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(Revision – 2021)

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Reg. No……
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2025

RENEWABLE ENERGY POWER PLANTS

[Maximum Marks: **75**] [Time: **3** Hours]

PART-A

I. Answer '*all*' the following questions in one word or one sentence. Each question carries *'one'* mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	Name the type of turbine used in high head hydro power plants.	M1.02	R
2.	Define the term biomass.	M1.04	R
3.	Define the term solar irradiation.	M2.01	R
4.	Write any one function of charge controller in solar power plants.	M2.03	R
5.	State the difference between solar cell and solar module.	M2.03	R
6.	Name any one type of electric generator used in wind power plants.	M3.03	R
7.	Match the components with their functions in wind energy system. (A) Generator – a. Kinetic energy to mechanical energy (B) Turbine – b. Mechanical energy to electrical energy c. Electrical energy to mechanical energy	M3.02	R
8.	List any two types of energy conversion methods to harvest energy from oceans.	M4.01	R
9.	Write chemical reaction formula at anode of a hydrogen oxygen fuel cell.	M4.03	R

PART-B

II. Answer any '*eight*' questions from the following. Each question carries *'three'* marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Define biogas and list it constituents	M1.04	R
2.	State the basic concepts of the following: A) Building integrated type solar energy system B) Solar power satellite	M2.03	R
3.	Explain the operation of parabolic trough solar collectors.	M2.02	U
4.	List out any three criterions for selection of site for wind power plant.	M3.01	R
5.	A 60 m diameter wind turbine runs at a speed of 5.4 m/s. Calculate the power output of the turbine. Assume the air density as 1.226 kg/m^3	M3.03	A
6.	Draw the block diagram representation of constant speed constant frequency electric power generation scheme from wind.	M3.04	R

7.	Draw the block diagram representation of grid connected wind power plant	M3.03	R
8.	Describe the operation of oscillating water coloumn type ocean wave energy conversion system.	M4.01	U
9.	Explain the working principle of ocean thermal energy conversion system.	M4.02	U
10.	List out any three advantages and disadvantages of tidal power plants.	M4.01	R

PART-C

Answer '*all*' questions from the following. Each question carries *'seven'* marks.

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Explain the operation of vapour dominated geothermal power plant with the help of block diagram.	M1.03	U
	OR		
IV.	Draw the schematic diagram and identify the function of each component in a small hydro power plants.	M1.02	U
V.	Explain different biomass conversion processes.	M1.04	U
	OR		
VI.	Distinguish between conventional and non conventional energy sources with the help of examples.	M1.01	U
VII.	Illustrate the construction and working of solar cells.	M2.03	U
	OR		
VIII.	Describe the operation of buck converter with the help of circuit diagram.	M2.03	U
IX.	Solar system is installed in a house for night time to meet the following loads for a duration of 10 hours per day. 1. Ten 40 w LED lamps 2. Four 80w ceiling fans Calculate: i) inverter rating to meet the load ii) Ampere hour rating of battery if battery voltage is 12V and efficiency of 90% and rate of discharge of 80%. iii) no of 200 Wp solar panels required if panel generation factor is 4.	M2.04	A
	OR		
X.	If solar system contains a battery of rating 12V, 150 Ah and needs a charging current of 20A. If the rating of individual solar panel is 250W find A. Back up period of system for a day if it is used to drive a load of 1000W. B. Total no of panels to be connected in the system.	M2.04	A

XI.	Compare horizontal axis and vertical axis wind turbine based on any five aspects.	M1.02	U
	OR		
XII.	Explain the operation of stand alone type wind power plant with the help of block diagram.	M3.03	U
XIII.	Draw the block diagram and describe the operation of magneto hydro dynamic power plant.	M4.04	U
	OR		
XIV.	Compare battery and fuel cell based on any five aspects.	M4.03	U

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