

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-17

Code: 7G234

II B.Tech. I Semester Supplementary Examinations May/June 2022

Electrical Circuits and Technology

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. Derive the equations to convert (i) Delta network to Star network; (ii) Star network to a Delta network 14M

OR

2. Obtain Transient Response of RLC Series Circuits for DC Excitation using differential equation approach. 14M

UNIT-II

3. a) Define Resonant frequency, Band Width & Q-Factor 6M
b) An RLC circuit has $R=1\text{ K}$, $L=100\text{ mH}$ and $C=10\text{ pF}$. If a voltage of 100 V is applied across the series combination, determine (i) resonant frequency (ii) Q factor and (iii) half power frequencies 8M

OR

4. Explain the series resonant circuit. Derive the expression for the resonant frequency, Quality Factor of a series resonant circuit. 14M

UNIT-III

5. a) Derive the expressions for converting Z parameters in to transmission parameters. 7M
b) The Impedance parameters of a two port network are $Z_{11}=10$, $Z_{12}=15$, $Z_{21}=15$, $Z_{22}=10$, determine the h-parameters. 7M

OR

6. Explain the parallel connection of two port networks. Which type of 2-port parameters is ideal for such a parallel connection? 14M

UNIT-IV

7. a) Determine the EMF equation of DC generator and constructional features of DC machine. 7M
b) A 4 pole DC shunt generator with lap connected has a useful flux of 1mwb per pole has 120 conductors per pole rotating with a speed of 6200 rpm find the generated EMF. 7M

OR

8. a) Explain the types of armature windings used in dc generators. 6M
b) An 8 pole lap wound DC generator armature has 960 conductors, a flux of 40 mWb and a speed of 400 rpm. Calculate the emf generated on open circuit. If the same armature is wave wound, at what speed must it be driven to generate 400V. 8M

UNIT-V

9. a) Explain OC and SC test of a 1-phase transformer with a neat sketch. 7M
b) Explain the principle of operation of three phase induction motor. 7M

OR

10. Explain the principle of operation, Types, Constructional Features of single phase transformer. 14M

Hall Ticket Number :										
----------------------	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations May/June 2022

Engineering Mathematics-III

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. a) Using Taylor's series method, compute the value of y at $x=0.2$ from $\frac{dy}{dx} = x + y$; $y(0) = 1$. 7M
- b) Using the bisection method, find a real root of the equation $\cos x = x e^x$ correct to three decimal places. 7M

OR

2. a) Apply fourth order Runge-Kutta method to $\frac{dy}{dx} = 3x + \frac{1}{2}y$, $y(0) = 1$ determine $y(0.1)$ correct to four decimal places. 7M
- b) Find a real root of the equation $3x = \cos x + 1$ by Newton-Raphson's method correct to four decimal places. 7M

UNIT-II

3. a) Evaluate $\int_0^1 \frac{1}{1+x} dx$ by Simpson's 1/3 rule. 7M
- b) Using Lagrange formula find $f(4)$. Given 7M

x	0	2	3	6
y	-4	2	14	158

OR

4. The following table of values of x and y is given. 7M
- | | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 6.9897 | 7.4036 | 7.7815 | 8.1291 | 8.4510 | 8.7506 | 9.0309 |
- Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=6$ 14M

UNIT-III

5. a) Fit a straight line $y = a + bx$ to the data by the method of least squares 7M
- | | | | | | |
|---|---|---|---|---|---|
| x | 0 | 1 | 3 | 6 | 8 |
| y | 1 | 3 | 2 | 5 | 4 |
- b) Form the partial differential equation by eliminating a, b from $ax^2 + by^2 + z^2 = 1$ 7M

OR

6. a) Form a partial differential equation by eliminating the arbitrary functions from $z = f(x+at) + g(x-at)$. 7M

b) Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z = yf(x) + xg(y)$. 7M

UNIT-IV

7. a) Express $f(x) = x$ as half range sine in $0 < x < 2$ 7M

b) Find the Fourier series to represent $f(x) = f x$ in $0 \leq x \leq 2$ 7M

OR

8. a) Find the half range cosine series for $f(x) = x(2-x)$ in $0 \leq x \leq 2$ and hence find prove

that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} - \frac{1}{6^2} + \dots = \frac{f^2}{12}$ 7M

b) Find the Fourier series to represent $f(x) = |x|$ when $-f < x < f$ and deduce that

