Code No: R1621041 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRONIC DEVICES AND CIRCUITS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What is intrinsic semiconductor? (2M)
   b) Write the disadvantages of LED (2M)
   c) Define Ripple factor and peak inverse voltage (3M)
   d) Write the applications of JFET (2M)
   e) What are the advantages of self-biasing circuit? (3M)
   f) What is emitter follower? (2M)

PART –B

2. a) Explain in detail about Hall effect (7M)
   b) Calculate the resistivity of intrinsic germanium at 300^0K .Assume $n_i = 2\,x10^{13} per\ cm^3, \mu_n = 3800 cm^3/V-s\ and \mu_p = 1800 cm^3/V-s$ (7M)

3. a) Explain the formation of depletion region in a PN junction (7M)
   b) A P-N junction silicon diode has a reverse saturation current of 50nA at room temperature 27^0K. If the new reverse saturation current is observed to be 160nA , calculate the value of new temperature. (7M)

4. a) Draw and explain the circuit diagram of full wave rectifier with L-section filter (7M)
   b) In half-wave rectifier an ac voltage of peak value 24V is connected in series with silicon diode and load resistance of 480Ω. If the forward resistance of the diode is 20Ω, find average load current and rms value of load current. (7M)

5. a) Explain input and output characteristics of a transistor in CB configuration (7M)
   b) A certain JFET operates in the linear region with a constant drain voltage of 1V. When the gate voltage is 2V, a drain current of 10mA flows, but when gate voltage is changed to 1V, the drain current becomes 22.8mA. Find (a) the pinch-off voltage (b)the channel resistance for zero gate voltage (7M)

6. a) Explain any two bias compensation techniques (7M)
   b) An npn transistor if β=50 is used in CE circuit with $V_{CC} = 10V, R_C = 2k\Omega$. The bias is obtained by connecting 100kΩ resistor from collector to base. Find the quiescent point and stability factor. (7M)
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7. a) Draw the h-parameters equivalent circuit for a common emitter amplifier and derive the Expression for Ai ,RI, Av. (7M)
   b) Compare the performance of BJT as an amplifier in CE, CB, CC configuration (7M)

Code No: R1621041 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRONIC DEVICES AND CIRCUITS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What is meant by doping in semiconductor? (2M)
   b) Write the advantages of photo diode (2M)
   c) Define Transformer utilization factor (2M)
   d) Why are n-channel MOSFETs preferred over P-channel MOSFET? (3M)
   e) What are the advantages of fixed biasing circuit? (2M)
   f) What is an amplifier ?What are the various types of amplifiers (3M)

PART -B

2. a) Derive continuity equation and state its special cases (7M)
   b) The mobility of free electrons and holes in pure silicon are 0.13 and 0.05$m^2/V-s$and the corresponding values for pure germanium are 0.38 and 0.18$m^2/V-s$ respectively .Determine the values intrinsic conductivity for both silicon and germanium. Given that $n_i = 2.5x10^{19}/m^3$ for geranium and $n_i = 2.5x10^{19}/m^3$for silicon at room temperature. (7M)

3. a) Derive the expression for diffusion capacitance in PN junction (7M)
   b) Explain in detail about V-I characteristics of a zener diode. (7M)

4. a) Draw and explain the circuit diagram of full wave rectifier with inductor filter (7M)
   b) A zener diode shunt regulator circuit is to be designed to maintain a constant load current 400mA and voltage 40V. The input voltage is 90±5V. The zener voltage is 40V and its dynamic resistance is 2.5Ω.Find the following quantities for regulator: (a) the series dropping resistance (b) zener power dissipation (c) load resistance .assume the zener current to be10% of load current. (7M)

5. a) Explain input and output characteristics of a transistor in CE configuration (7M)
   b) Explain the four distinct regions of the output characteristics of JFET (7M)

