Name:

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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2021

Course: Signals and System **Semester: IV**
Program: B.Tech Electrical Engineering **Time 03 hrs.**
Course Code: ECEG 2032 **Max. Marks: 100**

Instructions:

- Attempt all questions as per the instruction.
- Assume any data if required and indicate the same clearly.
- Unless otherwise indicated symbols and notations have their usual meanings.
- Strike off all unused blank pages

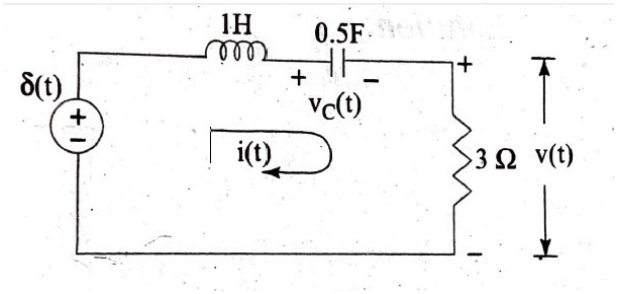
SECTION A **6x 5=30**

Write only answer in the text box(for S.No:1, 2 & 5 write ONLY the final answer)

S. No.	Question	Marks	CO
Q1.	Find the even and odd components of the signal $x(t) = \cos t + \sin t + \cos t \sin t$.	5	CO1
Q2.	Define energy of the signal and find whether the given x (n) = $\left(\frac{1}{3}\right)^n$ u (n) is an energy signal or power signal	5	CO2
Q3.	List the Applications of Laplace transform with examples.	5	CO3
Q4.	Distinguish Fourier transform and discrete Fourier transform	5	CO4
Q5.	Which of the signals are causal and non causal? (a) $x(t) = e^{2t} u(-t+2)$ (b) $y(t) = u[t+2] - u[t-2]$ c) $x[n]=\{1,-1,2,2\}$ (d)$x[n]=2^n u[-n]$ (e)$Y(t) = 2x(t^2)$;	5	CO1
Q6.	Write the relation between DTFT and Z plane (write in statement no need of equations)	5	CO5

SECTION B **5x10=50**

Q7.	Sketch the waveforms of the following signals: (a) if x(t) = u(t + 3) - u(t - 1) (b) $x(t) = e^{-2t}u(-2+t)$	10	CO1
Q8.	Find the Fourier Transform of (i) $x(t) = e^{-2t}$ u(t-4) (ii) x(t) = cosωt u(t)	10	CO2

Q9.	Explain about the significance of LT in determining the Initial and Final values of a function in time domain. Find the initial value and final value of the function $$X(s) = \frac{(s+5)}{(s^2 - 3s + 2)}$$	**10**	**CO3**
Q10.	Determine the voltage across the resistor as a function of time for t>0. If the current in the circuit i(0) = Vc(0)=0 from the figure 1 using suitable transform.  Fig 1	**10**	**CO4**
Q11.	**Answer any two** (a)Determine the Z.T and ROC of the causal sequence x[n]={1,2,-2,-4,1} ↑ (b)Determine Z.T and ROC $(2/3)^n$ u[n]+ $(-1/2)^n$ u[n] . (c)Consider the signal $x[n] = \left(\frac{1}{5}\right)^n u[n-3]$, Evaluate the z-transform of this signal and specify the corresponding region of convergence	**10**	**CO4**
	SECTION C		**5x10=50**
Q12.	**(a)** A linear time invariant (LTI) system is characterized by the system function $H(z) = \frac{3-4z^{-1}}{1-3.5z^{-1}+1.5z^{-2}}$. Specify the region of convergence and determine h[n] when **(i)** the system is stable **(ii)** the system is causal **(iii)** Determine the difference equation representation of this LTI system. (b)Using Z.T find convolution of two sequences	**12+8**	**CO5**

	$X_1[n]=\{1,1,0,-1,0,3\}$ & $X_2[n]=\{1,1,-1\}$		