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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code:EE367

Course Name: NEW AND RENEWABLE SOURCES OF ENERGY (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks

Marks

1 Explain how current scenario of world energy consumption leads to the exploitation of renewable energy sources? (5)

2 Define the terms solar constant, solar altitude angle and solar azimuth angle? (5)

3 Draw the V-I characteristics of a solar cell and list out the factors affecting the electricity produced by a solar cell? (5)

4 Compare different types of solar cells with reference to their construction and efficiency. (5)

5 Derive the expression forpower in the wind. Define the term capacity factor of wind power plant. (5)

6 Explain the lift and drag forces in wind and its importance in wind power generation. (5)

7 Explain the design and selection of different types of turbines used for small hydro plants. (5)

8 Explain how fuel cell works as a renewable energy source. (5)

PART B

Answer any two full questions, each carries 10 marks

9 a) Elaborate the availability and limitations of conventional sources of energy and its impact on human life. What are the alternate solutions? (5)

b) Explain the non-conventional energy resources available in Indian energy scenario. (5)

10 a) With the aid of a neat diagram, explain the working of a central tower collector type solar thermal electric plant. (5)

b) Explain the necessity of energy storage in renewable power harnessing? Give the diagram and explain the operation of a pumped energy storage system. (5)

11 a) Distinguish betweenconcentratingand non-concentrating type solar collectors and also draw the schematic diagram of a flat plate collector. Explain its working. (5)

b) For a solar PV installation it is necessary to measure the global solar irradiance of the site. Suggest a suitable solar measuring instrument and explain its working. (5)

PART C

Answer any two full questions, each carries10 marks

12 Explain the principle of operation of a tidal power plant. How it is classified? Draw the layout of a double basin tidal power plant and label all the components.Explain the function of each component. (10)

13 Explain stand-alone and grid connectedsolar PV systems? Explain each type with the help of block diagram and bring out their relative merits. (10)

14 What are the site selection criteria for OTEC? Draw the block diagram and explain the working of Anderson cycle based OTEC system. Explain how biofouling affects efficiency of energy conversion and how can it be minimised? (10)

PART D

Answer any two full questions, each carries 10 marks

15 a) Give the site selection criteria for wind plants and write a note on wind energy potential in India. (5)

b) Draw the block diagram of a typical wind energy conversion system and explain the working of wind power plant. (5)

16 a) Explain how wind power plants are classified. Explain vertical axis wind turbine with necessary diagrams. (5)

b) Describe how energy is harnessed from satellite stations. (5)

17 a) Explain the how urban waste is converted into useful energy. (5)

b) Explain the process of anaerobic digestion of biomass into biogas. Draw the schematic diagram of a biodigestor. (5)

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