6. a) What is thermal runaway? Explain how it can be avoided. (6M)
   b) A silicon transistor with β=80 is use in self-biasing arrangement with$V_{CC} = 15V, R_C = 4.7k\Omega$. The operating point Q is at $V_{CE} = 8.2V, I_C = 1.2mA$. find values $R_1, R_2\ and R_E$. (8M)
~~~~~~

7. a) For a common source amplifier as shown in Figure 2, operating point is defined byVGSQ= -2.5V, VP= -6V & IDQ=2.5mA with IDSS=8mA. Calculate gm, rd , Zi , Zo &Voltage gain Av (7M)

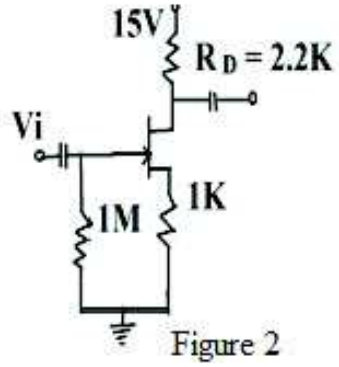

Figure 2

b) Derive the expressions for Z i, Zo and Av for common drain J-FET amplifier (7M)

Code No: R1621041 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
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2. Answer**ALL** the question in **Part-A**
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PART –A

1. a) What is diffusion current? (2M)
   b) Write the Application of PN junction diode (2M)
   c) What is need for filters in power supplies? (2M)
   d) Compare JFET with BJT (3M)
   e) What is need for biasing a transistor? (2M)
   f) What is h-parameter for a transistor? (3M)

PART -B

2. a) Prove that Fermi level lies in the Centre of forbidden band for intrinsic semiconductor (7M)
   b) The resistivity of pure silicon is $2.3x10^6\Omega - cm\ at\ 27^0C$. Calculate intrinsic concentration at 127^0C (7M)

3. a) Derive the expression for Transition capacitance in PN junction (7M)
   b) Explain the tunneling effect with the help neat diagrams (7M)

4. a) Derive expression for ripple factor and rms value of voltage of full wave rectifier with resistive load (7M)
   b) An L-C filter is to be used to provide a dc output with1% ripple filter from a full-wave rectifier operating at 50Hz.AssumeL/C =0.01, determine the required values of L and C (7M)

5. a) Calculate the collector current and emitter current for a transistor with $\alpha_{dc} = 0.99\ and\ I_{CBO} = 50\mu A\ when\ the\ base\ current\ is\ 20\mu$A (7M)
   b) Explain construction of n channel JFET with neat diagram (7M)

6. a) determine the stability factor for a CB amplifier circuit (7M)
   b) In voltage divider bias circuit, if $V_{CC} = 10V, V_{CE} = 5V, I_C = 1.2mA, R_2 = 10k\Omega, \beta = 100\ and\ R_E = 270\Omega, calculate\ R_1\ and\ R_3. assume\ V_{BE(act)} = 0.6V$ (7M)

7. a) Draw the hybrid parameter equivalent circuit for an NPN common emittertransistor and explain. (7M)
   b) For common source amplifier V_{GSQ}=-2V, I_{DSS}=8mA, Vp=-8V, Yos=20μs, R_G=1MΩ, R_D=5.1KΩ, calculate gm, rd, Zi, Zo and Av (7M)

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Code No: R1621041 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
ELECTRONIC DEVICES AND CIRCUITS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What is drift current? (2M)
   b) Define the term transition capacitance C_T of PN junction diode (3M)
   c) What are the advantages of bridge rectifier? (3M)
   d) What is early effect? (2M)
   e) What is meant by Q-point? (2M)
   f) Write the advantages of h-parameters. (2M)

PART -B

2. a) Derive the expression for the conductivity of extrinsic n type an p type semiconductor. (7M)
   b) Calculate the resistivity of silicon if donor type of impurity is added to the extent of 1 atom per 10^8 silicon atom, at $300^0K\ and\ assume\ \mu_n = 1300cm^3/V-s$ (7M)

3. a) Derive the expression for Dynamic Resistor in PN junction (7M)
   b) Explain the working principal of PIN diode (7M)

4. a) Derive expression for ripple factor in full wave rectifier using inductor filter (7M)
   b) Design a zener regulator for following specification: load current=20mA, output voltage=5V, zener wattage=500mW, input voltage=12±2V and I_{Zmin}=8mA. (7M)

5. a) A transistor operating in CB configuration has $I_C = 2.98mA\ and\ I_E = 3mA and I_{CO} = 0.01mA$ what current will flow in collector circuit, of this transistor when connected in CE configuration with a base current of $30\mu A$ (7M)
   b) Draw an explain the drain characteristics of n-channel enhancement type (7M)

6. a) Derive the expression for stability factor of a collector to base bias circuit (7M)
   b) Determine the operating point for the circuit of a potential divider bias arrangement with $R_2 = R_c = k\Omega, R_E = 1k\Omega and\ R_1 = 40k\Omega$ (7M)

7. a) Explain in detail about the h-parameters using a two port network model (7M)
   b) The amplifier utilizes n-channel FET using source self bias circuit for which Vp=-2V, IDSS=1.65 mA. It is desired to bias the circuit at ID=0.8 mA, Av=20 dB using VDD=4V. Assume rd >> RD, find i) VGs ii) gm iii) Rs iv) RD (7M)
