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Question Paper Code: 56A01

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Agriculture Engineering

15UAG601- SOLAR AND WIND ENERGY ENGINEERING

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The total solar radiation received at any point on the earth's surface is termed as _____. CO1- R
(a) Insulation (b) Insolation (c) Insulated radiation (d) Radiation
2. The electrical output of a solar cell depends on the _____. CO1- R
(a) Heat component of solar radiation (b) Ultraviolet radiation
(c) Intensity of solar radiation (d) Infrared radiation
3. The value of Solar Constant is _____. CO2- R
(a) 1347 W/m² (b) 1357 W/m² (c) 1377 W/m² (d) 1367 W/m²
4. The term photo voltaic comes from _____. CO2- R
(a) Spanish (b) German (c) Greek (d) English
5. An anemometer is an instrument used for measurement of _____. CO3- R
(a) Depth in ocean (b) Wind speed (c) Temperature gradient (d) Solar radiation
6. What kind of energy does a wind turbine use? CO3- R
(a) Kinetic energy (b) Chemical energy
(c) Thermal energy (d) Potential energy

7. Power output from a wind energy electric generator is directly proportional to _____. CO4- R
- (a) Cube of wind velocity (b) Square root of wind velocity
(c) Square of wind velocity (d) Wind velocity
8. How much wind power does India hold? CO4- R
- (a) 40,000 MW (b) 20,000 MW (c) 5000 MW (d) 7500 MW
9. The molten mass of earth is called _____. CO5- R
- (a) Hot cake (b) Magma (c) Magmus (d) Magnous
10. The overall efficiency of an OTEC power plant is _____. CO5- R
- (a) 2-3 % (b) 10-15% (c) Around 40% (d) Around 25%

PART – B (5 x 2= 10 Marks)

11. Can solar dryer produce electricity? Mention one application of a solar dryer. CO1- R
12. How do solar refrigerators work? CO2- R
13. Define Tip speed ratio. CO3- R
14. Draw and explain power curve of a typical wind turbine. CO4- R
15. State and explain the site requirements to construct a tidal power plant? CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Discuss the need for estimation of solar radiation at a given location. Explain how to measure the diffuse component of solar radiation. CO1- App (16)

Or

- (b) Draw the schematic diagram of a flat plate collector with liquid transport medium. Explain the main components involved in the same and also explain the method to assess the performance of the collector. CO1- App (16)

17. (a) How thermal energy is harnessed from solar pond? Explain the characteristics and applications of a solar pond. CO2- App (16)
- Or
- (b) Draw the basic layout for a solar powered water pumping system for agricultural applications. Explain the data required to design the solar powered water pump. CO2- Ana (16)
18. (a) How does wind speed affect power output? Explain the torque and power characteristics of modern wind power facilities. CO3- Ana (16)
- Or
- (b) Describe the working of a wind electric conversion system with a block diagram. CO3- Ana (16)
19. (a) Describe the construction and working of any one type of vertical axis type wind mill. CO4- U (16)
- Or
- (b) With the help of a neat sketch, describe the different types of rotors used in wind turbines. CO4- U (16)
20. (a) Draw and explain the schematic diagram of an OTEC plant and point out its major differences with a conventional thermal electric plant. CO5- U (16)
- Or
- (b) Draw the basic block diagram of a fuel cell. Explain how fuel cells produce energy. CO5- U (16)

