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[58] SEAT No._____ No. of Printed Pages: 02

(58) **SARDAR PATEL UNIVERSITY**

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

Wednesday 20-03-2019, Time: 10.00 to 01.00P.M

PS02CREN02: Ocean Energy and Tidal Energy

Total Marks: 70

Q-1 Select most appropriate answer **(8x1 =8)**

1. With an increase in depth temperature of ocean water

a) increases
b) decreases
c) remains same
d) constant

2. Second layer of ocean water is called

a) surface zone
b) thermo cline
c) secondary zone
d) deep zone

3. Intensity of a wave is directly proportional to the

a) amplitude
b) square of amplitude
c) cube of amplitude
d) frequency

4. As wave travels, intensity

a) increases
b) remains same
c) decreases
d) varies

5. An increased tide range twice a month is the

a) tidal average
b) tidal range
c) neap tide
d) spring tide

6. Neap tides occur when earth, sun and moon forms an angle of

a) 60°
b) 90°
c) 20°
d) 180°

7. Minimum range of tide which occurs during first and third quarters of moon is called

a) tidal average
b) tidal range
c) neap tide
d) spring tide

8. Difference in levels of ocean water between a high tide and low tide is called

a) tidal average
b) tidal range
c) neap tide
d) spring tide

(P.T.O)

Q-2 Answer ANY SEVEN questions **(7x2 =14)**

1. What is ocean energy?
2. Write advantage and limitation of oceans energy conversion technology.
3. Write technical obstacles of closed-cycle OTEC plants.
4. For warm seawater at 77◦F and cold seawater at 45◦F, find the Carnot efficiency.
5. Enlist main deciding criteria for location of ocean wave plants.
6. Calculate wavelength and wave velocity for progressive ocean wave with period 6 second.
7. List out limitation of ocean wave energy conversion technology.
8. What is point absorber wave machine?
9. What is spring and neap tide?

Q-3 A) Discusses various forms of ocean energy source and its merits and demerits (06)

Q-3 B) Give classification for off-shore and on-shore ocean energy conversion technologies (06)

OR

Q-3 B) Describe in detailed about power transmission technology from off-shore ocean to land based centers (06)

Q-4 A) Explain construction and working principle of open cycle OTEC system with neat sketch diagram. Write technical difficulties of open-cycle OTEC Systems. (06)

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

OR

Q-4 B) Describe structure and principles of hybrid OTEC system. How OTEC system used for multipurpose? (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 the classification of wave power extraction methods based on operating principle and structure with neat diagram. (06)

Q-6 A) Discusses how potential energy calculated difference in height between high and low tides and also explain how power harvested from ebb and flood generation. (06)

Q-6 B) A tidal power plant of single basin type has a basin area of 25 x 10^6 m^2. The tide has a range of 10 m. The turbine however, stops operating when the head on it falls below 2 m. Calculate the energy generated in one filling process, in kWh if the turbine generator efficiency is 75 %. Take density of seawater is 1025 kg/m^3. (06)

OR

Q-6 B) Discusses kinetic energy calculation for tidal current energy harvesting technique and also explain how tidal power harvested from horizontal and vertical axis turbine (06) (06)

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