TED (21) – 5033A
(REVISION – 2021)

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Reg.No……
Signature…….

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER - 2024

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' marks.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1	Define Renewable energy?	M1.01	R
2	Define Pyrolysis with respect to Biomass	M1.04	R
3	State the purpose of a heliostat.	M2.02	R
4	Expand the term "MPPT" in solar power plant.	M2.03	R
5	State any two applications of wind energy.	M3.01	R
6	Write any two classification of wind turbines.	M3.02	R
7	List any two schemes for wind power generation.	M3.04	R
8	Write any two disadvantages of tidal energy.	M4.01	R
9	List any two applications of fuel cells.	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	Explain the need of tapping non-conventional energy resources.	M1.01	U
2	Write the classification of small hydel power plants based on capacity and water head	M1.02	R
3	Define biogas and list the major constituents	M1.04	R
4	Illustrate flat plate solar collector.	M2.01	U
5	Outline the working solar power tower	M2.02	U
6	Draw the block diagram of a Grid connected solar PV system and label various blocks.	M2.03	R
7	Determine the power in the wind if the wind speed is 20m/s and blade length is 30m. Take air density as $1.23kg/m^3$	M3.02	A
8	Illustrate power generation from tide using single basin system	M4.01	U
9	Explain the principle of operation of OTEC power generation.	M4.02	U
10	Illustrate power generation from wave using oscillating water column	M4.02	U

PART - C

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

(6 x 7 = 42 Marks)

<table>
<tr><th></th><th></th><th>Module Outcome</th><th>Cognitive level</th></tr>
<tr><td>III.</td><td>Draw the schematic diagram of binary cycle geothermal power plant and identify various blocks.</td><td>M1.03</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>IV.</td><td>Distinguish between fixed dome type and floating drum type biogas plants.</td><td>M1.04</td><td>U</td></tr>
<tr><td>V.</td><td>A house has the following electrical appliance usage:
1. One 36 Watts fluorescent lamp with electronic ballast used 4 hours per day.
2. One 80 Watts fan used for 2 hours per day.
3. One 250 Watts refrigerator that runs 24 hours per day with compressor run 12 hours and off for 12 hours.
The system will be powered by 12Vdc, 120 Wp PV module.
(Assume panel generation factor=3.4)
Determine the following:-
(a) Solar energy consumption in watt-hour per day
(b) Number of PV panels required</td><td>M2.04</td><td>A</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>VI.</td><td>Calculate the number of batteries required for 8 hours backup power for the following load in a solar PV system? (Assume 12V 120Ah Battery)
<table>
<tr><th>Sl.No</th><th>Type of Load</th><th>No.of load</th><th>Power Rating(W)</th></tr>
<tr><td>1</td><td>LED Screen</td><td>2</td><td>300</td></tr>
<tr><td>2</td><td>Cooling Fan</td><td>8</td><td>50</td></tr>
</table></td><td>M2.04</td><td>A</td></tr>
<tr><td>VII.</td><td>Draw the schematic diagram and explain the principle of operation of solar pond.</td><td>M2.02</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>VIII.</td><td>With a neat diagram explain buck converter used in PV systems</td><td>M2.03</td><td>U</td></tr>
<tr><td>IX.</td><td>Draw the block diagram with basic components for wind energy conversion system and write the functions of each.</td><td>M3.02</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>X.</td><td>Illustrate the variable speed constant frequency scheme for wind power generation.</td><td>M3.04</td><td>U</td></tr>
<tr><td>XI.</td><td>State and explain any seven factors to be considered in selection of sites for wind power plant.</td><td>M3.01</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>XII.</td><td>Explain standalone wind power plant with a block diagram.</td><td>M3.03</td><td>U</td></tr>
<tr><td>XIII.</td><td>With a neat diagram explain open cycle OTEC Power plants</td><td>M4.03</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>XIV.</td><td>Explain working of MHD plant with the help of neat sketch.</td><td>M4.04</td><td>U</td></tr>
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