Hall Ticket Number :										

R-17

Code: 7GC43

II B.Tech. II Semester Supplementary Examinations February 2022

Complex Variables & Special Functions

(Common to EEE & ECE)

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) Symmetry of Beta function B(m, n)=B(n, m) 7M

   b) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x^5}}dx$ in terms of B function 7M

OR

2. a) Show that $\Gamma(n)=\int_0^1\left(\log\frac{1}{x}\right)^{n-1}dx \ , n>0$ 7M

   b) Evaluate $\int_0^1 \sqrt{\cot^{-}}\,d^{-}$ 7M

UNIT–II

3. a) Show that $f(z)=z+2\bar{z}$ is not analytic anywhere in the complex plane. 7M

   b) Determine whether the function $2xy+i\left(x^2-y^2\right)$ is analytic. 7M

OR

4. Prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|\mathrm{Re}\,al\ f(z)|^2=2|f'(z)|^2$ where $w=f(z)$ is analytic. 14M

UNIT–III

5. Evaluate $\int_c \frac{\log z}{(z-1)^3}dz$ where $c:|z-1|=\frac{1}{2}$ using Cauchy's integral formula 14M

OR

6. Expand $Log\ z$ by Taylor's series about z=1. 14M

UNIT–IV

7. Find the poles of the function $\frac{z+1}{z^2(z-2)}$ and Residues at the poles 14M

OR

8. a) Find the poles and Residues at each pole $\frac{ze^z}{(z-1)^3}$ 7M

   b) Use Residue theorem to find the number of zeros of the polynomial $z^{10}-6z^7+3z^3+1$ if $|z|<1$ 7M

UNIT–V

9. Show that the image of the hyperbola $x^2-y^2=1$ under the Transformation $w=\frac{1}{z}$ is the Lemniscate $^{\circ 2}=\cos 2¤$ 14M

OR

10. Show that the function $w=\frac{4}{z}$ transforms the straight line x=c in the z-plane into a circle in the w-plane. 14M

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Hall Ticket Number :										

R-17

Code: 7G331

II B.Tech. I Semester Supplementary Examinations February 2022

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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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain cascode amplifier operation with neat diagrams and mention its uses.	7M		
	b)	Derive the expressions of Millers theorem and its dual.	7M		
		OR			
2.	a)	With a neat diagram, explain in detail about the operation of direct and transformer coupled amplifiers	7M		
	b)	Using the h-parameter model, derive expressions for Current gain(AI), Input impedance(Zi), Output impedance(Zo) and Voltage gain(AV)	7M		
		UNIT–II			
3.	a)	Explain the frequency response of amplifier at Low, Mid and High frequencies	9M		
	b)	What are half power frequencies?	5M		
		OR			
4.		Consider a single stage CE transistor amplifier with the load resistor “RL”. Find out an approximation expression for the gain factor of this amplifier.	14M		
		UNIT–III			
5.	a)	Derive the input impedance (Zi) and output impedance (Zo) of a voltage series –ve feedback amplifier in terms of its open loop parameters.	8M		
	b)	Why positive feedback is not suitable in amplifiers.	6M		
		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.	a)	Explain the working principle of crystal oscillator and derive expressions for frequency of oscillation.	9M		
	b)	Derive the expression of condition for oscillations.	5M		
		UNIT–V			
9.	a)	What is Q Factor? Write about unloaded and loaded Q in tuned circuit.	7M		
	b)	Explain Advantages, disadvantages and applications of tuned amplifiers	7M		
		OR			
10.	a)	Explain class B push-pull amplifier operation with neat diagrams.	7M		
	b)	Draw and explain the circuit diagram of a single tuned capacitive coupled amplifier. Also explain its operation.	7M		

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Hall Ticket Number :										

R-17

Code: 7G344

II B.Tech. II Semester Supplementary Examinations February 2022

Field Theory and Transmission Lines

(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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Marks

UNIT–I

1. a) State and explain Coulomb's law? Obtain an expression of it in vector form. 7M
   b) Point charges 1mC and -2mC are located at (3, 2, -1) and (-1, -1, 4) respectively. Calculate the electric force on a 10nC charge locate at (0, 3, 1) and the electric field intensity at that point. 7M

