K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

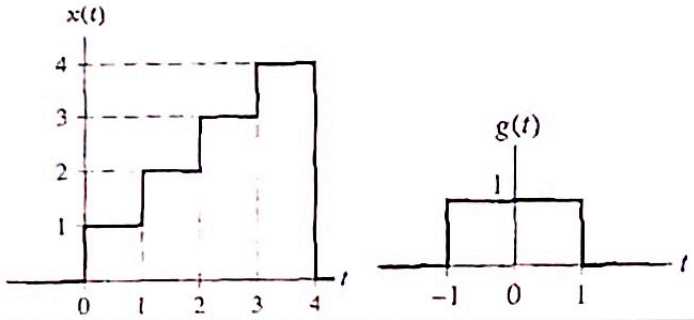
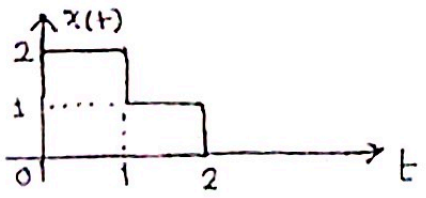
I SESSIONAL TEST QUESTION PAPER 2019 – 20 ODD SEMESTER

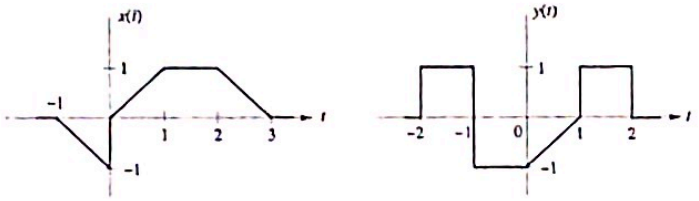
SET-A

USN										

Degree	: B.E	Semester	: V
Branch	: Electrical and Electronics Engineering	Date	: 4-9-2019
Course Title	: Signals and Systems	Course Code	: 15EE54/17EE54
Duration	: 90 Minutes	Max Marks	: 30

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	Explain classification of signals .	5	Understanding K2	CO1
(b)	Two signals x(t) and g(t) are shown. **Sketch** signal x(t) in terms of g(t). 	5	Applying K3	CO1
(c)	A continuous time LTI system is represented by the impulse response $h(t) = e^{-3t}u(t-1)$. **Determine** whether it is (i) Memory less (ii) Causal and (iii) stable.	5	Applying K3	CO2
	OR			
2(a)	**Differentiate** between power and energy signal.	5	Understanding K2	CO1
(b)	**Sketch** the following signals for given signal x(t). (i) $x(2(t-2))$ (ii) $x(2t-1)$ 	5	Applying K3	CO1

(c)	**Find** the step response for the LTI system represented by the impulse response $h(n) = \left(\frac{1}{2}\right)^n u(n)$	5	Applying K3	CO2
	PART-B			
3(a)	**Determine** whether the following systems are linear, time variant, causal, memory less and stable. $y(t) = x^2(t)$	5	Applying K3	CO1
(b)	**Determine** whether the following signals are periodic, if periodic determine the fundamental period $x[n] = \cos\left(\frac{n\pi}{5}\right)\sin\left(\frac{n\pi}{3}\right)$	5	Applying K3	CO1
(c)	**Find** convolution of two finite duration sequences $h(n) = a^n u(n)$ for all n and $x(n) = b^n u(n)$ for all n when $a \neq b$	5	Applying K3	CO2
	OR			
4(a)	**Sketch** x(t)y(t-1) for given signal x(t) and y(t). 	5	Applying K3	CO1
(b)	**Sketch** the signal $x(t) = -u(t+3) + 2u(t+1) - 2u(t-1) + u(t-3)$	5	Applying K3	CO1
(c)	**Find** the convolution integral of $x_1(t) = e^{-2t}u(t)$ and $x_2(t) = u(t+2)$	5	Applying K3	CO2

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Course In charge

Head - Dept

Principal

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II SESSIONAL TEST QUESTION PAPER 2019 – 20 ODD SEMESTER

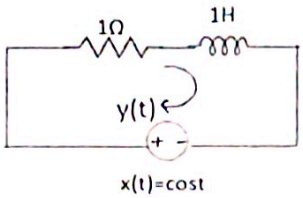
SET-A

USN | | | | | | | | | |

Degree	: B.E		Semester	: V
Branch	: Electrical and Electronics Engineering		Date	: 16-10-2019
Course Title	: Signals and Systems		Course Code	: 15EE54 / 17EE54
Duration	: 90 Minutes		Max Marks	: 30

