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SARDAR PATEL UNIVERSITY

M.Sc. Renewable Energy Examination (Semester –II)

Wednesday, 22-04-2015, Time: 10.30 to 01.30P.M

PS02CREN02: Ocean Energy and Tidal Energy

Total Marks: 70

Q-1 Select the most appropriate options

(8x1= 08)

1. Ocean thermal energy conversion systems are more suitable to generate power is _____
 - a) Sub -tropical region
 - b) Tropical region
 - c) Cold region
 - d) Moderate climate region
2. Ocean thermal energy plants can operate if the temperature difference between the water at the surface and water at depths upto ----- km is -----or more.
 - a) 293 K, 2km
 - b) 100K, 15km
 - c) 13km 250K
 - d) d) None of the above
3. Floating generators are used in the sea to harness _____.
 - a) tidal energy
 - b) wave energy
 - c) hydel energy
 - d) energy from OTEC power plant
4. The actual efficiency of a practical OTEC plant is _____.
 - a) 3%
 - b) <2%
 - c) 3-4%
 - d) 3-5%
5. The typical range of wave height is _____.
 - a) 0.2 to 4 m
 - b) 0.1 to 0.3m
 - c) 0.4 to 2m
 - d) 8km to 200m
6. Wave power density is commonly expressed in terms of _____.
 - a) Power per unit width
 - b) kW/m
 - c) m/s
 - d) answer a and b
7. Ebb current is
 - a) the same as eddy current
 - b) the movement of the tidal current away from shore or down a tidal stream
 - c) the removal by screen of undesirable fine materials from broken are
 - d) none of the above.
8. The amplitude of tides covers range of
 - a) 25cm to 10 m
 - b) 25m to 100 m
 - c) 12.5 to 6 m
 - d) 18 to 1.8 cm

Q-2 Answer any seven questions

(7x2 =14)

1. What is ocean energy?
2. Write the technical obstacles of closed-cycle OTEC plants.
3. Write month-wise variation of ocean surface water temperature

4. Calculate the wave length and wave velocity for the progressive ocean wave with period 6 second.
5. List out limitation of ocean wave energy conversion technology.
6. What is point absorber wave machine?
7. What is tidal current?
8. Define flood tide and ebb tide
9. Enlist the main deciding criteria for location of ocean wave energy plants.

Q-3 A) State various forms of ocean energy sources and write their advantages and disadvantages (06)

Q-3 B) Describe the power transmission technologies from off-shore ocean energy plant to remote main-land consumer by monopower and bipolar HVDC submarine cable (06)

OR

Q-3 B) Describe the salinity gradient energy conversion technology. (06)

Q-4 A) Explain the working principle of open cycle OTEC system with neat sketch diagram. Explain the thermodynamic cycle of open cycle OTEC system with T-S diagram. (06)

Q-4 B) Drive an expression for Carnot efficiency of closed cycle OTEC plant with the help of T-S diagram. (06)

OR

Q-4 B) Explain the structure and principle of hybrid cycle OTEC system and write the environmental impact of OTEC system? (06)

Q-5 A) Drive an expression for energy and power in ocean waves. (06)

Q-5 B) Calculate wave energy and power. Ocean waves on the coast of Tamilnadu, India were with following data. Amplitude 1 m, Period 6s. Calculate the following: wavelength, velocity, energy density, power extracted from a wave of 10 m with a power density, energy in 100 m wide wave. Assume density of ocean water as 1000 kg/m^3 (06)

OR

Q-5 B) Give classification of wave power extraction methods based on operating principle and structure with neat diagram (06)

Q-6 A) Explain the various methods of tidal power generation with neat sketch diagram. (06)

Q-6 B) Discuss the advantages and limitations of tidal power generation (06)

OR

Q-6 B) State the present status of tidal power plants in India and around the world. Why the tidal energy not being utilized fully? (06)

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