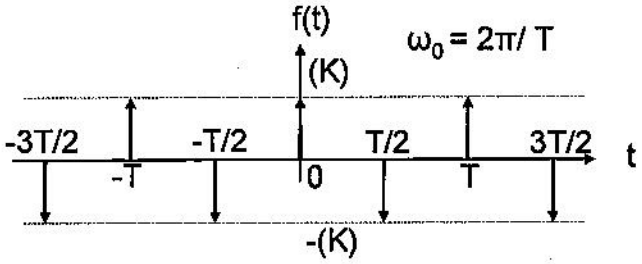
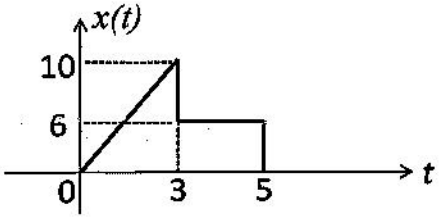
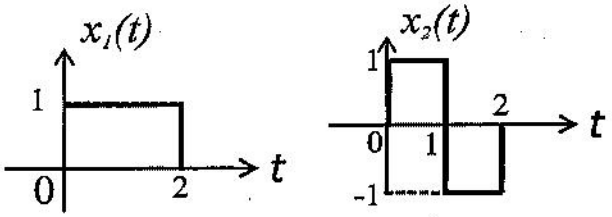
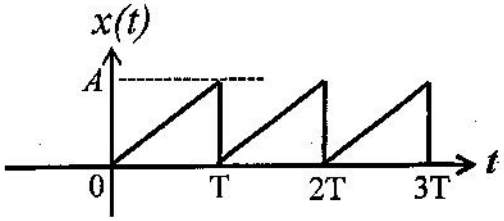
Ref No: Ex/EE/5/T/221/2018

B.E. E (PART TIME) 2ND YEAR 2ND SEMESTER EXAM 2018

SUBJECT: - SIGNALS & SYSTEMS

Time: Three hours **Full Marks 100**
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART-I	Marks
	Answer any 4 questions; 2 marks for well organized answers (12X4+2=50)	
1.	Derive expressions for Fourier series for the following signal *f(t)*. 	12
2.	A signal *x(t)* is shown below:  Find the even and odd components of *x(t)*.	12
3.	Perform graphically the convolution between $x_1(t)$ and $x_2(t)$ as shown in the following figure. 	12
4.	Plot the single-sided and double-sided frequency spectra of the following signal. 	12

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B.E. E (PART TIME) 2ND YEAR 2ND SEMESTER EXAM 2018

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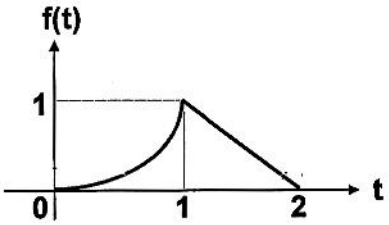
Time: Three hours **Full Marks 100**
(50 marks for each part)

Use a separate Answer-Script for each part

5. a)	Find Fourier Transform of unit step function $u(t)$.	8
b)	If, fifth harmonic of a signal $f(t)$ is 150Hz, then find the second harmonic of $f(2t-3)$.	4
6. a)	Determine whether the signal $x(t)$ is energy signal or power signal. $x(t) = 8e^{(2+j4\pi).t}$	4
b)	Prove that any signal can be resolved into even and odd components.	4
c)	Prove that, output of a system is the convolution of input and the impulse response of the system itself.	4
7. a)	Express following function $f(t)$ in terms of singularity functions: 	7
b)	Derive an expression of complex form of Fourier series from trigonometric form of Fourier series.	5

Ref No: Ex/EE/5/T/221/2018

B. E. ELECTRICAL ENGG. (PART TIME) 2ND YEAR 2ND SEMESTER -2018

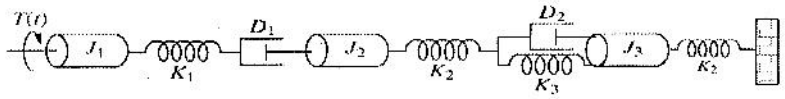
SUBJECT: SIGNALS AND SYSTEMS

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
	Answer any three. ***Two marks reserved for neatness and well organized answers.***	
1.(a)	Define transfer function. What is meant by poles & zeros of a system.	4
(b)	A system has following transfer function $G(s) = \frac{100(s+7)(s+16)}{s^5(s+10)(s^2+3s+10)}$ Draw the pole zero map. Comment on type and order of the system.	4
(c)	Derive the transfer function for armature controlled DC motor.	8
2. (a)	What is meant by damping? Classify systems based on different values of damping.	3
(b)	Discuss about time response specifications of a system.	6
(c)	A unity feedback control system has an open loop transfer function $G(s) = \frac{5}{s(s+1)}$, H(s)=1. Find the closed loop transfer function, rise time, peak time, settling time, percentage overshoot for a step unit of 5 units.	7
3. (a)	Write the differential equation governing the system.	4
(b)	Find the transfer function $\frac{\theta_3(s)}{T(s)}$, where $\theta_3(s)$ is the rotational angle of the inertial mass J_3.	8
(c)	Draw the corresponding F-I analogus electrical circuit.	4



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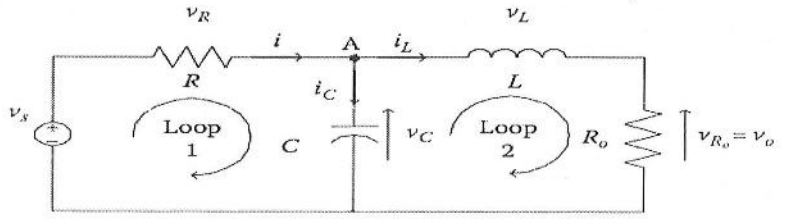
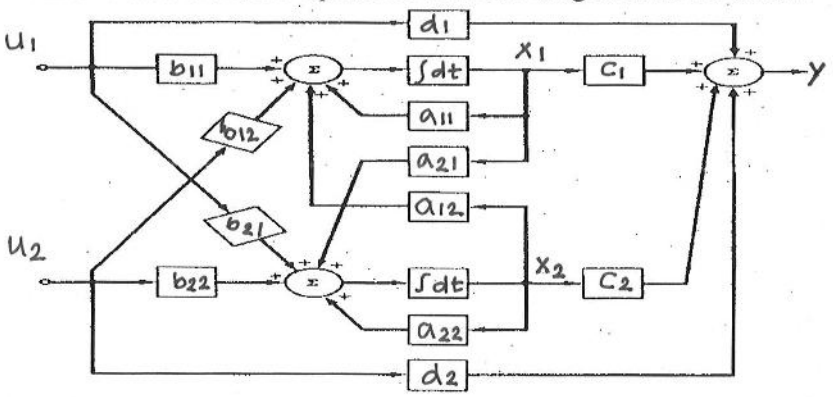
B. E. ELECTRICAL ENGG. (PART TIME) 2ND YEAR 2ND SEMESTER -2018

SUBJECT: - SIGNALS AND SYSTEMS

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
4.(a)	Write the state variable formulations of the electrical system shown. 	10
(b)	Write the state variable equations from the diagram shown below. 	6
5.(a)	Define causal and Non-causal system.	2
(b)	Derive J_{eq} and B_{eq} for and applied torque T_a and load torque T_L for two gears connected together.	8
(c)	Find f(t). Where $F(s) = \frac{s+5}{s^2+6s+16}$. Find the initial and final value of f(t).	6