VELAMMAL COLLEGE Of

DEPARTMENT

ENGINEERING & TECHNOLOGY

OF ECE

INTERNAL ASSESSMENT TEST – D

ANSWER

KEY

SUBJECT: 21EC203/ SIGNALS AND SYSTEMS

DATE 12/9/21

PART-A

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u (n)

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Scal

2)

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          o  A<O


              n=0

              nto
```

$x(^) = (-1)^{\wedge},\ -2 \le n \le 2.$

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$= -1]$

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X(^)

x(=_^)

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xo (^)

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رائع = teral

xo (n) = 0

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(

4)

5

* (^) =

$\{0,-4,3,4,5,2\}$

$=$

$8(^\wedge)-28(n-1)+38(n-2) + 8(n-1)+58$
$(0-4)$

$x(t) = \sin 20\, \text{Tit} + \sin 5\pi E$

$A1 = \underline{IT\pi}$

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$\pi =$

П

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$=$

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Q

$471=62$

еже)

$(t) = C$

© $y(x)=$

$y_1(t)$

$= e$

$a, X_1(E)$

$9_2(t) = e$

"1

$+28(n-s)$

$612 =$

2TT

5πT

T=2/5

Aa fact)

e

2

$$((a, x1 (t)$$

$$+92\ x2\ (t))$$

3

42 X2 (8)

$$y, (t) + J2 (t) =$$
C

$$= e$$

9,2-(2-)

$$+ @ + E$$

e

The giver system is Non teneal

$$x(1) = \{1, 2, -1,0,3,4]\}$$

x(n-1)

3

$$x(Qn)$$

3

2

2

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5 b

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122

$$+7 \, x \quad (n) = \sin$$

$$(6T+1)$$

co

N

=

QII xm

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(i) reet

N=7

$$(++1$$

$$)$$

rect (t)

$$2\,\pi$$

$$XM =$$

$$6\pi/4$$

reet

$$==/ \quad xm = 7 \text{ for}$$

$$m=3.$$

$$(+/+\%$$

$$4)$$

↑ reet (t + 1/4)

(t+ ' / 4)

reet

(Hutlu)

(i) 5 ramp (0.1t)

2(t)

-314

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PART-B

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10

20

-3

60

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St

shlart)

9)

a)

$\underline{y}(t)$

=

tx $(t-1)$

(i)

Yich = tax, (t-1) –☺

ya (t) = taa xa (t-1)

12 –

Y, (t) + 42 (t) = = [a, x, (k-1) + %2 (k-1))

@ + Q

taxi $(t-1)$ +ta2 $x2$ $(t-1)$

3

is linear

The giver system

in

(i)) Y1 (t-T) = $(t-T) x$

(t-T-1)

y (E,T) = Ex $(t-1-T)$

0 #2 The rystem is

O

2

3

Time Variant

10220

(971)

(0) = 0.

y(o)

$g() = x(0)$

dynamis or

system

The sky is

dynami

سام

(iv) y (-1)=-2

(~~)

(U)

F

(-2)

y

$y(1) = x(0)$

$y(0)$

$= 0$

The obe is Causal

$y(t) = tx(t-1)$

the

with

mema
ry

input is bounded, the op still becomes

unbounded as

t

The `she` is unstable

9)

(a) `(D)`

`E =`

`x(t) =`

p-st

$$Ic-bt$$

e-66

e

-b

$$\overset{O}{\underset{2}{}}$$

dt

心

:. Coreyy

$$-16$$

$$[\text{e-t-}e2]$$

$$=-1/6 \; [0 - 1] =$$

$$1/6/1$$

It is [neyy
uynal,

(b)

(ii) $x(t) = u(t) + 5u(t-1) - Qu(t-2)$

$$E = \left|\; \right|$$

$x1+) / = dt$

$\sim$

S4

$\sqrt{12}dt + S62\, de$

$+ \sqrt{4} + dt$

ct

$+ 36\, t1.$

$+$

16

$t/202$

0

b

+36 +16 (∞0-2)

=

P= 4 4 **++**

$\sqrt{}$ / 2 /**0**/**=** dt

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ult)

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- from £= [[ide +

$6`d + 5 unde]

i *lt*

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27

dt

dt

(9-2

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−= [1 +36

+ 1 6 (~~)]

+40 + [37

+165-32]

IT

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It

T7 ∞

2T

[5+16T]

It

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$$==/ (x) = \ 82 \ / \ (1 \ 6)$$

$\frac{d2 \ x}{dt2 \ 736}$

(i)

y(t) =

Y1 (t) =

d2x1

$a1$

des

dx

dz +

x(t)

dxi

*+

[==+1

6]

+3ta. +912, (4) −0

dt,

(in)

$$x(t) = u(t) + 5u(t-1) - Qu(t-2)$$

$$E = \sqrt{\quad}^{2}$$

$$/x1t)/= dt$$

-N

S 12

dit

+

+

t lo

t

P = It

