

Model Question Paper-1 with effect from 2021(CBCS Scheme)

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Sixth Semester B.E. Degree Examination Subject Title: Renewable Energy Power Plants

TIME: 03 Hours

Max. Marks: 100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks																									
Q.01	a	Explain different types of renewable energy and Discuss India's production and reserves of commercial energy sources.	L2	CO1	10																									
	b	Explain extra-Terrestrial radiation and Solar constant. With neat sketch describe construction and working principle of Pyranometer (Pyrometer)	L2	CO1	10																									
OR																														
Q.02	a	How renewable energy is different from Conventional one? Discus Indian and global energy scenario.	L2	CO1	10																									
	b	Describe spectral distribution of extra-terrestrial radiation. With neat sketch describe construction and working principle of Pyrheliometer.	L2	CO1	10																									
Module-2																														
Q. 03	a	Define the following terms (i) latitude angle (ii) declination angle (iii) hour angle. Explain with a neat sketch Evacuated tubular collector.	L2	CO2	10																									
	b	Describe with a neat sketch solar distillation system. With a neat sketch solar flat plate collector	L2	CO2	10																									
OR																														
Q.04	a	Discuss apparent motion of the sun with neat sketch. Determine the local apparent time (LAT) corresponding to 1430 hours(IST) at Mumbai (19° 07' N, 72° 51' E) on July 1. In India, standard time correction on July 1 is equal to -3.5.	L2	CO2	10																									
	b	Describe with a neat sketch working of solar pond. With a neat sketch explain solar air collector	L2	CO2	10																									
Module-3																														
Q. 05	a	Discuss the causes and properties of wind. What are the major problems associated with wind machines.	L2	CO3	10																									
	b	Explain energy plantation. Describe the applications of biogas.	L2	CO3	10																									
OR																														
Q. 06	a	With neat sketch explain components of horizontal axis wind mill. Explain elementary design principles for wind turbines.	L2	CO3	10																									
	b	Discuss working principle of KVIC biogas digester with sketch. Discuss the problems associated with biogas generation.	L2	CO3	10																									
Module-4																														
Q. 07	a	Discuss need of hydrographs and flow duration curves with sketch. Describe general layout of hydro power plant with schematic diagram.	L2	CO4	10																									
	b	<p>The mean monthly discharge for 12 months at a particular site of the river is tabulated below,</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <thead> <tr> <th>Month</th> <th>April</th> <th>M</th> <th>J</th> <th>J</th> <th>A</th> <th>S</th> <th>O</th> <th>N</th> <th>D</th> <th>J</th> <th>F</th> <th>M</th> </tr> </thead> <tbody> <tr> <td>Discharge*</td> <td>500</td> <td>200</td> <td>1500</td> <td>2500</td> <td>3000</td> <td>2400</td> <td>2000</td> <td>1500</td> <td>1500</td> <td>1000</td> <td>800</td> <td>600</td> </tr> </tbody> </table> <p>* Discharge in million's m³ per month.</p> <p>Draw: (i) Hydrograph for the given discharge and find the average monthly flow.(ii) The power available at mean flow of water if the available head is 80 m at the site and overall efficiency of the generation is 80 %. Take 30 days in a month.</p>	Month	April	M	J	J	A	S	O	N	D	J	F	M	Discharge*	500	200	1500	2500	3000	2400	2000	1500	1500	1000	800	600	L2	CO4
Month	April	M	J	J	A	S	O	N	D	J	F	M																		
Discharge*	500	200	1500	2500	3000	2400	2000	1500	1500	1000	800	600																		

OR							
Q. 08	a	The mean monthly discharge for 12 months at a particular site of a river is tabulated below:		L2	CO4	10	
		Month	Discharge in millions m³ per month	Month	Discharge in millions m³ per month		
		January	80	J	150		
		F	50	A	200		
		M	40	S	250		
		A	20	O	120		
		M	0	N	100		
		J	100	D	80		
		Draw: (a) Hydrograph for the given discharge and find the average monthly flow (b) The power in MW available at mean flow of water if the available head is 100 meters at the site and overall efficiency of the generation is 80 %. Take 30 days in a month					
	b	Discuss advantages and disadvantages of hydroelectric power plant. Explain working of pumped storage power plant with schematic diagram		L2	CO4	10	
Module-5							
Q. 09	a	Explain the working principle of ocean thermal energy conversion (OTEC) plantName power plant installed in the world based on ocean thermal energy.		L2	CO4	10	
	b	Discuss in brief geothermal energy resources. Describe a vapour dominated hydrothermal type geothermal power plant.		L2	CO4	10	
OR							
Q. 10	a	Describe construction and working principle of geothermal energy with schematic diagram		L2	CO4	10	
	b	Discuss advantages and disadvantages of geothermal energy. Describe a hot dry rock geothermal resource power plant		L2	CO4	10	

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.

