Hall Ticket Number :										

R-17

Code: 7G332

II B.Tech. I Semester Supplementary Examinations August 2021

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)

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UNIT–I

1. a) Write a short note on logic gates and their truth tables 10M
   b) List out the properties of XOR gate 4M

OR

2. a) Convert BCD code to 5421 and 84-2-1 code 10M
   b) Why NAND and NOR gates are called as universal gates? 4M

UNIT–II

3. a) Simplify the following Boolean expressions to a minimum number of literals
      i) $ABC+A^{I}B+ABC^{I}$
      ii) $(X+Y)^{I}(X^{I}+Y^{I})$
      iii) $X^{I}YZ+XZ$ 9M
   b) Realize XOR gate using NAND gates 5M

OR

4. a) Obtain minimal expression using the K-map for a given Boolean function F(A,B,C,D) = Σ(0,2,8,10,12,13,14) and implement using basic gates 10M
   b) what are the limitations of K-Map method 4M

UNIT–III

5. a) Realize full adder using two level basic gates. 7M
   b) with a neat diagram explain operation of 2-bit magnitude comparator 7M

OR

6. a) Design 8-line –to-3-line encoder by using basic gates and explains basic operation of it 7M
   b) Realize full subtractor using half subtractors. 7M

UNIT–IV

7. a) Differences between combinational and sequential circuits 6M
   b) With a neat diagrams explain the operation of Ring counter 8M

OR

8. a) Draw the logic diagram of LATCH using NOR and NAND gates 4M
   b) Design a circuit to Convert JK-FF to D-FF 10M

UNIT–V

9. a) Discuss about the capabilities and limitations of FSM 8M
   b) compare Mealy and Moore machines 6M

OR

10. Design a control circuit using D- FFs with one control input S. When X=0, the state of the circuit remains the same. When S=1,the circuit goes through the state transition from 00 to 01 to 10 to 11 and repeats 14M

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Hall Ticket Number :										

R-17

Code: 7G331

II B.Tech. I Semester Supplementary Examinations August 2021

Electronic Circuits

(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)

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UNIT–I

1. a) Compare the input impedance, output impedance and voltage gain of CE, CB and CC configurations. Why CE amplifiers are widely used? 6M

   b) Draw the circuit diagram of a two stage RC coupled amplifier. Explain the need of using multi-stage amplifiers 8M

OR

2. a) Draw and explain the circuit of cascaded amplifier and mention the advantages 7M

   b) Draw the equivalent circuit of a CE amplifier using Millers theorem. What is the upper 3-dB frequency of such circuit? 7M

UNIT–II

3. Explain the role of coupling capacitors and Bypass capacitors in a RC Coupled Amplifier Circuit. 14M

OR

4. Draw the hybrid –pi model of BJT. Explain the circuit elements in this model. 14M

UNIT–III

5. a) Explain the advantages of negative feedback over positive feedback. 7M

   b) Briefly discuss about the effect of feedback on amplifier bandwidth 7M

OR

6. a) Explain the concept of feedback with block diagram 6M

   b) Write about Classification of feedback amplifiers, 8M

UNIT–IV

7. a) With neat diagram explain about amplitude stability of oscillators. 8M

   b) Distinguish between various oscillators. 6M

OR

8. Why +ve feedback is generally used in oscillator circuits? Derive the oscillation frequency of a RC Phase Shift Oscillator. 14M

UNIT–V

9. a) Classify the power amplifiers. 7M

   b) Explain crossover distortion in Class B power amplifier 7M

OR

10. Explain in detail about complementary symmetry push pull amplifier. 14M

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Hall Ticket Number :										

R-17

Code: 7G234

II B.Tech. I Semester Supplementary Examinations August 2021

Electrical Circuits and Technology

(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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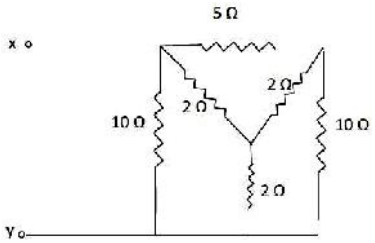
		Marks	CO	Blooms Level

UNIT–I

1. a) Simplify the given network by using Y- Δ transformation and obtain equivalent resistance across X-Y terminals.

