

School: School of Engineering and Technology
Program/s: Electrical & Electronics Engineering

Year: 4th Semester: 8th

Examination: End Semester Examination

Examination year: May - 2023

Course Code: BE401 Course Name: Renewable energy sources

 Date:
 17/05/2023
 Total Marks:
 40

 Time:
 10 am to 12 pm
 Total Pages:
 2

Instructions:

→ Write each answer on a new page.

→ Use of a calculator is permitted.

Que. A	Attempt any Five.	Marks	BTL	со
Q.1	What are the ways by which geothermal power generation is possible? Explain with appropriate diagrams.	6	CO7, CO8	BT1, BT2, BT3,
Q.2	Derive the equation for yearly power generation from tidal power plant. Also show the energy & power output from double cycle system with required diagram.	6	CO9. CO10	BT1 ,BT2, BT4, BT5
Q.3	What is Biogas? Give the classification of biomass resources and also list out the biogas plants. Explain any one in detail with diagram.	6	CO10, CO11	BT1 ,BT2, BT3, BT4
Q.4	What is Thrust in a wind turbine rotor? Derive the equation of thrust and torque acting on the turbine rotor.	6	CO7. CO8	BT1 ,BT2, BT3, BT4
Q.5	The following data are given for a horizontal-axis wind turbine: Speed of wind= 15m/s, air density=1.229 kg/m^3, rotor diameter=100m Rotor speed= 50 rpm, power co-efficient=50%. Calculate (i) total power density in wind system (ii) maximum torque (iii) maximum thrust.	6	CO4, CO5	BT1 ,BT2, BT4, BT5
Q.6	The undisturbed wind speed at a place is 14 m/sec^2. The wind speed at the turbine rotor and at exit is 80% & 50%, respectively, of the undisturbed wind. The rotor diameter is 10 m and air density is 1.229 kg/m^3. Calculate (i) Power available in the undisturbed wind (ii) power developed by wind turbine(iii) power co-efficient.	6	CO10, CO11	BT1 BT2, BT3, BT4

Que B	Attempt the following .(Justify your answer if required.	10	CO1, CO2, CO3	BT1 ,BT2, BT4,
1.	What is the condition for maximum wind turbine rotor power output? a)Vd=Vu b)Vd=1/2*(Vu) c)Vd=1/3*(Vu) d) Vu=1/3*(Vd)			BT5
2.	If the wind turbine rotor is of 5-m radius with 28 blades each with 0.4 m wide, the solidity is a) 0.44 b) 0.35 c) 0.50 d) 0.55			
3.	a) 0.44 b) 0.35 c) 0.50 d) 0.55 The difference in water level between two consecutive high tides & low tides is called a) Spring tide b) Neap tide c) Tidal range d)Estimation of tidal energy			
4.	Which of the following tidal power plants requires reversible turbine for electrical power generation? a) Single-basin single-effect plant effect plant c) Double-basin with paired-basin operation d) Both (2) & (3)			
5.	Yearly average tidal cycles occur are a)700 tidal cycle b)705 tidal cycle c) 650 tidal cycle d) 710 tidal cycle		-7,	
6.	A spring that shoots jets of hot water and steam into the air is called as a)Mine hole b) Geyser c) Hot spring d) Mud pot		-	
7.	Match the following in reference with geothermal power plant D. Flashed steam plant 1. Operates with a steam of 245 °C & 7 kg/cm^2 E. Binary cycle plant 2. Uses brine as a geothermal fluid with temperature more than 180 °C F. Vapour dominated plant 3. Uses isobutene & freon with low boiling point as a working fluid b) A-2, B-1,C-3 b) A-1, B-2,C-3 c) A-2, B-3, C-1	*		
8.	In geo-thermal power plants waste water is			
	a) Discharged back to earth. b) Discharged into the sea. c) Re-circulated after cooling in cooling towers. d) Evaporated in ponds.	1		
9.	What is the relation between torque co-efficient & power co-efficient of wind turbine?? b) $C_p = \lambda * C_T$ b) $C_T = \lambda * C_p$ c) $C_p = 0.593 * C_T$ d) $C_T = 0.593 * C_P$			
10.	The lunar day is longer than solar day by 50 min results in c) Maximum water level d) two tidal cycle per day d) both (1) & (3)			