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SARDAR PATEL UNIVERSITY

M.Sc. Renewable Energy Examination (Semester -IV) APRIL - 2016

Thursday, 07-04-2016, Time: 14.30- to - 17.30

PS04ESYT02: Solar Power Plant Technology

Total Marks: 70

Q-1 Select the most appropriate options

(8x1= 08)

1. Super heating of steam is done at

a) Constant volume	d) Constant entropy
b) Constant temperature	e) Constant enthalpy
c) Constant pressure	
2. Efficiency of Rankine cycle can be increased by

a) Decreasing initial steam pressure and temperature	c) Decreasing exhaust pressure
b) Increasing exhaust pressure	d) Increasing the expansion ratio
3. An ideal regenerative cycle is

a) Equal to Carnot cycle	c) More than Carnot cycle
b) Less than Carnot cycle	d) Could be anything
4. The overall efficiency of thermal power plant is

a) Boiler efficiency, turbine efficiency, generator efficiency	c) Carnot cycle efficiency
b) All the three above plus gas cycle efficiency	d) Regenerative cycle efficiency Rankine cycle efficiency
5. Solar thermal power generation can be achieved by

a) Using focusing collector or heliostates	c) Using a solar pond
b) Using flat plate collectors	d) Any of the above
6. Which of the following statements about concentrated solar thermal power (CSTP) are correct? Please select all that apply.

a) It can provide electricity at night-time.	e) The output in ocean thermal conversion plants depends on the cube of the temperature difference between the surface and water below 1000 m.
b) The output from a solar chimney is proportional to its height.	f) Stirling engines are external heat engines capable of high efficiency
c) The technology does not depend on any rare element.	
d) CSTP plants are often best located within 15 degrees of the equator.	
7. In solar thermal conversion systems the solar heat is transferred to

a) water-steam	c) molten salts
b) liquid metals	d) any of the above.
8. Which of the following area is preferred for solar thermal power plants?

a) mountain tops	c) coastal areas
b) hot arid zones	d) high rainfall zones.

Q-2 Answer **any seven** questions

(7x2= 14)

1. List the methods of improving the performance of a rankine cycle
2. Why Carnot cycle not practical for a steam power plant? Explain shortly.
3. Give the advantages of feed water heating system.
4. Write short notes on steam turbine
5. Define the condenser & write the need for condenser in steam power plant
6. Write the need for solar tracking system in solar thermal power generation.
7. What is solar field?
8. What is receiver?
9. Explain Fresnel steam generation technology.

Q3 A) Compare the Otto and Diesel cycles on the basis of same compression ratio and same heat inputs, with help of T-S and P-V diagrams. (06)

Q3 B) Discuss the effect of i) Boiler pressure and ii) Condenser pressure on the performance of a Rankine cycle. (06)

OR

Q3B) With a neat diagram explain construction and working of steam turbine. (06)

Q4 A) Explain different types of thermal power generation technologies with diagram (06)

Q4 B) Discuss the structure, reflecting mirrors, receiver of parabolic dish power plants. (06)

OR

Q4 B) Describe the working principle, main elements and characteristic parameters of a stirling engine (06)

Q 5A) Explain the parabolic dish power plants and write possibility of power generation for the Indian context. (06)

Q 5B) Describe central receiver power plant (CRPP) with neat sketch diagram (06)

OR

Q5B) B) Describe any conventional power plant and how the CRPP integrated conventional power plants. (06)

Q6 A) Describe Integrated Solar Combined Cycle (ISCC) and how to integrate water/steam cycle in Parabolic Trough, Central Tower, and Linear Fresnel Concentrated solar power plants and hybrid plants. (06)

Q6 B) Describe the mechanism and need of solar tracking system in solar power plant technology with neat sketch diagram. (06)

OR

Q6 B) Discuss the rough unit cost rating of different types of solar thermal power generation technology. (06)

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