

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

R-13

Code: 1G342

II B.Tech. II Semester Supplementary Examinations March 2021

Electromagnetic Waves and Transmission Lines

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Explain Gauss's Law and derive the Maxwell equation
b) Describe the applications of Gauss's law in the case of point charge , Infinite line charge and in infinite sheet of charge distribution
2. Simplify the continuity equation and the Relaxation Time
3. a) Explain Ampere Circuits Law with related equations
b) Discuss the applications of Ampere circuits law in the case of infinite long coaxial transmission line
4. a) Determine the Inconsistency of Ampere's Law
b) Determine the motional emf for the moving loop in the static B field
5. Derive ϵ' , ϵ'' and explain waves propagation in lossy dielectrics
6. Explain Reflection of plane wave at Normal incidence
7. a) Derive Condition for Distortion less ness and Minimum Attenuation
b) Define Phase and Group Velocities
8. a) Outline the Input Impedance Relations
b) Write in detail about reflection coefficient

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--

R-13

Code: 1GC41

II B.Tech. II Semester Supplementary Examinations March 2021

Mathematics – III

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal Marks (**14 Marks** each)

1. a) Evaluate $\int_0^{f/2} \sqrt{\tan u} \, du$. 7M
- b) Prove that $S(m, 1/2) = 2^{2m-1} S(m, m)$. 7M
2. If $w = W + i\mathcal{E}$ represents the complex potential function for an electric field and $\mathcal{E} = x^2 - y^2 + \frac{x}{x^2 + y^2}$ determine the function w 14M
- 3 a) If $\cosh(u+iv) = x+iy$ then prove that $\frac{x^2}{\cosh^2 u} + \frac{y^2}{\sinh^2 u} = 1$ and $\frac{x^2}{\cos^2 v} - \frac{y^2}{\sin^2 v} = 1$. 7M
- b) Find all the roots of the equation $\tanh z + 2 = 0$. 7M
4. Integrate $f(z) = x^2 + ixy$ from $A(1,1)$ to $B(2,8)$ along the curve C given by $x = t, y = t^3$ 14M
5. a) Find the Taylor's expansion of $f(z) = \frac{1}{(z+1)^2}$ about the point $z = -i$. 7M
- b) Expand $f(z) = \frac{1}{(z-1)(z-2)}$ in the regions (i) $|z| < 1$, (ii) $1 < |z| < 2$. 7M
6. Using Residue Theorem, Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)} dx$ 14M
7. a) State and prove Rouché's theorem. 7M
- b) Prove that the polynomial $z^5 + z^3 + 2z + 3$ has just one zero in the first quadrant of the complex plane. 7M
8. Find a bilinear transformation which maps the point's $z = 1, i, -1$ onto the points $w = 0, 1, \infty$. 14M

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

R-13

Code: 1G341

II B.Tech. II Semester Supplementary Examinations March 2021

Signals and Systems

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. Give a short notes on the following
 - i) Unit Impulse function
 - ii) Signum Function
 - iii) Continuous time complex exponential signal
 - iv) Orthogonal signal space

2. a) State and prove convolution property in Fourier series
b) Find the cosine Fourier series of a half wave rectified sine function

3. Explicate the following properties of Fourier transform
 - i. Time shifting
 - ii. Convolution

4. Show that the following systems are LTI systems
 - i) $y(t)=x(t/4)$
 - ii) $y(t) = x t + x(t^{-4}), t \geq 0$
 $0, t < 0$

5. a) Establish the relationship between Autocorrelation and Power Spectral Density
b) Derive the relationship between convolution and Correlation

6. Write short notes on the following
 - i) Sampling
 - ii) Oversampling
 - iii) Perfect sampling

7. a) State and Prove initial value theorem and final value theorem for Laplace transform
b) Find the Inverse Laplace Transform for $X(s) = 2/(s^2+3s+2)$

8. a) State and prove z –transform time reversal property
b) Obtain the Z-Transform of $y(n)=3x(n)+2x(n-1)$ for $x(n)= 3(1/2)^n u(n)+ 2(1/3)^n u(n)$