3
T∞

It

$$S.62 \, dt + S4 = dt$$

+ 36 t +

+36 +16
(∞0-2)

22

ult)

pult-1)

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5-

16

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Doll.

$$\pm \sqrt{\ /x/6/12}$$

dt

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↑ult-2)

- A+ w += [[i`de +

} b "de + 5 ++de]

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36 +16

(9-2)]

++ [37

+167-32]

+16

+]

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$$+"]$$

$$\mathrm{T}\to\infty$$

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TIN&T

$$2(16) =$$

$$8\mathsf{W} /$$

T

$$+1$$

(b)

(i)

$y(t) =$

dax

dt 2

2

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dx.

dt

+2 *(t)*

+9,2, (7) —

(

$y1 (t) = d2x2$

+ 27 a, dr.

a1

dr

as

dx.

$dz2 + 37$ A

$42 (t) =$

a2

02

$+ A2\ x2\ (t)$

Q

p

$gilt) + 92 (t) = \# d2 [aix1 + 9xxx) +$

st d (a,x,+)

d42

di

$x1\ (t) + 92\ 72(t))$

$+$

$x2 + 3\ ta1\ d\ x1$

$+37\alpha ==$

$+$

[ai

a,

d2

$x1\ + A2$

d2

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linear

dt

$+ Q1x, (t) + Qaxa (t)$

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dynamie

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$\dfrac{dx}{(t-T)} = d2x + 3(x-7) d2 + x(t-T) - 0$

(t, T)

dt

de

$= d2x \; de$
i

$+37 \quad dx$

de

$+x(t-T)$

$(2 \quad \#$

The she is Time Variant

The **op** depends **only** `The ove` **is** Causal

Current `ip`

вод

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(ii) y(a) = login (1)

$y_1(n) =$ logudaxı(n)

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`Yaln`

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$_2$

12(~1 = logo

[93x+ (~)] —Q

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92x

4. (^) = 42 (^)= logo [air

(^) + Q2xa(n)]

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logis

arxi (n)

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in

#13

Non Linear

The she is causal

Az

logo da

xz (^)

[3]

BY

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$$y \, (\char94=) = \text{logro } y^{x \quad (n-1)}$$

$$(n, k) \quad = \quad \text{logo}$$

$$x \, (\char94\_x)$$

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in

Terre Invariant

رما

The one is statie

$x(\sim) =$

$\{0,1,2,1,2,1$

].

a.

X(1-2)

2

56

4 5 6

7

x(x+1)

D

1234

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(مام)

a.

i

x(−n)

-4-3-2-1

x(-2^41)

1

x(~~+1)

x(29)

2

sie DTE + Cas Tit

$$22 = + = = = =$$

$=1$

$Ta=$

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$T = 2$

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P = _lt == s
lacks /= dt

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$$\cos(1777 + \text{The})^2 \, dt + 2$$

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= 44 2+ [5+1]

TIN2T

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7/2 watts

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(05) ^ar^)

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(0.5)

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(0.25) ^

11)

a)

a)

b)

c)

$$1$$

$$1-0.25$$

PART-C

$$1$$

$$0.75$$

neither

even

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11)

d) edd

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dight y(t)
```
$= x(t)$

5)

dzyst

x(t) -

dry(t)

4dzyct)

sdy (t)

des

y (t-T) =

x(+-T) d=

d'

d732

d+5

y(t-7)-4_d2

y(t,T) =

x(t-T) _d=

The

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abr

dt

o`y (t-7) - 4dr geft-7) -

5 *dag* ((-7)

·7)-4 d2 -5d

des y (t)). -4_12

-4_d2 y(t,T)-5=

g (6,7)

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time Invaliad

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u(t)-

$$\frac{1}{2}(\alpha^{-1}((-1)-4(1-2)]$$

北

- [u (1-2)-ult-3)]

$[RE+4)-2(1+3)]$

3

1= u(t) -u(1-1) +ault-1) -ylt (1-2)

-u(t-3) + u (4-3) + 2(-x+4) +8 (-x+3)

= ult) +u(t-1) -su (t-2)+u (t-1) -2(-t+4) +8 (-1+3)