OR

2. a) State and Prove Gauss's law and Derive D and E due to infinite line charge. 7M
   b) Define Electric field intensity? Derive Electric field intensity for surface charge. 7M

UNIT–II

3. a) Define current and current density? Differentiate convection and conduction currents. 7M
   b) Discuss the properties of dielectric materials. 7M

OR

4. a) Write a short note on the following i) dielectric constant and dielectric strength ii) Polarization. 7M
   b) Explain the procedure to find the Resistance and capacitance for non-uniform cross section of the conductor. 7M

UNIT–III

5. a) Analogy between Electric and Magnetic field? 7M
   b) Write a short note on the following i) magnetic flux ii) magnetic flux density, iii) Magnetic field intensity or (strength) 7M

OR

6. a) With neat diagram explain Biot Savarts law and write H equations for three current distributions. 7M
   b) Planes z=0 and z=4 carry current K=-10a_x A/m and K-10a_x A/m, respectively Determine H at (i) (1,1,1) (ii) (0,-3,10) 7M

UNIT–IV

7. a) Write a short note on the following i) wave length ii) skin depth iii) propagation constant iv) intrinsic impedance. 7M
   b) Explain the waves in general. 7M

OR

8. a) Derive an expression for reflection coefficient and transmission coefficient when a plane wave is incident normally on an interface between two different media. 7M
   b) In free space ($z \leq 0$), a plane wave with H_i=10 cos(10^8t-βz)a_x mA/m. is incident normally on a lossless medium($\epsilon=2\epsilon_0$, $\mu=8\mu_0$) in region $z \geq 0$). Determine the reflected wave H_r, E_r and the transmitted wave E_t, H_t. 7M

UNIT–V

9. a) Define with mathematical equations of the following : i) characteristic impedance ii) attenuation constant iii) velocity of propagation iv) wave length 7M
   b) Draw and explain about standing waves in OC and SC lines. 7M

OR

10. a) Derive the transmission line equation 7M
    b) Discuss about the Reflection coefficient with relevant expressions. 7M

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Hall Ticket Number :										

R-17

Code: 7GA41

II B.Tech. II Semester Supplementary Examinations February 2022

Managerial Economics and Financial Accounting

(Electronics and Communication and 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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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	What is the importance and uses of Managerial Economics to Engineers? How can these concepts be used in the Manufacturing Sector?	7M	1	L1
	b)	Outline the objectives & uses of demand forecasting? How do you predict demand for Steel Manufacturing?	7M	1	L4
		OR			
2.	a)	Describe the determinants of demand, Law of demand and its exceptions.	7M	1	L2
	b)	Explain with suitable diagrams, different kinds of Elasticity of demand.	7M	1	L2
		UNIT–II			
3.	a)	What is marginal rate of technical substitution? How does it vary from marginal rate of substitution?	7M	2	L1
	b)	Define production. Analyse the Internal and External economies of large scale production.	7M	2	L4
		OR			
4.	a)	Explain the importance of Cobb-Douglas production function.	7M	2	L2
	b)	State the determinants of cost. Distinguish between Marginal cost and Opportunity cost.	7M	2	L2
		UNIT–III			
5.	a)	Define market. Highlight the difference between perfect and imperfect market.	7M	2	L2
	b)	Explain the price-output determination in Monopoly in long run and short run.	7M	2	L3
		OR			
6.	a)	Outline the features, and advantages of sole proprietorship.	7M	2	L4
	b)	Explain the Objectives, features & limitations of Co-operative type of organisation.	7M	2	L3

UNIT–IV

7.	a)	Summarise the nature and scope of capital budgeting.	7M	3	L5
	b)	What are the different Methods of evaluating capital budgeting projects?	7M	3	L1

OR

8.	a)	The initial cash outlay of a project is Rs.50, 000 and it generates cash inflows of Rs.20, 000, Rs.15, 000, Rs. 25, 000 and Rs.10, 000 in four years. Using profitability index method, appraise profitability of the proposed investment assuming 10% rate of discount.	14M	3	L2

