



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2016/2017**

COURSE NAME : RENEWABLE RESOURCES  
COURSE CODE : DAU 22202  
PROGRAM : 2 DAU  
EXAMINATION DATE : JUNE 2017  
DURATION : 2 HOURS 30 MINUTES  
INSTRUCTIONS : SECTION A) } ANSWER ALL  
SECTION B) } QUESTIONS  
SECTION C) ANSWER TWO (2)  
QUESTIONS ONLY

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THIS EXAM PAPERS CONSIST SEVEN (7) PAGES

## SECTION A

1. Geothermal energy is the thermal energy present \_\_\_\_\_.
  - A. on the surface of the earth
  - B. in the interior of the earth
  - C. on the surface of the ocean
  - D. none of the above
  
2. In dry steam hydrothermal plant, \_\_\_\_\_ is used.
  - A. Carnot cycle
  - B. Brayton cycle
  - C. Rankine Cycle
  - D. None of the above
  
3. Water boils underground in a hydrothermal when it has pressure of about \_\_\_\_ atm and temperature of about \_\_\_\_ °C.
  - A. 3, 100
  - B. 5, 120
  - C. 6, 140
  - D. 7, 165
  
4. The amount of energy available in the wind at any instant is proportional to \_\_\_\_ of the wind speed.
  - A. square root power of two
  - B. square root power of three
  - C. square power
  - D. cube power

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5. Wind energy is harnessed as \_\_\_\_\_ energy with the help of windmill or turbine.
- A. mechanical
  - B. solar
  - C. electrical
  - D. heat
6. Winds having following speed are suitable to operate wind turbines.
- A. 5 – 25m/s
  - B. 10 – 35m/s
  - C. 20 – 45m/s
  - D. 30 – 55m/s
7. The wind intensity can be described by \_\_\_\_\_.
- A. Reynolds number
  - B. Mach number
  - C. Beaufort number
  - D. Froude number
8. Identify which of the following statements about pumped storage are true.
- A. it is useful in countries with nuclear power stations.
  - B. the power output of a pumped storage reservoir is of the form  $P = \eta\rho ghQ$ .
  - C. it is useful for peak lopping.
  - D. it does not require a large amount of capital.
9. Select which of the following statements about fuel cells are true.
- A. they can provide carbon-free electricity with very low emissions and good efficiencies of ~80%.
  - B. fuel cells are quiet and reliable.
  - C. the advantage of fuel cells rather than batteries for cars is an increased range and speed of refueling.
  - D. the main source of hydrogen for fuel cells is currently from fossil fuels.

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10. Identify which of the following statements about a copper-zinc cell are true.
- A. the first copper-zinc cell was invented by Galvani.
  - B. the electrolyte used in a copper-zinc cell is dilute hydrochloric acid.
  - C. zinc is the anode or negative electrode.
  - D. the standard potential is 1.1 V
11. Identify which of the following statements about flywheels are true.
- A. they are not useful for peak-logging.
  - B. they take many hours to restore to full speed.
  - C. it is more effective to make flywheels faster than heavier.
  - D. the maximum tensile stress of the material is a limiting factor.
12. Assign which of the following statements about compressed air storage are true.
- A. it is not useful in countries with nuclear power stations.
  - B. storage in large pressure vessels is uneconomic.
  - C. it is useful for peak logging.
  - D. it is not suited for salt caverns because they are not gas-tight when under pressure.
13. Select which of the following statements about high voltage AC transmission are true.
- A. the fractional loss of power due to ohmic heating increases with line voltage.
  - B. electric breakdown occurs at the surface of a conductor when the electric field exceeds the breakdown limit.
  - C. an overhead transmission cable consists of twisted strands of conducting wire.
  - D. the voltage is stepped-up from the power station to the overhead transmission line using transformers.

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14. Classify which of the following is *not* necessary for a wind turbine to generate electricity.
- A. blades
  - B. photovoltaic motor
  - C. wind
  - D. magnets
15. Identify which fossil fuel is most often used to heat homes.
- A. oil
  - B. wind
  - C. natural gas
  - D. coal
16. Identify which of the following is one example of passive solar.
- A. electricity running through an appliance.
  - B. sun shining through a window
  - C. sun powering a photovoltaic cell
  - D. a solar water heater
17. Photovoltaic cells do this.
- A. prevent the spread of bacteria
  - B. take pictures of the sun
  - C. store heat from the sun
  - D. transform the energy from the sun into electrical energy
18. In which of the following light, rate of photosynthesis is maximum.
- A. white
  - B. discontinuous white
  - C. red
  - D. blue

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19. During light phase of photosynthesis \_\_\_\_\_ is oxidized and \_\_\_\_\_ is reduced.
- A. CO<sub>2</sub> and water
  - B. water and CO<sub>2</sub>
  - C. water and NADP
  - D. NADPH<sub>2</sub> and CO<sub>2</sub>
20. During dark phase of photosynthesis \_\_\_\_\_ is oxidized and \_\_\_\_\_ is reduced.
- A. CO<sub>2</sub> and water
  - B. water and CO<sub>2</sub>
  - C. water and NADP
  - D. NADPH<sub>2</sub> and CO<sub>2</sub>

**SECTION B**

- Q1** (a) Define what is tidal energy. (4 marks)
- (b) Explain how does tidal power work. (5 marks)
- (c) Explain what makes OTEC different compared with another renewable energy. (11 marks)
- Q2** (a) Describe five technologies approaches where energy can be stored. (5 marks)
- (b) By using an example, explain how the energy can be stored and what is the advantage using this equipment? (10 marks)
- (c) Explain why AC is the preferred way to transmit electrical power rather than DC. (5 marks)

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**SECTION C**

- Q3** (a) Briefly discuss the scientific principles of renewable energy. (8 marks)
- (b) Explain the difference between active and passive solar heating systems. (5 marks)
- (c) Discuss how can solar thermal energy be used to supply potable drinking water in environmentally difficult places. (7 marks)
- Q4** (a) Explain the different types of turbines used in Hydroelectric Power Plants. (8 marks)
- (b) Explain the classification of hydro projects based on installed capacity. (4 marks)
- (c) Discuss the different types of wind turbines used to extract wind energy. (8 marks)
- Q5** (a) List the two major processes of photosynthesis and state what occurs in those sets of reactions. (5 marks)
- (b) What is a first generation and second generation biomass feedstocks. Give two examples of plants for each category. (6 marks)
- (c) Explain what is biodiesel. Discuss the production of biodiesel from Jatropha. (9 marks)

- END OF QUESTION -

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