Hall Ticket Number :										

R-11 / R-13

Code: 1G342

II B.Tech. II Semester Supplementary Examinations December 2017

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)	Define Gauss's Law and derive D and E due to infinite line charge.	8M
	b)	Derive the two Maxwell's equations from the static electric fields.	6M
2.	a)	Define Linear, Isotropic and Homogeneous mediums	6M
	b)	Derive the continuity of current equation for time varying and static fields	8M
3.	a)	Define Ampere's Circuital Law and derive Maxwell's equation related to this.	7M
	b)	Develop an expression for H both inside and outside of solid cylindrical conductor of radius 'a' carrying current 'I' with a uniform current density.	7M
4.	a)	Describe inconsistency of Ampere's Law? Give the clarity of conduction and displacement current densities.	8M
	b)	Derive the boundary conditions between Dielectric-Dielectric and Dielectric-Conductor Interfaces.	6M
5.	a)	Derive the wave equations for free space.	7M
	b)	Describe the plane waves in good conductors.	7M
6.	a)	Define and derive Poynting Theorem.	6M
	b)	Describe the Reflection coefficient of Plane Wave with Normal and Oblique Incidences.	8M
7.	a)	Define the following terms. i. Characteristic Impedance, ii. Propagation Constant, iii. Phase and iv. Group Velocities	8M
	b)	Describe the Condition for Distortion less and Minimum Attenuation transmission lines.	6M
8.	a)	Define Reflection Coefficient and VSWR of transmission lines.	4M
	b)	A transmission line of length of length 0.4λ has a characteristic impedance of 100Ω and is terminated in a load impedance of 200+j180Ω. Find the following with a Smith Chart. i. Voltage reflection coefficient, ii. VSWR iii. Input impedance of the line	10M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1G246

II B.Tech. II Semester Supplementary Examinations December 2017

Electrical Technology

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

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

****

1.	a)	Find necessary expressions for Y parameters in terms of Z parameters.	8M
	b)	Two 2 port networks are connected in cascaded find the equivalent Z parameters	6M
2.	a)	The h-parameters of a two port network are h11=6Ω, h22=3ʊ, h12=h21=5. Determine the ABCD parameters.	6M
	b)	Show and find the condition of reciprocity & symmetry for z- parameters.	8M
3.	a)	A series R-L circuit has R=20Ω and L=4H .A dc voltage of V= 80V is applied at t=0. Find (i) the equqtions for current.voltage across Rand L (ii) the current at t-0.9 secs.	10M
	b)	Recall the time constant of series R-C circuit and give its significance.	4M
4.	a)	An uncharged 60μF capacitor is connected in series with a 1kΩ resistor and switch across a 100V supply. Determine the time constant of the circuit and the initial value of current flowing. Determine also the value of current flowing after (a) 30ms and (b)60ms.	8M
	b)	A series RLC circuit is excited y dc voltage of V volts .find the transient response	6M
5.	a)	Describe about filters classification.	7M
	b)	Design a constant-k low pass filter to match with a line having characteristic impedance of 500Ω and to pass frequency up to 5kHz.	7M
6.	a)	What is an attenuator ? Derive design equation for T type attenuator	6M
	b)	Design Π type attenuator to provide an attenuation of 15dB. Taking characteristic impedance of 200 Ω.	8M
7.	a)	Derive torque equation of dc motor?	8M
	b)	The armature of 6 [pole dc generator has a wave winding containing 664 conductors .Calculate the generated emf when flux per pole is 0.06 weber and speed is 250 rpm.At what speed must the armature be driven to generate an emf of 250 V. if the flux per pole is reduced to 0.058 webers.	6M
8.	a)	Recall the various methods of speed control applicable to dc series motor.	4M
	b)	Describe with neat sketch the construction of dc machine.	10M

******

Hall Ticket Number :										

R-11 / R-13

Code: 1GC41

II B.Tech. II Semester Supplementary Examinations December 2017

Mathematics – III

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks each**)

****

1. a) Prove that $(2n+1)P_n(x) = P'_{n+1}(x) - P'_{n-1}(x)$ 7M

   b) Show that $\int_{-1}^{1} P_m(x).P_n(x)\,dx = 0,\ if\ m \neq n$ 7M

2. a) Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin although the Cauchy Riemann equations are satisfied at the origin. 6M

   b) Find the analytic function whose imaginary part is $f(x,y) = x^3y - xy^3 + xy + x + y$ Where $z = x + iy$. 8M

3. a) Separate the real and imaginary parts of $\cosh(x+iy)$ 6M

   b) Find the general value of i^i 8M

4. a) Evaluate $\int_c (x+y)\,dx + x^2y\,dy$ from (0, 0) to (3, 9) along $x^2 = y$ 6M

   b) Use Cauchy's Integral Formula to evaluate $\int_c \frac{\sin^2 z}{\left(z - \frac{®}{6}\right)^3}\,dz$, Where C is unit circle. 8M

