C.U.SHAH UNIVERSITY
Summer Examination-2018

Subject Name : Alternate Energy Sources

Subject Code : 4TE03AES1   **Branch:** B.Tech (Mechanical)

Semester : 3   **Date :** 06/04/2018   **Time :** 02:30 To 05:30   **Marks :** 70

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

  a) Direct Solar energy is used for
         (A) Water heating (B) Distillation (C) Drying (D) All of the above
  b) The sun subtends an angle of _____ minutes at the earth's surface.
         (A) 22 (B) 32 (C) 42 (D) 52
  c) The wind intensity can be described by
         (A) Reynolds number   (B) Mach number
         (C) Beaufort number   (D) Froude number
  d) The wind speed is measured using an instrument called
         (A) Pyranometer (B) Manometer (C) Anemometer (D) Wind vane
  e) The power from the sun intercepted by the earth is approximately
         (A) 1.8×10^8 MW (B) 1.8×10^{11} MW (C) 1.8×10^{14} MW (D) 1.8×10^{17} MW
  f) The global radiation reaching a horizontal surface on the earth is given by
         (A) Hourly beam radiation + Hourly diffuse radiation
         (B) Hourly beam radiation − Hourly diffuse radiation
         (C) Hourly beam radiation / Hourly diffuse radiation
         (D) Hourly diffuse radiation / Hourly beam radiation
  g) The ratio of the beam radiation flux falling on a tilted surface to that falling on a
         horizontal surface is called the
         (A) Radiation shape factor (B) Tilt factor (C) Slope (D) None of the above
  h) The hour angle is equivalent to
         (A) 10° per hour (B) 15° per hour (C) 20° per hour (D) 25° per hour
  i) The angle made by the plane surface with the horizontal is known as
         (A) Latitude (B) Slope (C) Surface azimuth angle (D) Declination
  j) The rate of change of wind speed with height is called
          (A) Wind shear(B) Wind rose(C) Wind solidity (D) None of the above

  k) The centre of earth is estimated to have a high temperature of about
         (A) 1,000 K (B) 4,000 K (C) 6,000 K (D) 10,000 K

l) Hydrothermal fluids are _____ in nature.

(A) Corrosive (B) Abrasive (C) Both (A) and (B) (D) None of the above

m) In dry steam hydrothermal plant, we use

(A) Carnot cycle (B) Brayton cycle (C) Rankine Cycle (D) None of the above

n) The molten rock within the earth is

(A) Igneous (B) Magma (C) Sedimentary (D) Metamorphic

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	
	(a)	Differentiate between Beam radiation and Diffuse radiation.	(07)
	(b)	Define solar constant. Also explain about the variation of extraterrestrial solar radiation during the year with graph.	(07)
Q-3		**Attempt all questions**	
	(a)	Explain the methods which are used to control the fluctuation of power in Wind turbine.	(07)
	(b)	What are the conventional and non-conventional energy sources? Describe briefly.	(07)
Q-4		**Attempt all questions**	
	(a)	Write short notes on: (i) Savonious rotor (ii) Darrieus rotor.	(07)
	(b)	Why two or three blade rotors are preferred for wind power application?	(07)
Q-5		**Attempt all questions**	
	(a)	Write note on solar photovoltaic cells.	(07)
	(b)	Discuss the factor which affects the biogas production in detail.	(07)
Q-6		**Attempt all questions**	
	(a)	Classify Biogas plants. Explain KVIC digester with a schematic diagram.	(07)
	(b)	What is the basic principle of OTEC? Explain Closed cycle OTEC plant.	(07)
Q-7		**Attempt all questions**	
	(a)	What is low temperature liquid dominated geothermal resources? How this heat can be utilized for power generation? Also, state the advantages of such a system.	(07)
	(b)	State MHD principle. Explain open MHD plant with a neat diagram.	(07)
Q-8		**Attempt all questions**	
	(a)	Discuss about the basic principles of 'Energy Management'.	(07)
	(b)	Enumerate the advantages and disadvantages of MHD systems.	(07)