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Sixth Semester B.E. Degree Examination Renewable Energy Power Plant

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Elaborate on India's Production and reserves of Commercial Energy Sources	L2	CO1	10
	b	List advantages and disadvantages of renewable energy resources	L2	CO1	10
OR					
Q.02	a	With schematic representation explain mechanism of absorption, scattering beam and diffused radiation received at Earth's surface	L2	CO2, CO3, CO4	10
	b	Explain with neat sketch working of pyranometer	L2	CO2, CO3, CO4	10
Module-2					
Q. 03	a	Define the following (i) Declination Angle (ii) Hour Angle (iii) Latitude (iv) Zenith Angle (v) Surface Azimuth Angle	L2	CO2, CO3, CO4	10
	b	Calculate the angle made by beam radiation with the normal to a flat-plate collector on May 1 at 0900h (local apparent time). The collector is located in New Delhi (28°35'N, 77°12'E). It is tilted at an angle of 36° with the horizontal and is pointing due south.	L3	CO2, CO3, CO4	10
OR					
Q.04	a	With a neat sketch explain any two types of concentrating collectors	L2	CO2, CO3, CO4	10
	b	Describe Solar Pond for Solar Energy Collection and Storage	L2	CO2, CO3, CO4	10
Module-3					
Q. 05	a	Describe the main consideration in selecting the site for wind generator	L2	CO2, CO3, CO4	10
	b	Wind at 1 standard atmospheric pressure and 15°C has velocity of 15 m/s. Calculate : (i) The total power density in the wind stream (ii) The maximum power density (iii) Reasonable power density, assume efficiency = 35% (iv) Total power (v) Torque and axial thrust Given : Turbine Diameter = 120 m, and Turbine Operating speed = 40 rpm at maximum efficiency. Consider Propeller type wind turbine	L3	CO2, CO3, CO4	10
OR					
Q. 06	a	Explain the biomass sources for biogas generation	L2	CO2, CO3,	10

				CO4	
	b	Sketch and explain the working of a floating dome type biogas plant used in India	L2	CO2, CO3, CO4	10
Module-4					
Q. 07	a	With a neat sketch explain general layout of Hydro-electric power plant	L2	CO2, CO3, CO4	10
	b	Explain with a neat sketch pumped storage plant	L2	CO2, CO3, CO4	10
OR					
Q. 08	a	Explain principle of generation of tides	L2	CO2, CO3, CO4	10
	b	List advantages and disadvantages of wave energy	L2	CO2, CO3, CO4	10
Module-5					
Q. 09	a	Explain with a sketch, the closed Rankine Cycle OTEC System	L2	CO2, CO3, CO4	10
	b	List and explain the problems associated with OTEC	L2	CO2, CO3, CO4	10
OR					
Q. 10	a	List various sources of Geothermal Energy. What are the problems associated with Geothermal Energy Conversion.	L2	CO2, CO3, CO4	10
	b	With a neat sketch Vapour dominated Geothermal thermal power plant	L2	CO2, CO3, CO4	10

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Model Question Paper-2 with effect from 2021(CBCS Scheme)

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Sixth Semester B.E. Degree Examination Renewable Energy Power Plant

TIME: 03 Hours

Max. Marks: 100

Note: 01. 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each

MODULE

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Explain the need of non conventional energy sources	L2	CO1	10
	b	Explain merits and demerits of any three non conventional energy sources	L2	CO1	10
OR					
Q.02	a	Explain spectral distribution of extra-terrestrial radiation	L2	CO2, CO3, CO4	10
	b	Explain with neat sketch working of sun shine recorder	L2	CO2, CO3, CO4	10
Module-2					
Q. 03	a	With a neat sketch explain working of liquid flat plate collector	L2	CO2, CO3, CO4	10
	b	Explain how Solar Energy can be used for Solar drying and cooking	L2	CO2, CO3, CO4	10
OR					
Q.04	a	Explain Sensible Heat and Latent Heat Thermal Energy Storage	L2	CO2, CO3, CO4	10
	b	Explain the working principle and I-C Characteristics of Solar PV Cell	L2	CO2, CO3, CO4	10
Module-3					
Q. 05	a	List types of wind mills. Explain Horizontal Axis Wind Machine	L2	CO2, CO3, CO4	10
	b	List advantages, disadvantages and applications of Wind Energy	L2	CO2, CO3, CO4	10
OR					
Q. 06	a	With neat explain Fixed dome biogas plant	L2	CO2, CO3, CO4	10
	b	List the applications of biogas. What are the problems involved in production of biogas.	L2	CO2, CO3, CO4	10
Module-4					
Q. 07	a	How are hydroelectric power plants classified ? Explain	L2	CO2, CO3, CO4	10
	b	Explain the following	L2	CO2,	10

		(i) Hydrograph (ii) Flow Duration Curve (iii) Surge Tank (iv) Spill way (v) Draft tube		CO3, CO4	
OR					
Q. 08	a	With a neat sketch explain single basin and double basin tidal power plant	L2	CO2, CO3, CO4	10
	b	List advantages and disadvantages of Tidal energy	L2	CO2, CO3, CO4	10
Module-5					
Q. 09	a	What is the basic principle of OTEC	L2	CO2, CO3, CO4	10
	b	Explain with a sketch, the Open Rankine Cycle OTEC System	L2	CO2, CO3, CO4	10
OR					
Q. 10	a	With a neat sketch explain Geothermal Energy System by Hot Dry Rock (HDR)	L2	CO2, CO3, CO4	10
	b	List and explain the problems associated with Geothermal System operations	L2	CO2, CO3, CO4	10

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