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SEAT No. _____

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SARDAR PATEL UNIVERSITY
M.Sc. Renewable Energy Examination (Semester -IV) MARCH - 2019

Wednesday, 20-03-2019, Time: 02:00- to – 05.00PM

PS04ESYT02: Solar Power Plant Technology

Total Marks: 70
(8x1= 08)

Q-1 Select the most appropriate options

- 1.0 A Carnot engine operates between 200°C and 20°C. Its maximum possible efficiency is:
 - a) 90%
 - b) 100%
 - c) 38%
 - d) 72%
- 2.0 The reheating of steam in a turbine.....
 - a) Increases work done through the turbine
 - b) Increases efficiency of the turbine
 - c) Reduces wear on blades
 - d) All of the above
- 3.0 A fixed nozzles is _____
 - a) Reaction turbine
 - b) Impulse turbine
 - c) Both of these
 - d) None of these
- 4.0 Stirling cycle are...
 - a) Reversible cycle
 - b) Quasi-static cycle
 - c) Irreversible cycle
 - d) Adiabatic irreversible cycle
- 5.0 Select the appropriate answer about concentration ratio of solar dish
 - a) If the rim angle is very small, then mirror will get favourable focal point.
 - b) very big rim angles as well as very small rim angles are unfavourable for high concentration ratios.
 - c) two effects that provoke a reduction of the concentration ratio: Small rim angles provoke a widening of the focal spot and big rim angles provoke a widening of the focal spot.
 - d) Answer b and c correct
- 6.0 Polished silver has highest reflectivity of any metal surface
 - a) 98%.
 - b) 95%
 - c) 90%
 - d) None of the above
- 7.0 Following are not major fresnel power plant components
 - a) Solar field
 - b) Fresnel
 - c) Coal block
 - d) Steam drum
- 8.0 In fresnel following mirror used
 - a) Nearly flat reflectors to concentrate sunlight.
 - b) Curved reflector mirror to concentrate sunlight
 - c) 45° curved mirror used to concentrate sunlight
 - d) 90° curved mirror used to concentrate sunlight

Q-2 Answer ANY SEVEN questions

(7x2= 14)

- 1. Define thermodynamic cycle
- 2. Why Carnot cycle cannot be realized in practical?
- 3. Write some advantages of reheat cycle in thermal power plant
- 4. Write importance of economizer in power plant technology
- 5. Write reflector properties of solar dish collector : a) Reflective surface b) climatic
- 6. Write a short note on external and cavity receiver of solar dish

7. Explain fresnel steam generation technology.
8. How owner get benefit following process integration from solar ISCC by a) Power boost method b) Heat rate improvement.
9. Write a short note on economic consideration of ISCC power plant

Q3 A) Explain working principle of carnot engine. Draw T-S and P-V diagram and explain the process. (06)

Q3 B) Describe steam turbine and also explain the working principle of impulse and reaction turbine (06)

OR

Q3 B) Explain necessity of feed water heater in steam power plant. Explain (a)Open and (b)Closed feed water heater (06)

Q4 A) Discuss important constructive parameter needed to design rim angle to achieve higher concentration ratio. (06)

Q4 B) Write advantages and disadvantages of dish/engine systems in relation to other solar-to-electric conversion systems. (06)

OR

Q4 B) Discuss efficiency of a dish/engine system based on following parameter: (a) solar irradiance, (b) radiation concentration, (c) intercept factor, (d) engine efficiency, (e) generator efficiency. (06)

Q5 A) Discuss in detailed about what are the important design parameters to be considered to design linear Fresnel solar collector for solar power generation. (06)

Q5 B) Describe receiver technologies of fresnel solar collector (06)

OR

Q5 B) Discuss advantage and disadvantages of fresnel solar power plant (06)

Q6 A) Discuss how high, medium and low temperature solar technologies can be integrated into combined cycle power plant. (06)

Q6 B) Explain in detailed design of major equipment in ISCC power generation. (06)

OR

Q6 B) Discuss the advantages, limitation and challenges in ISCC power generation (06)