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	**Determine** the natural response for the system described by the following differential equation. $\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 6y(t) = 2x(t) + \frac{dx(t)}{dt}$; $y(0) = 3, \frac{dy(t)}{dt}\Big\|_{t=0} = -7$	5	K3 Applying	CO2
(b)	**Determine** the z-transform, the ROC, and the locations of poles and zeros of X(z) for the following signal. $x[n] = \left(\frac{1}{2}\right)^n u[n] + \left(\frac{-1}{3}\right)^n u[n]$	5	K3 Applying	CO3
(c)	**State** and **prove** differentiation property of the Z transform.	5	K3 Applying	CO3
	OR			
2(a)	**Draw** direct form I and direct form II implementation for the system described by $y[n] - \frac{1}{4}y[n-1] - \frac{1}{5}y[n-2] = x[n] + 2x[n-1] + 3x[n-2]$	5	K3 Applying	CO2
(b)	**Obtain** the time domain signal corresponding to the following z-transform using partial fraction expansion method. $X(z) = \frac{1 + \frac{7}{6}z^{-1}}{(1 - \frac{1}{2}z^{-1})(1 + \frac{1}{3}z^{-1})}; \frac{1}{3} < \|z\| < \frac{1}{2}$	5	K3 Applying	CO3
(c)	**Determine** the input to the system if the output and impulse response are given by $y[n] = \frac{1}{3}u[n] + \frac{2}{3}\left(\frac{-1}{2}\right)^n u[n]$ $h[n] = \left(\frac{1}{2}\right)^n u[n]$	5	K3 Applying	CO3

	PART-B			
3(a)	**Find** the forced response of electrical system shown in figure.  	5	K3 Applying	CO2
(b)	**Determine** the impulse response of the system, $x[n] = \delta[n] + \frac{1}{4}\delta[n-1] - \frac{1}{8}\delta[n-2]$, $y[n] = \delta[n] - \frac{3}{4}\delta[n-1]$	5	K3 Applying	CO3
(c)	**Find** the Z transform of the following signal using appropriate properties. $x[n] = n\left(\frac{1}{2}\right)^n u[n] * \left(\frac{1}{2}\right)^n u[n]$	5	K3 Applying	CO3
	OR			
4(a)	**Draw** the direct form I and direct form II implementation of the following system $2\dot{y}(t) - 3\ddot{y}(t) = 4x(t) - 3\dot{x}(t) + \ddot{x}(t)$	5	K3 Applying	CO2
(b)	**State** and **prove** time reversal property of the Z transform.	5	K3 Applying	CO3
(c)	Using appropriate properties **find** the z-transform of the following signal. $x[n] = n\sin\left(\frac{\pi}{2}n\right)u[-n]$	5	K3 Applying	CO3

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

III SESSIONAL TEST QUESTION PAPER 2019 – 20 ODD SEMESTER

SET-A

USN | | | | | | | | | | |

Degree	: **B.E**	**Semester**	: **V**
Branch	: **Electrical and Electronics Engineering**	**Date**	: **25-11-2019**
Course Title	: **Signals and Systems**	**Course Code**	: **15EE54 / 17EE54**
Duration	: **90 Minutes**	**Max Marks**	: **30**

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	**Find** the inverse Fourier transform of $X(jw) = \frac{5jw + 12}{(jw)^2 + 5jw + 6}$	5	Applying K3	CO4
(b)	**Find** the Fourier transform of the following signal $x(t) = u(t+1) - u(t-1)$	5	Applying K3	CO4
(c)	**State** and **prove** convolution property of DTFT.	5	Applying K3	CO5
	OR			
2(a)	**State** and **prove** time differentiation property of CTFT.	5	Applying K3	CO4
(b)	**Find** the Fourier transform of the signal using appropriate properties. $x(t) = \sin(\pi t)e^{-2t}u(t)$	5	Applying K3	CO4
(c)	**Find** the discrete time Fourier transform of the following signal $x[n] = 2^n u[-n]$	5	Applying K3	CO5
	PART-B			
3(a)	**Prove** that if $x(t) \overset{FT}{\leftrightarrow} X(jw)$ then $\int_{-\infty}^{t} x(\tau)d\tau \overset{FT}{\leftrightarrow} \frac{X(jw)}{jw} + \pi X(j0)\delta(w)$	5	Applying K3	CO4
(b)	The impulse response of a continuous time LTI system is given by $h(t) = \frac{1}{RC}e^{\frac{-t}{RC}}\ u(t)$ **Find** the frequency response and **draw** its spectrum.	5	Applying K3	CO4

(c)	**Obtain** the frequency response and impulse response of the system described by the difference equation $y[n] - \frac{1}{4}y[n-1] - \frac{1}{8}y[n-2] = 3x[n] - \frac{3}{4}x[n-1]$.	5	Applying K3	CO5
	OR			
4(a)	**Find** the time domain expression for the following $X(jw) = \frac{2jw+1}{(2+jw)^2}$	5	Applying K3	CO4
(b)	**Find** the frequency response and the impulse response of the system described by differential equation $\frac{d^2y(t)}{dt^2} + 3\frac{dy(t)}{dt} + 2y(t) = 4\frac{dx(t)}{dt} + x(t)$	5	Applying K3	CO4
(c)	**State** and **prove** frequency shift property of DTFT.	5	Applying K3	CO5

(5)

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