GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2021
NON CONVENTIONAL ENERGY SOURCES
EI603B

TIME ALLOTTED: 3HR **FULL MARKS:70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

			Marks	CO No.
1.	(i)	The maximum solar irradiance on surface of the earth is a. 1 kW/m^2 b. 10 kW/m^2 c. 100 kW/m^2 d. None of these	1	CO1
	(ii)	In the northern hemisphere, the duration of daytime is maximum on a. 21st March b. 21st June c. 21st September d. 21st December	1	CO1
	(iii)	Direct solar irradiance can be measured by a. Pyranometer b. Anemometer c. Pyroheliometer d. None of these	1	CO1
	(iv)	Highest efficiency is obtained by the photovoltaic cell made of a. Monocrystalline silicon b. Polycrystalline silicon c. Amorphous silicon d. Thin-film silicon	1	CO2
	(v)	In small wind turbines, the preferred generator is a. DC generator b. Permanent magnet synchronous generator c. Doubly fed induction generator d. None of these	1	CO2
	(vi)	The approximate value of solar constant is: a. 1364 W/m^2 b. 1500 W/m^2 c. 2165 W/m^2 d. 2230 W/m^2	1	CO1

(vii)	Solar pond is used to store: a. Solar thermal energy b. Water thermal energy c. Air thermal energy d. None of these	1	CO2
(viii)	Highest efficiency is obtained by a. 1-blade wind turbine b. 2-blade wind turbine c. 3-blade wind turbine d. 4-blade wind turbine	1	CO2
(ix)	Pyrolysis converts biomass to: a. Water vapour b. Thermal energy c. Char d. Syngas	1	CO2
(x)	In a fuel cell, the electrolyte can be: a. Polymer b. Ceramic c. Carbonate d. All of these	1	CO1
(xi)	The equinox occurs on a. 21st June b. 21st September c. 21st December d. None of these	1	CO1

GROUP – B
(Short Answer Type Questions)

(Answer any *three* of the following) **3 x 5 = 15**

		Marks	CO No.
2.	Why is it becoming increasingly more important to use nonconventional sources of energy? Explain with reference to our country.	5	CO1
3.	With respect to our country, what are the advantages and disadvantages of using solar energy as a nonconventional source of energy?	5	CO1
4.	Describe with diagram the principle of operation of solar pond.	5	CO2
5.	Briefly describe how biomass can be used as a nonconventional source of energy.	5	CO3
6. a)	What is the difference between green energy and brown energy?	1	CO1
6.b)	Justify if atomic energy is green energy.	4	CO1

GROUP – C
(Long Answer Type Questions)

(Answer any *three* of the following) **3 x 15 = 45**

		Marks	CO No.
7. a)	Briefly explain with proper diagram how a photovoltaic cell works.	6	CO3
b)	Draw the I-V and P-V characteristic curves of a photovoltaic cell.	4	CO3
c)	Compare monocrystalline solar cell and polycrystalline solar cell as the material for solar cell.	5	CO3
8. a)	Briefly explain the working principle of a wind mill used for generation of electricity.	8	CO2
b)	Justify why 3-blade turbine is preferred for wind turbines used for generation of electricity.	2	CO3
c)	What are the advantages and disadvantages of vertical axis wind turbines?	5	CO3
9.a)	What are the advantages and disadvantages of ocean thermal energy converter (OTEC)?	5	CO2
b)	Compare the principles of operation of closed cycle OTEC and open cycle OTEC.	10	CO4
10.	Answer any three from the following:	3X5=15	
a)	Solar still	5	CO2
b)	Multistage flash distillation	5	CO3
c)	Pyranometer	5	CO2
d)	Flash steam plant	5	CO4
e)	Fuel cell	5	CO3