5. a) Find the Taylor's expansion of $f(z) = \frac{1}{(z+1)^2}$ with center at $z = -i$. 7M

   b) State and prove Laurent's theorem. 7M

6. a) Prove by calculus of residues $\int_0^{\infty} \frac{\cos px}{\left(x^2 + b^2\right)} = \frac{®}{2b} e^{-bp}$ 7M

   b) Evaluate by contour integration $\int_0^{2®} \frac{d¯}{5 + 4\cos¯}$ 7M

7. a) Use Rouche's theorem the prove that all the roots of $z^7 - 5z^3 + 12 = 0$ lie between the circles $|z| = 1\ and\ |z| = 2$ 8M

   b) State and prove the fundamental theorem of algebra. 6M

8. a) Define bilinear transformation. Find the bilinear transformation that maps the points $z = 2, i, -2$ into the points $w = 1, i, -1$ respectively 7M

   b) Find the image of $|z - 2i| = 2$ under the mapping $w = \frac{1}{z}$ 7M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1G341

II B.Tech. II Semester Supplementary Examinations December 2017

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**)

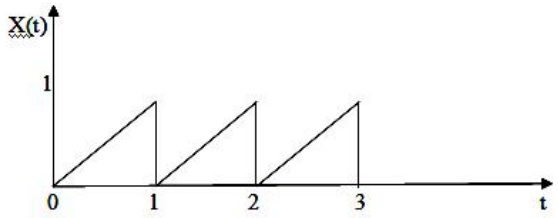
****

1. a) Briefly explain the analogy between vector and signals 6M

   b) With an example explain the concept of orthogonality in complex functions 8M

2. a) Briefly explain the properties of fourier series 6M

   b) Find the Exponential Fourier series of the following signal



8M

3. a) Determine the Fourier Transform of the following functions

   (i) $f(t) = e^{-a|t|}sgn(t)$ (ii) $x(t) = u(t)$ (iii) $x(t) = Cos\omega_o t$ 9M

   b) Explain the properties of a fourier transforms 5M

4. a) What is a LTI system? Explain its properties. Derive an expression for the transfer function of a LTI system 6M

   b) A LTI system is described by the following differential equation

$$\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 6y(t) = \frac{dx(t)}{dt} + 4x(t)$$

   The input is $x(t) = e^{-t}u(t)$

   Find the total response with initial conditions $y(0) = 3$, $\frac{dy(0)}{dt} = 0$ 8M

5. a) Explain the properties of autocorrelation function 7M

   b) Explain sampling theorem for low pass signals and discuss the effect of under sampling. 7M

6. a) Explain the process of Reconstruction of signal from its samples 7M

   b) Briefly explain Natural and Flat top Sampling 7M

7. a) Explain the properties of Laplace Transform 6M

   b) Find the Laplace transform of

$$x(t) = \begin{cases} e^t \sin 2t & t \le 0 \\ 0 & t > 0 \end{cases}$$

   Indicate the location of its poles and its ROC 8M

8. a) Write the difference between Laplace, Fourier and Z transforms. 6M

   b) Determine the Z-Transforms, ROC and poles and zeros of

   (i) $x(n) = 2^n u(n) + 3^n u(-n-1)$

   (ii) $x(n) = e^{-2n}u(n-1)$ 8M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1G245

II B.Tech. II Semester Supplementary Examinations December 2017

Switching Theory and Logic Design

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks each**)

****

1. Discuss in detail about error detecting and correcting codes. 14M

2. a) Realize XOR, AND and OR gates using NAND only and NOR gates only. 7M

   b) Express the boolean function F= A+B'C in a sum of min terms. 7M

3. Simplify the boolean function using K-map method
   F(A,B,C,D,E) = (0,2,4,6,9,13,21,23,25,29,31) 14M

4. With neat logic diagram explain look ahead carry adder. 14M

5. a) Give the comparison between PROM, PAL and PLA. 7M

   b) Implement the following functions with a PLA.
   $F_1(A,B,C) = \sum (0,1,2,4)$
   $F_2(A,B,C) = \sum (0,5,6,7)$ 7M

6. a) Draw and explain 4 bit up/down counter. 7M

   b) Draw and explain RS and D Flip - flops with their function tables. 7M

7. a) Define Mealy and Moore machines and distinguish them. 7M

   b) Reduce the no.of states in the state table given below and tabulate the reduced state table and give proper assignment.

PS	NS, Z	
	X = 0	X = 1
A	F, 0	B, 0
B	D, 0	C, 0
C	F, 0	E, 0
D	G, 1	A, 0
E	D, 0	C, 0
F	F, 1	B, 1
G	G, 0	H, 0
H	G, 1	A, 0

7M

8. a) Mention salient features of ASM charts. 7M

   b) Draw and explain state diagram and ASM chart of a sequence detector. 7M

***