UNIT–V

9. a) Determine Debt-Equity Ratio, Proprietary Ratio and Funds Proportion Ratios, with the help of following information:

Description	Amount Rs.
Equity Capital	10,00,000/-
Profit & Loss A/C(Profit)	5,00,000/-
Reserves & Surplus	3,00,000/
Premium on Issue of Shares & Debentures	2,50,000/
Debentures	30,00,000/
Long Term Fixed Deposits Accepted	5,00,000/
Long Term Bank Loans	15,00,000/
Provision for Dividend & Taxation	1,50,000/
Short Term Bank Loans	5,00,000/
Fixed Assets	45,75,000/

14M 3 L2

OR

10.	a)	What are activity ratios and solvency? Give two examples of each ratio	8M	4	L2
	b)	Define financial accounting. What do you understand by ‘double-entry’ book keeping?	6M	4	L1

END

Hall Ticket Number :										

R-17

Code: 7G342

II B.Tech. II Semester Supplementary Examinations February 2022

Pulse and Digital Circuits

(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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UNIT–I

1. a) Design and find the response of a High Pass Circuit for Symmetrical Square wave input for different time constants. Also, derive the expression of percentage tilt. 10M

   b) Design a simple attenuator circuit and explain its functionality. 4M

OR

2. a) Which RC circuit acts as an Integrator? Under what condition, it acts as an Integrator? Derive that condition. 6M

   b) Determine and plot the frequency response of a High Pass circuit for Sinusoidal input. Also, derive the necessary equations. 8M

UNIT–II

3. a) Compare and contrast Linear and Non-Linear wave shaping. 2M

   b) Design any two positive and two Negative Clipper circuits with and without biasing. Also, draw the corresponding input, output waveforms and transfer characteristics. 12M

OR

4. a) Design Transistor as Switch circuit and then verify its functionality. 5M

   b) Design any three different positive and Negative Clamper circuits and then draw the corresponding input and output waveforms. 9M

UNIT–III

5. a) What is a Multivibrator? What are its applications? 4M

   b) Design the Schmitt trigger circuit and then explain the operation of it. Also, derive the expressions for UTP and LTP. 10M

OR

6. a) Define the terms: LTP, UTP, Hysteresis and triggering. 4M

   b) Design an Astable multivibrator circuit and then with the help of the collector and base waveforms explain the principle of operation. Also, derive the expression for its frequency of oscillations. 10M

UNIT–IV

7. a) Describe the operation of a transistor voltage sweep waveform generator, employing a constant current charging method with the help of its circuit diagram and waveforms. 7M

   b) With the help of a neat circuit diagram, explain the working of a transistor current time base generator. 7M

OR

8. a) Draw the circuit of a Boot strap sweep generator and explain its operation. Derive an expression for its sweep time. 8M

   b) Illustrate different methods of generating time base waveform. 6M

UNIT–V

9. a) Compare different logic families in terms of fan-In, fan-out, Propagation delay, noise margin, logic levels and Power dissipation. 6M

   b) Design the four diode bi-directional sampling gate and then explain its operation. Also, give the related expressions. 6M

   c) What is Inhibit operation? 2M

OR

10. a) Compare and contrast the unidirectional sampling gate and bidirectional sampling gate. 3M

    b) Derive expressions for gain and minimum control voltages of a bi-directional two- diode sampling gate. 5M

    c) Design a 2-input TTL NAND gate circuit diagram and then verify its operation with the help of truth table. 6M

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Hall Ticket Number :										

R-17

Code: 7G341

II B.Tech. II Semester Supplementary Examinations February 2022

Random Variables and Random Processes

(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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			Marks	CO	Blooms Level

UNIT–I

1. a) Discuss the relative frequency approach and axiomatic approach of probability 7M

   b) Consider the experiment of tossing two dice simultaneously. If X denotes the sum of two faces, find the probability for $X \leq 6$. 7M