$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{f^2}{8}$ 7M

UNIT-V

9. a) Find the Fourier sin and cosine transform of $f(x) = \frac{e^{-ax}}{x}, a > 0$ 7M

b) Find the Fourier cosine transform of $f(x) = \begin{cases} x, & 0 < x < 1 \\ 2-x, & 1 < x < 2 \\ 0, & x > 2 \end{cases}$ 7M

OR

10. Find the Fourier transform of $e^{-|x|}$. Hence show that $\int_0^{\infty} \frac{x \sin mx}{1+x^2} dx = \frac{f}{2} e^{-m}, m > 0$ 14M

Hall Ticket Number :										
----------------------	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7G333

II B.Tech. I Semester Supplementary Examinations May / June 2022

Signals and Systems

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

- 1. a) Discuss the concept of Trigonometric Fourier series and derive the expressions for coefficients. 7M
- b) State and prove convolution property in Fourier series. 7M

OR

- 2. a) Find the exponential Fourier series and plot the magnitude and phase spectrum of half wave rectified sine wave with amplitude A and T =2 8M
- b) What are the Dirichlet's conditions of Fourier series? 6M

UNIT-II

- 3. a) Obtain the Fourier transform of Signum function and sketch its phase spectrum. 7M
- b) Find the inverse Fourier transform of $x(t) = te^{-at}u(t)$ using properties of Fourier transform 7M

OR

- 4. a) Find the Fourier transform of triangular function 7M
- b) State and prove the properties of Hilbert's transform 7M

UNIT-III

- 5. The input and output of a causal LTI system are related by the differential equation: $d^2y(t)/dt^2 + 6dy(t)/dt + 8y(t) = 2x(t)$ (i) Find the impulse response of the system. (ii) What is the response of this system if $x(t) = t e^{-2t} u(t)$ 14M

OR

- 6. a) What is the impulse response of two LTI systems connected in parallel? 7M
- b) Differentiate LTI system with LTV system. 7M

UNIT-IV

- 7. a) Discuss the properties of correlation function. 7M
- b) Find the power spectral density and power of a sinusoid given by $x(t) = A \cos(\omega_c t + \phi)$ 7M

OR

- 8. a) Explain the relation between convolution and correlation. 7M
- b) State and prove Time convolution property 7M

UNIT-V

- 9. a) Explain the concept of ROC in Z- transforms and list any 2 properties of the same. 7M
- b) Find the inverse of Z transform of $X(Z) = Z / (3Z^2 - 4Z + 1)$. 7M

OR

- 10. a) Discuss any 3 properties of Laplace transform. 7M
- b) Find the inverse Laplace transform of $x(s) = 5(s+5) / s(s+3)(s+7)$; $\text{Re}(s) > -3$ 7M

Hall Ticket Number :																			
----------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7G332

II B.Tech. I Semester Supplementary Examinations May/June 2022

Digital Design

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. a) Perform following operations using 1's complement

i) $(27)_{10} - (09)_{10}$

ii) $(35)_{10} - (38)_{10}$

b) Do the following conversions

i) $(144)_8 = ()_{16}$

ii) $(225.25)_8 = ()_{10}$

iii) $(EAEB)_{16} = ()_8$

OR

2. a) Convert BCD code to 5421 and 84-2-1 code

b) Why NAND and NOR gates are called as universal gates?

UNIT-II

3. Simplify the following Boolean function, $f(W,X,Y,Z) = m(0,1,2,6,8,9,10,11,14,15)$ using Quine McClukey method

OR

4. a) Find the DUAL of the given functions

i) $F = (1,3,7)$

$G = (0,2,4,)$

b) Realize XOR gate using NAND gates

UNIT-III

5. a) Explain basic operation of De-multiplexer

b) Design 4-bit Ripple carry adder and explain operation of it.

OR

6. a) Design a circuit which convert given 4-bit gray code to binary code

b) with a neat diagram explain operation of 2-bit magnitude comparator

UNIT-IV

7. a) Design 4-bit twisted Ring counter and explain operation.

b) Compare ring and twisted ring counters

OR

8. a) Design a circuit to Convert JK-FF to D-FF

b) With a neat diagrams explain the operation of Ring counter

UNIT-V

9. a) With a suitable diagrams explain operation of serial binary adder

b) compare serial adder with the parallel adder

OR

10. a) List out the salient features of the ASM chart

b) compare Mealy and Moore machines
