Hall Ticket Number :										

R-15

Code: 5G332

II B.Tech. I Semester Supplementary Examinations March 2021

Digital Design

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Convert the given octal number 234.75 to Binary, Decimal and Hexadecimal form
   b) What is the difference between 1's and 2's compliments? Give one example.

OR

2. a) Perform a+b, a*c and c/a operations in a given data a=1001,b=101,c=10001
   b) With a suitable example explain associate and distribute laws in OR logic

UNIT–II

3. Simplify the following expression using K-map.
   Y = AB'C+A'BC+A'B'C+A'B'C'

OR

4. a) Find the DUAL of the given functions
      i) F=π (1,3,7)
      ii) G=∑(0,2,4,)
   b) Find the complement of the given functions
      F=x+yz +x(y+z)
      G= A'BD'+ACD+B'CD+A'C'D

UNIT–III

5. a) Differences between PAL,PLA and ROM
   b) Realize given function using decoder and additional logic .f= F=∑(0,2,4,6)

OR

6. a) Design a circuit which generates the no of ones in a given 3-input binary data
   b) Construct BCD to excess-3 code converter using ROM

UNIT–IV

7. a) Differences between combinational and sequential circuits
   b) With a neat diagrams explain the operation of Ring counter

OR

8. Design a circuit which generate the following sequence 0,2,4,6,7,11,13,15, and repeat using T-FFs

UNIT–V

9. With a suitable example explain the partition technique used for state reduction

OR

10. Convert given Moore machine into Mealy machine

PS	NS		Z
	X=0	X=1	
a	c	a	1
b	b	d	0
c	a	b	1
d	d	c	1

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Hall Ticket Number :										

R-15

Code: 5GC32

II B.Tech. I Semester Supplementary Examinations March 2021

Mathematics Methods-III

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix} 6 & 2 & 1 \\ 6 & 1 & 2 \\ 7 & 2 & 2 \end{bmatrix}$ and find its inverse.

OR

2. Discuss for values of a and « the simultaneous equations $x+y+z=6$; $x+2y+3z=10$; $x+2y+$ a $z=$ « have (i) unique solution, (ii) no solution and (iii) infinite number of solutions

UNIT–II

3. Employ Taylor's method to obtain appropriate value of y at $x=0.2$ for the differential equation $\dfrac{dx}{dy}=2y+3e^{x}$, $y(0)=0$. Compare the numerical solution obtained with the exact solution.

OR

4. Find a root of the equation $x^3-2x-5=0$, using the Bisection method correct to three decimal places.

UNIT–III

5. Find first and second derivatives of y at x=1.5 if

x	1.5	2	2.5	3	3.5	4
y	3.375	7.000	13.625	24.000	38.875	59.000

OR

6. Use Lagrange's interpolation formula to find the value of y when $x=10$, if the following values of x and y are given

x	5	6	9	11
y	12	13	14	16

UNIT–IV

7. Form the partial differential equations (by eliminating the arbitrary constants and arbitrary functions) from

(i) $z=ax+by+a^2+b^2$ and (ii) $z=f(x+ay)+g(x-ay)$

OR

8. a) Solve $(mz-ny)p+(mx-lz)q=(ly-mx)$

b) Solve $q^2=z^2p^2(1-p^2)$

UNIT–V

9. Obtain the Fourier series for the function $f(x)=x-x^2$ in the interval [–®,®] Hence show that $\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+---+\infty=\frac{®^2}{12}$

OR

10. Find the sine and cosine transform of $f(x)=\begin{cases}\sin x, 0<x<a \\ 0, x\geq a\end{cases}$

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Hall Ticket Number :

R-15

Code: 5G333

II B.Tech. I Semester Supplementary Examinations March 2021

Signals and Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Write the Classification of systems based on certain properties.

   b) Determine whether the following signals are energy signals or power signals and calculate their energy or power

   i) $x(n) = (\frac{1}{2})^n u(n)$ ii) $x(t) = \cos^2 \mu_0 t$

OR

2. a) Check whether the following systems are time invariant or not

   i) $y(t) = t^2 x(t)$ ii) $y(t) = x(-2t)$ iii) $y(n) = x(n)$ iv) $y(n) = x^2(n-2)$

   b) Obtain the expressions to represent trigonometric Fourier coefficients in terms of exponential Fourier coefficients.

UNIT–II

3. Obtain Fourier transforms and spectrums of following signals

   i) $x(t) = Cos\mu_0 t$ ii) $x(t) = Sin\mu_0 t$

OR

4. a) Find the Fourier transform of x(t) = u(2t), where u(t) is the unit step function

   b) Determine the Fourier Transform for double exponential pulse whose function is given by $y(t) = e^{-a|t|}u(t)$ Also draw its magnitude and phase spectra

UNIT–III

5. a) Find the impulse response of series RC limit. Explain the difference between causal and non-causal systems.

   b) Explain the Filter characteristics of linear systems

OR

6. a) State and prove the sampling theorem for a band limited signals

   b) Compare different types of sampling techniques

UNIT–IV

7. a) State and prove any four properties of Auto correlation function

   b) Determine the auto correlation function and energy spectral density of $x(t) = e^{-at} u(t)$

OR

8. a) With an example explain the Graphical representation of convolution.

   b) Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair.

UNIT–V

9. State and prove the following properties of z-transform.

   i) Time shifting ii) Time reversal iii) Differentiation iv) Scaling in z-domain

OR

10. Find the Laplace Transform of the following:

    i) t e^{-at} u(t) ii) Cos ωt u(t)

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