OR

2. a) State and prove Bayes Theorem. 7M

   b) In a box there are 100 resistors whose resistances and tolerances are as shown in the table below. Let A be the event of drawing a 47Ω resistor, B be the event of drawing a resistor with 5% tolerance, and C be the event of drawing a 100Ω resistor. Find P(A/B), P(A/C) and P(B/C). 7M

UNIT–II

3. a) Derive expressions for mean and variance for uniform random variable? 7M

   b) A discrete random variable X takes values from 1 to 5 with probabilities given below

X	1	2	3	4	5
P(X)	0.1	0.2	0.4	0.2	0.1

   Compute the variance and skew of the random variable X 7M

OR

4. a) Obtain the characteristic function of Poisson random variable 7M

   b) Find the Moment generating function of a uniform random variable distribute over (A, B) and find its first and second moments about origin, from the Moment generating function 7M

UNIT–III

5. a) Explain covariance of two random variables. 6M

   b) X and Y are two statistically independent random variables related to W as W= X + Y. Obtain the probability density function of Y in terms of probability density functions of X and Y 8M

OR

6. a) Let X and Y be the random variables defined as X=Cosθ and Y=Sinθ where θ is a uniform random variable over (0, 2π). Are X and Y Uncorrelated/Are X and Y Independent. Analyse in detail. 7M

   b) Prove that the variance of weighted sum of N random variables equals the weighted sum of all their covariances 7M

UNIT–IV

7. a) Classify random processes and explain. 6M

   b) List and explain various properties of Autocorrelation function 8M

OR

8. a) X(t) is a random process with mean =3 and Autocorrelation function Rxx(τ) =10 [exp(- 0.3|τ|)+2]. Find the second central Moment of the random variable Y=X(3)-X(5). 8M

   b) Discuss in detail about: (i) First order stationary random process. (ii) Ergodic process. 6M

UNIT–V

9. a) Discuss properties of cross power density spectrum 7M

   b) Obtain the auto correlation function corresponding to the power density spectrum:

$$S_{XX}(\omega) = \frac{8}{(9 + \omega^2)^2}$$

7M

OR

10. a) Discuss the relationship between cross power spectrum and cross correlation function. 7M

    b) Briefly explain the concept of cross power density spectrum. 7M

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Hall Ticket Number :										

R-17

Code: 7G343

II B.Tech. II Semester Supplementary Examinations February 2022

Analog Communication

(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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Marks

UNIT–I

1. a) Write about elements of Communication system. 6M
   b) Discuss about various steps Involved in Need for Modulation. 8M

OR

2. a) Prove that the efficiency of Amplitude Modulation is 33.3%. 7M
   b) A Broadcast AM transmitter radiates 50KW of carrier power, what will be the radiated power at 85% of modulation and also find total sideband power? 7M

UNIT–II

3. a) Distinguish between AM and FM. 6M
   b) Draw the frequency spectrum of WBFM with required expressions. 8M

OR

4. a) Explain the generation of Narrow band Frequency Modulation with suitable block diagram. 7M
   b) The FM signal has a sinusoidal modulation frequency of 15 KHz and a modulation index is 2, using Carson's rule find the transmission BW. 7M

UNIT–III

5. a) Define Noise? Derive an expression for output SNR for DSB-SC system. 6M
   b) Write about noise performance of AM systems. 8M

OR

6. a) Explain the noise performance of SSB - SC receiver and prove its FOM is unity. 8M
   b) Write short note on Pre-Emphasis and De-Emphasis circuits. 6M

UNIT–IV

7. a) What is image frequency? How is it rejected? Also enumerate the steps to improve the image frequency rejection? 7M
   b) Classify the radio transmitters based on type of modulation and service involved. 7M

OR

8. a) Outline the working principle of TRF receiver with neat sketches. 7M
   b) Explain about the working principle of FM Receiver. 7M

UNIT–V

9. a) Describe with suitable circuit, the scheme of generation of PAM signals. 7M
   b) Distinguish between PAM, PWM. 7M

OR

10. a) Explain the method of generation and detection of PAM signals with neat schematics. 7M
    b) Discuss the necessity of multiplexing and Write short notes on FDM 7M

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