

NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR**Mid-Term Examination, 2023-24**

Course Code: EEE710

Full Marks: 25

Course Name: Renewable Energy Systems

Time: 90 Minutes

Question Paper No.: NITDGP/EEE710

Date of Exam:

Instructions: Answer all questions of a section in one part. Answer all parts of a question at one place only

Section A

Q. No	Question	Marks	Mapped CO
1	a) Draw the flow chart of Energy Chain. b) Write the four major problems facing by Indian Power Sector. c) Write two deciding factors to formulate the Energy policy by WEC. d) Write four major problems facing by WEC. e) Write three major reasons that India need Renewable Energy ?	1x5	CO1
2	(a) Define Energy Triangle in brief and the flow chart for the calculation of Energy sustainability index of any country in view of energy performance and contextual performance of that country. OR (i) Describe the Keys for Energy Security and Energy Market in global perspective. (ii) Draw daily load curve, weekly load curve, monthly load curve and yearly load curve of the hostels at NIT, Durgapur with assumptions of relevant data.	3+3	CO1
3	(a) Describe in brief (any two): (i) Global Energy mix (ii) Carbon Credit (iii) Classification of Energy Resources	3x2	CO1, CO2

Section B

1	What is the global position of India for overall installed renewable energy capacity? Explain "Operating principle of Wind Turbine is the opposite of FAN"	1+1	CO1, CO3
2	Prove that the efficiency limit for a thrust operated converter is $8/27$ times the available power. What do you mean by Lift force?	3+1	CO3
3	Find the required diameter of a wind turbine to generate 4kW at a wind speed of 10m/s and a rotor speed of 120rpm. Assume power coefficient =0.4, efficiency of mechanical transmission =0.92 and efficiency of generator =0.95 and $\rho = 1.25 \text{ kg/m}^3$ at 15 degree centigrade at NP.	2	

Course Outcomes

CO1: Understand the concept of Renewable energy as a whole.

CO2: Acquire knowledge about Solar photovoltaic.

CO3: Acquire an idea about Wind Energy, Bio fuel and Fuel cell.

CO4: Understand Energy Conservation, Energy audit, energy economics etc.

NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR
Odd Semester Mid-Term Examination, 2023-24

Course Code: EEE720

Course Name: Digital Signal Processing

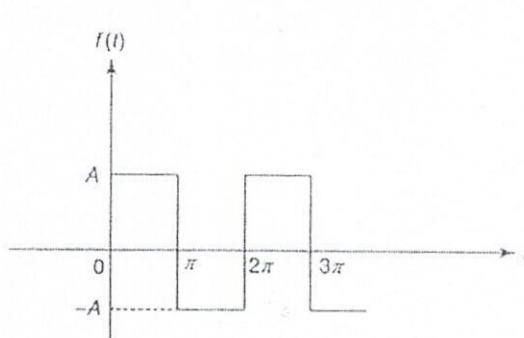
Full Marks: 25

Time: 90 minutes

Question Paper No.: NITDGP/EE0443/1

Instructions: Answer any five questions.

Materials to be supplied: Graph paper shall be supplied, if required.

Question No.	Body of the Question	Marks	Mapped CO
1	<p>Derive the exponential Fourier series of the following waveform and plot the magnitude spectrum.</p> 	5	CO1
2	Determine the Fourier transform of the signum function and draw the magnitude and phase spectrum.	5	CO2
3	Determine the Z transform and determine ROC of the following sequence: $x(n) = [3(2^n) - 4(3^n)] u(n)$	5	CO2
4	Solve the following difference equation: $y(n+2) - 3y(n+1) + 2y(n) = 0$ <p>Assume zero initial conditions.</p>	5	CO3
5	Determine the discrete time Fourier transform (DTFT) of the following sequence and determine the magnitude and phase spectrum: $x(n) = 3^n u(n)$	5	CO3
6	Derive the impulse response of the system which is given by the following equation: $x(n+2] - 3x(n+1) + 2x(n) = \delta(n)$ <p>Assume zero initial conditions.</p>	5	CO3

Course Outcomes:

CO1: To understand the properties signals and systems.

CO2: To understand the concept of signal processing.

CO3: To analyse discrete time signals and systems in time as well as frequency domain.

CO4: To design digital filters.

CO5: To get acquainted with digital processors recently used.