

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name: Alternate Energy Sources

Subject Code: 4TE03AES1

Branch: B.Tech(Mechanical)

Semester: 3

Date: 14/12/2015 Time: 2:30 To 5:30

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) What is the average distance between sun and earth?
A. 1.495×10^{11} M B. 1.495×10^{11} KM C. 1.495×10^{11} CM D. 1.495×10^{11} MM
- b) Standard value of the solar constant is _____
A. 1253 W/m² B. 1053 W/m² C. 1353 W/m² D. 1000 W/m²
- c) We can measure beam radiation with the help of _____
- d) What is the concentration ratio of compound parabolic concentrator
A. 4-7 B. 6-7 C. 4-12 D. 4-10
- e) With the help of Fresnel lens collector we can achieve temperature range.
A. 100-200C B. 100-300C C. 00-200C D. 150-300C
- f) Middle zone of solar pond is called _____.
A. Surface convective zone B. Non convective zone
B. C. Storage zone D. None of the above
- g) First solar pond of India is at
A. Bangalore B. Chennai C. Bombay D. Kutch Bhuj
- h) What is the most common material used for making solar cells?
A. Silver B. Silicon C. Brass D. Plastic
- i) Which of the following solar cookers is the most efficient and has the shortest cooking time?
A. Box cooker B. Parabolic cooker. C. Panel cooker D. Cardboard type.
- j) A solar still is device used for
A. Heating water B. Cooling water C. Distilling water D. Production of electricity
- k) Which of the following states in India ranks first in the installation of wind power?
A. Gujarat B. Andhra Pradesh C. Maharashtra D. Tamil Nadu
- l) An anemometer is an instrument used for measurement of
A. Solar radiation B. Wind speed C. Temperature gradient D. Depth in ocean



- m) Which gas has a major share in biogas?
 A. N₂ B. CH₄ C. CO₂ D. H₂
- n) The tidal energy of a sea wave is the sum of its.
 A. Mechanical energy & thermal energy B. Potential energy & hydropower energy
 C. Potential energy & kinetic energy D. Kinetic energy & thermal energy

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

- Q-2 Attempt all questions (14)**
- A** Explain, what do you understand by energy conservation and its importance? **5**
- B** Write advantages and disadvantages of concentric collectors over flat plate type collectors. **5**
- C** What is Solar pond? Explain Solar pond with a neat sketch. **4**
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- Q-3 Attempt all questions (14)**
- A** Which Instruments are used for solar radiation measurements? Explain construction and working of Pyranometer. **7**
- B** List types of solar thermal power plants. Discuss working of solar pond electrical power plant with neat sketch. **7**
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- Q-4 Attempt all questions (14)**
- A** Write short notes on Man and Energy. **4**
- B** What do you mean by solar distillation? Explain it with neat sketch **5**
- C** The following data refer to a wind mill of a wind farm in Gujarat. Average wind speed = 23.5 km/hr., Atmospheric temperature =30°C, Atmospheric pressure is 1.01bar, Power coefficient = 0.41, Total power output capacity of wind farm 1 MW. Determine : **5**
- I. Available Power Density of wind ,
 II. Actual Power density of wind mill,
 Numbers of wind mills in the farm if the rotor diameter is 25 m.
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- Q-5 Attempt all questions (14)**
- A** Differentiate between line focusing and point focusing collectors. **4**
- B** Describe working of fixed dome biogas plant with figure. Write its demerits. **5**
- C** Write the advantages of Geothermal Energy. Explain Liquid dominated geothermal plant. **5**
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- Q-6 Attempt all questions (14)**
- A** Derive an equation for maximum power, maximum torque and maximum axial thrust available from wind turbine. What is optimum velocity? **7**
- B** Classify Biogas plants. Explain KVIC digester with a schematic diagram. **7**
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- Q-7 Attempt all questions (14)**
- A** What do you understand by geothermal field? Discuss. **4**
- B** What is basic principle of ocean thermal energy conversion? **5**
- C** State and explain various routes of Biomass energy conversion to other form of energy. **5**
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- Q-8 Attempt all questions (14)**
- A** What are co-generation plants? Discuss the gas turbine co-generation systems with neat sketches. Also write the advantages. **7**
- B** What is wave energy? How can it be used for power generation? **7**



