Hall Ticket Number :										

R-14

Code: 4GC41

II B.Tech. II Semester Supplementary Examinations March 2021

Mathematics-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)

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Show that $\int_0^1 \frac{x^{m-1}(1-x)^{n-1}}{(x+a)^{m+n}} = \frac{\beta(m,n)}{a^n(1+a)^m}$.	7M	2	II
	b)	Find all the roots of $\sin z = 2$.	7M	2	I
		OR			
2.	a)	Show that $\int_0^\infty x^n e^{-a^2x^2} = \frac{1}{2a^{n+1}}\Gamma\left(\frac{n+1}{2}\right), n > -1$	7M	2	II
	b)	Find all values of z which satisfy $\Gamma\left(\frac{n}{2}\right) = -2$.	7M	2	I
		UNIT–II			
3.	a)	Show that $f(z) = xy + iy$ is everywhere continuous but is not analytic.	7M	1	I
	b)	Find all the values of k such that $f(z) = e^{kx}(\cos ky + i\sin ky)$ is analytic.	7M	1	I
		OR			
4.	a)	Show that the function $f(z) = \sqrt{\lvert xy\rvert}$ is not analytic at the origin, although Cauchy- Riemann equations are satisfied at the point.	7M	1	I
	b)	Find k such that $f(z) = x^3 + kxy^2$ may be harmonic and find its conjugate.	7M	1	I
		UNIT–III			
5.	a)	Evaluate $\int_C z^2\,dz$ where C is the straight line segment from $O(z=0)$ to $A(z=2+i)$.	7M	2	V
	b)	Express $f(z) = \frac{1}{z}$ as the Taylor series at the point $z = 1$.	7M	2	II
		OR			
6.	a)	Verify Cauchy's theorem for the function $f(z) = z^2 + iz - 4$ if C is the square with the vertices at $1 \pm i$ and $-1 \pm i$.	7M	2	III
	b)	Express $f(z) = \left(\frac{1}{1-z}\right)\left(\frac{1}{(z-2)}\right)$ as the Laurent's series expansion in an annulus region $1 < \lvert z\rvert < 2$.	7M	2	II
		UNIT–IV			
7.	a)	Show that $\int_{-\infty}^{\infty} \frac{\cos ax}{x^2+1}\,dx = \pi e^{-a}, a \geq 0$.	7M	3	II
	b)	Using Rouche's theorem to identify the number of zeros of the polynomial $f(z) = 2z^4 - 2z^3 + 2z^2 + 2z + 11$, that lie inside the circle $\lvert z\rvert = 1$.	7M	3	III
		OR			
8.		Solve $\int_{-\infty}^{\infty} \frac{dx}{(x^2+a^2)(x^2+b^2)}\,dx,\ a > 0, b > 0, a \neq b$.	14M	3	III
		UNIT–V			
9.	a)	Illustrate the image of the infinite strip $0 < y < \frac{1}{2}$ under the transformation $w = \frac{1}{z}$.	7M	2	II
	b)	Find the bilinear transformation that maps the point $(0,1,\infty)$ in the z-plane onto the point $(-1,-2,-i)$ in the w-plane.	7M	2	I
		OR			
10.	a)	Illustrate the image of the rectangle $R: -\pi < x < \pi, \frac{1}{2} < y < 1$ under the transformation $w = \sin z$.	7M	2	II
	b)	Find the bilinear transformation that maps $z_1 = 0, z_2 = 1, z_3 = \infty$ onto $w_1 = -1, w_2 = -i, w_3 = 1$ respectively.	7M	2	I

*****

Hall Ticket Number :										

R-14

Code: 4G346

II B.Tech. II Semester Supplementary Examinations March 2021

Pulse and Digital Circuits

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

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

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Prove that for any periodic input wave form the average level of the steady state output signal from RC high pass circuit is always zero.	7M	CO1	
	b)	Derive the expression for percentage tilt (P) of a square wave output of RC high pass circuit.	7M	CO1	
		OR			
2.	a)	Analyze the high pass RC circuit for the following inputs, with the help of wave forms i) Exponential input ii) Ramp input	6M	CO1	
	b)	Explain how a low pass RC network acts as attenuator and ringing circuit	8M	CO1	
		UNIT–II			
3.	a)	Explain the working of an Emitter coupled clipper with circuit diagram.	8M	CO1	
	b)	Write a short note on Diode switching times	6M	CO1	
		OR			
4.	a)	Draw the diode comparator circuit and explain the operation of it when ramp input signal is applied.	7M	CO1	
	b)	Explain how a transistor can be used as a switch	7M	CO1	
		UNIT–III			
5.	a)	Explain the operation of Fixed-Bias Bistable multivibrator with circuit diagram and waveforms.	7M	CO2	
	b)	Design collector coupled monostable multivibrator for the following specifications. VCC=10V, VBB= -5V, IC(sat)= 10mA, hFE=20 ,VBE(off)= -0.5V, Output pulse width tp= 200µS. (assume Si transistors)	7M	CO2	
		OR			
6.	a)	Explain how an Schmitt trigger circuit acts as a comparator	7M	CO2	
	b)	Design the Astable Multivibrator to generate 1 KHz square wave. The supply voltage VCC=10V, IC(sat)=10mA hfe=50 and assume Si transistors.	7M	CO2	
		UNIT–IV			
7.	a)	Explain briefly the different methods of generating time-base waveform	6M	CO3	
	b)	With the circuit diagram explain current time base generator.	8M	CO3	
		OR			
8.	a)	Explain about the linearly correction through adjusting of driving waveform.	7M	CO3	
	b)	Explain how UJT is used for sweep circuit?	7M	CO3	
		UNIT–V			
9.	a)	Explain the basic operation of sampling gate.	8M	CO4	
	b)	Explain the operation of unidirectional diode gate.	6M	CO4	
		OR			
10.	a)	Draw and explain the circuit diagram of integrated positive DTL NAND gate.	7M	CO4	
	b)	Compare the RTL and DTL logic families in terms of Fan out, propagation delay, power dissipated per gate and noise immunity.	7M	CO4	

****