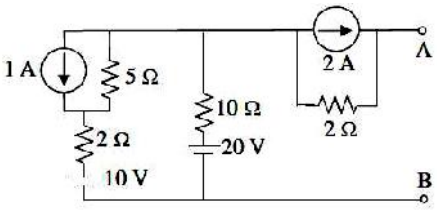


7M CO1 L1

b) State and explain the Kirchhoff's Law which can be applied to loop current method. 7M CO1 L2

OR

2. a) Obtain the single equivalent source network across the terminals A -B make use of source transformation technique



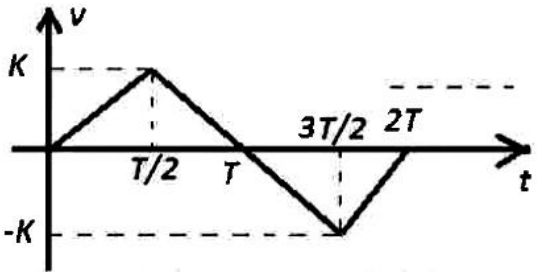
7M CO1 L3

b) Explain the series RLC circuits using differential equation approach for DC excitation. 7M CO1 L2

UNIT–II

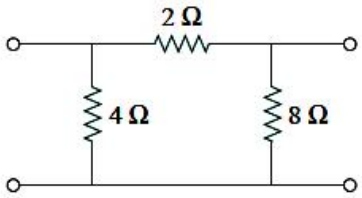
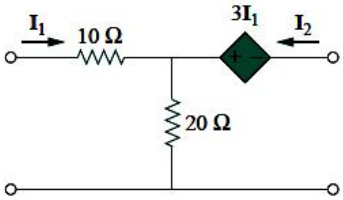
3. a) Define following terms:
i) RMS value ii) Average value iii) Peak factor iv) Form factor 7M CO2 L1

b) For the periodic waveform given in below figure, find Average value and RMS value.



7M CO2 L2

OR

4.		A series-connected RLC circuit has R = 4 & and L = 25 mH. (i) Calculate the value of C that will produce a quality factor of 50. (ii) Find $\omega 1$, $\omega 2$, and *Bandwidth*. (ii) Determine the average power dissipated at $\omega = \omega 0, \omega 1, \omega 2$. Take Vm = 100 V.	14M	CO2	L3
		UNIT–III			
5.	a)	Determine the Z-parameters and y-parameters of the below circuit.  	7M	CO3	L3
	b)	Determine hybrid parameters and draw the equivalent circuit of h-parameter.	7M	CO3	L2
		OR			
6.	a)	Find the transmission parameters for the two-port network shown below  	7M	CO3	L3
	b)	Appraise the importance of cascaded connection of two port networks.	7M	CO3	L1
		UNIT–IV			
7.	a)	Deriving the necessary expressions, explain how to predetermine the efficiency of a d.c shunt motor by suitable test.	10M	CO4	L2
	b)	A d.c shunt motor takes 1.2A on no-load when connected to a 220 V d.c mains, with an armature resistance of 1.2 ohms when the field current is 0.7 A. Determine the load current corresponding to maximum efficiency of the motor.	4M	CO4	L3
		OR			
8.	a)	Explain in detail the constructional features of DC machine	7M	CO4	L2
	b)	Explain the speed control methods for DC motor.	7M	CO4	L1
		UNIT–V			
9.	a)	Draw and explain the constructional features of a single phase transformer. Also discuss its operation with and without load.	10M	CO5	L3
	b)	Determine EMF equation of a Transformer.	4M	CO5	L2
		OR			
10.	a)	Describe construction and principle of operation of 3-phase squirrel cage induction motor.	7M	CO5	L3
	b)	Obtain the condition for maximum torque under running condition in induction motor.	7M	CO5	L1

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Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations August 2021

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)

