletion (4)
b) Explain any three methods for controlling air pollution by thermal power plants. (6)
- 14 a) Briefly explain any four air pollutants and their effects (4)
b) Explain the causes and effects of eutrofication (6)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
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) Explain briefly global energy resources. | (7) |
| | b) How do Industry Nation and Globe would benefit from energy efficiency programs | (3) |
| 2 | a) Give the schematic layout of a thermal power plant and explain its working with the help of Rankine cycle | (10) |
| 3 | a) What are the different solar thermal electric systems? Explain | (6) |
| | b) List any four advantages and disadvantages of solar energy | (4) |
| 4 | a) Explain Active and Passive solar systems | (4) |
| | b) Briefly explain the types of concentrating solar thermal power plants | (6) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|--------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 5 | a) Explain the main considerations in selecting a site for wind energy converters. | (3) |
| | b) How wind turbines are classified? Explain the construction and working of a horizontal axis wind turbine with the help of neat sketches | (7) |
| 6 | a) Write notes on solar-wind hybrid systems | (5) |
| | b) Discuss the environmental impact of wind turbines | (5) |
| 7 | a) Explain the biochemical and thermo chemical methods of biomass conversion | (7) |
| | b) What is the difference between biomass and biogas? | (3) |
| 8 | a) Explain the constructional details and working of a fixed dome digester with the help of a neat sketch. | (6) |
| | b) What are the advantages and disadvantages of a fixed dome biogas plant? | (4) |

PART C

Answer any four full questions, each carries 10 marks.

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|---|------------------------------------------------------------------------|-----|
| 9 | a) List four advantages of geothermal energy over other forms | (4) |
| | b) Explain the working principle of MHD power generation with a sketch | (6) |

- 10 a) What are the various components in hydrogen generation? Explain in detail. (10)
- 11 a) List any four applications of fuel cells (4)
- b) Explain the components and working principle of any one hybrid power plant with sketches (6)
- 12 a) Define Global warming. What are the reasons for Global warming? (10)
- 13 a) List out the environmental impact of utilizing hydro electric power (4)
- b) Explain the causes and effects of enhanced green house effect (6)
- 14 a) List any four sources of land degradation (4)
- b) Describe any six causes for the loss of biodiversity (6)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 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

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|---|-----------------------------------------------------------------------------------------------------------------|------|
| 1 | a) Sketch the layout of a diesel power plant. Explain the layout. | (6) |
| | b) Discuss the renewable energy potential of India. | (4) |
| 2 | Give the schematic layout of a gas turbine power plant and explain it's working with the help of Brayton cycle. | (10) |
| 3 | a) Discuss the various types of concentrating collectors | (6) |
| | b) Explain the working of a flat plate collector with a neat sketch. | (4) |
| 4 | a) List out the advantages and disadvantages of photovoltaic cells. | (6) |
| | b) Explain with a neat sketch solar pond electric power plant. | (4) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|--------------------------------------------------------------------------------------------|-----|
| 5 | a) What are advantages and disadvantages of wind energy? | (6) |
| | b) What do you mean by (1) Yaw control (2) Rated wind speed with respect to wind turbines? | (4) |
| 6 | a) Discuss site selection for wind power plants? | (6) |
| | b) How are wind turbines classified? | (4) |
| 7 | a) What are the advantages of using biomass as an energy source? | (6) |
| | b) Which are the main sources of Biomass? | (4) |
| 8 | a) With a neat sketch explain the working of a fixed dome type biogas plant. | (6) |
| | b) Write a short note on gasification of biomass? | (4) |

PART C

Answer any four full questions, each carries 10 marks.

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|----|-------------------------------------------------------------------------------|-----|
| 9 | a) Discuss micro hydro power plants. | (6) |
| | b) Explain the components of a Tidal power plants. | (4) |
| 10 | a) With a schematic layout describe hot dry rock system of geothermal energy? | (6) |

- b) What are the disadvantages of using geothermal energy? (4)
- 11 a) With the help of a schematic diagram explain the closed cycle MHD? (6)
- b) What are the chemical reactions involved in hydrogen-oxygen fuel cells? (4)
- 12 a) What is thermal pollution? List the harmful effects of thermal pollution. (6)
- b) What are eutrophication? Why is it undesirable? (4)
- 13 a) What is biodiversity? (4)
- b) What is cause for the loss of biodiversity and how is biodiversity protected? (6)
- 14 a) Describe the actions to be taken for sustainability of energy. (6)
- b) What do you mean by sustainable energy? (4)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

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) Explain the importance of renewable energy sources in current scenario of world energy consumption. (6)
- b) List any four advantages and disadvantages of nuclear energy. (4)
- 2 a) Draw the general layout of a thermal power plant and explain the working of different circuits. (10)
- 3 a) Distinguish between active and passive solar energy systems with neat sketches. (6)
- b) Describe the working principle of solar photovoltaic system with a simple figure. (4)
- 4 a) Elaborate with sketches, any three types of concentrating collectors. (6)
- b) List any four advantages and disadvantages of solar energy. (4)

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

- 5 a) Explain the working principle and components of horizontal axis wind turbine with sketches. (6)
- b) Illustrate the methods of collecting the annual wind data of a particular region. (4)
- 6 a) Describe working and components of solar wind hybrid energy system with sketches. (6)
- b) Discuss the advantages and limitations of vertical axis wind turbines over horizontal axis wind turbines. (4)
- 7 a) Explain various steps of pyrolysis process with schematic diagram (6)
- b) List advantages and disadvantages of a fixed dome biogas plant. (4)
- 8 a) Explain any two types of bio-chemical conversion process of biomass to energy. (6)
- b) Describe various stages in gasification process with a process flow chart. (4)

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) Explain the components and layout of a geothermal energy harvesting system. (6)
b) Describe four methods of storing hydrogen. (4)
- 10 a) Explain any two types of wave energy conversion device with schematic diagram. (6)
b) Describe any four sources of geothermal energy. (4)
- 11 a) Explain any three types of fuel cell with schematic diagram. (6)
b) List four advantages of geothermal energy over other forms. (4)
- 12 a) Discuss the various causes and effects of ozone layer depletion. (6)
b) List out the environmental impact of wave energy harvesting systems. (4)
- 13 a) Explain any four air pollutants and their effects. (6)
b) Suggest various measures to control global warming. (4)
- 14 a) Explain the causes and effects of eutrophication. (6)
b) List any four sources of land degradation. (4)