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UNIT–I

1. a) Using the bisection method, find a real root of the equation $\cos x = xe^x$ correct to three decimal places. 7M

   b) 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

OR

2. Find the real root of the equation $xe^x = 3$ by Regular-falsi method. 14M

UNIT–II

3. Using Lagrange formula find $f(4)$. Given

x	0	2	3	6
y	-4	2	14	158

14M

OR

4. Evaluate $\int_0^1 \sqrt{1+x^3}\,dx$ taking h = 0.1 Using (i) Simpson's 1/3 rd rule (ii) Trapezoidal rule. 14M

UNIT–III

5. Fit a second degree parabola to the following data by the method of least squares

x	10	12	15	23	20
y	14	17	23	25	21

14M

OR

6. Form a partial differential equation from $z = f(x+y)$. 14M

UNIT–IV

7. Obtain the Fourier series for $f(x) = x - x^2$ in the interval $[-®, ®]$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} - \frac{1}{6^2} + \ldots = \frac{®^2}{12}$$

14M

OR

8. Find the half range cosine series for the function $f(t) = t - t^2$, in $0 < t < 1$ 14M

UNIT–V

9. Find the Fourier cosine transform of $f(x) = e^{-ax}\,(x > 0, a > 0)$. 14M

OR

10. Find the Fourier transform of $f(x)$ given by $f(x) = \begin{cases} 1, & for\ |x| < 1 \\ 0, & for\ |x| > 1 \end{cases}$ hence evaluate $\int_0^\infty \frac{\sin x}{x}\,dx$ 14M

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Hall Ticket Number :										

R-17

Code: 7G333

II B.Tech. I Semester Supplementary Examinations August 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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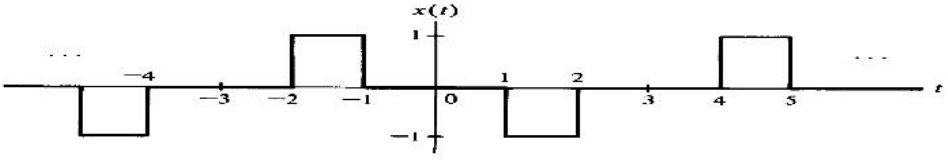
			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Find the even and odd components of the following signal x(t) = cost + sint +2sint+4cost	7M	1	L3
	b)	Obtain the expressions to represent trigonometric Fourier coefficients in terms of exponential Fourier coefficients.	7M	2	L2
		OR			
2.	a)	Show that a composite signal is periodic if the ratio of their fundamental periods is a rational number	6M	1	L1
	b)	Find the Fourier series of the following wave form 	8M	2	L3
		UNIT–II			
3.	a)	Find the Fourier Transform of a Gaussian Pulse	7M	3	L2
	b)	State and prove Differentiation Property of Fourier Transform	7M	2	L3
		OR			
4.	a)	Find the Fourier transform of DC Signal	7M	3	L4
	b)	State and prove Time Convolution property of Fourier Transform.	7M		
		UNIT–III			
5.	a)	Explain about the distortion less transmission	6M	1	L3
	b)	Explain the following i. Signal Bandwidth ii. System Bandwidth iii. Paley-Wiener Criterion	8M	2	L1
		OR			
6.	a)	A signal v(t)=cos5πt +0.5cos 10πt is instantaneously sampled. The interval between the samples is T_s. If the sampling signal is $S(t) = 5\sum_{k=-\infty}^{\infty} ¢\,(t-0.1k)$ and the $v_s(t) = \sum_{k=-\infty}^{\infty} I_k ¢\,(t-0.1k)$ show that $I_k = I_{k+4}$ where I_k is the strength of the k[th] pulse	7M	3	L4
	b)	Discuss the concept of Sampling of Band pass signals	7M	1	L1

UNIT–IV

7.	a)	Derive an expression for convolution of two signals. Find the convolution of unit step signal with itself	7M	4	L3
	b)	Show that when two signals are convolved in time domain is multiplied in frequency domain.	7M	4	L2

OR

8.	a)	Define auto correlation and cross correlation? Prove that the auto correlation function is maximum at origin.	7M	4	L4
	b)	Find the autocorrelation and Energy Spectral Density(ESD) of $x(t)=e^{-at}u(t)$	7M	4	L3

UNIT–V

9.	a)	Explain the Time convolution and Scaling properties of Laplace transform.	7M	5	L2
	b)	Find the inverse Laplace transform of x(s) = 5(s+5)/ s(s+3) (s+7); Re(s) > -3	7M	4	L4

OR

10.	a)	Explain the constraints on ROC for various classes of signals	7M	5	L2
	b)	Derive the relation between Z transform and Fourier transform	7M	4	L4

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