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Code No: R1621026 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE, EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

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PART –A

1.	a)	State the features of Managerial economics.	3M
	b)	Define production function.	2M
	c)	What is price discrimination?	2M
	d)	What are the advantages and limitations of partnership firm?	3M
	e)	Explain the significance of double entry system	2M
	f)	Define functional flow system analysis	2M

PART -B

2.	a)	Discuss the importance of managerial economics in decision making.	7M
	b)	What is cross elasticity of demand? Is it positive for substitute or complements? Illustrate in a diagram relating to the demand for coffee to the price of tea.	7M
3.	a)	Why does law of diminishing returns operate? Illustrate with assumed data.	7M
	b)	The P/V ratio of Lakshmi books Ltd is Rs. 40% and the margin of safety Rs. 30. Calculate BEP and Net Profit. If the sales volume is Rs. 14000/-.	7M
4.		How a firm attains equilibrium in the short run and in the long run under conditions of perfect competition? Explain.	14M
5.		Small is beautiful'. Do you think, this is the reason for the survival of the sole trader from of business organization? Support your answer with suitable examples.	14M
6.		How ratios are classified for the purpose of financial analysis? With assumed data illustrate any two types of ratios under each category.	14M
7.	a)	What is meant by discounting and time value of money? How is it useful in capital budgeting?	7M
	b)	ABC company is considering the purchase of two machines A and B each costing Rs:50,000/-.Earnings after taxes are expected to be as under :	7M

Year	1	2	3	4	5
Machine A	5,000	15,000	20,000	30,000	20,000
Machine B	15,000	20,000	25,000	15,000	10,000

Estimate the two alternatives according to
i.ARR method ii.NPV method a discount rate of 10%.
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Code No: R1621026 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE, EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

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PART –A

1.	a)	Give the criteria for a good demand forecasting method.	3M
	b)	Differentiate between Isoquants and Isocosts.	2M
	c)	Explain the feature of Oligopoly market?	2M
	d)	What are the different types of companies?	2M
	e)	List various types of financial statements.	3M
	f)	What is profitability index	2M

PART -B

2.	a)	Explain the role of a Managerial Economist in a Business Firm.	7M
	b)	Explain various types of Elasticity of demand.	7M
3.	a)	Describe law of variable proportions in detail.	7M
	b)	Discuss the concept of Cost-Volume-Profit analysis	7M
4.	a)	Describe Cobb-Douglas production function.	7M
	b)	Discuss the price determining system in perfect competition market	7M
5.		What are business cycles? Explain its phases in detail.	14M
6.		What is double entry book keeping? Explain scope of important records of Accounting under Double entry system.	14M
7.		A company has an investment opportunity costing Rs.1,50,000 with the following expected net cash flow.	14M

Year	Cash Flow After Tax
1	16,000
2	34,000
3	44,000
4	54,000
5	54,000

Using 10% as the rate of discount determine the following:
i. Pay -back method
ii. NPV method
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Code No: R1621026 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
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Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

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PART –A

1.	a)	What is the importance of elasticity of demand?	3M
	b)	Define margin of safety.	2M
	c)	List the important features of market structures.	2M
	d)	What is the need of public enterprises?	2M
	e)	Define Ledger.	2M
	f)	Explain the concept of capital budgeting	3M

PART -B

2.	a)	What is law of demand? Explain various factors that determine the demand for a computer.	7M
	b)	Discuss statistical methods of demand forecasting.	7M
3.	a)	Explain Cobb-Douglas Production function.	7M
	b)	Describe the BEP with the help of a diagram and its uses in business decision making.	7M
4.	a)	What is perfect competition? State its features and how the price is determined in this market structure.	7M
	b)	Explain the concepts of flat rate pricing and usage sensitive pricing	7M
5.		Write short notes on (i)public company (ii) Government Company (iii) Private Company.	14M
6.		What is Funds flow statement? Discuss the significance of funds flow statement as a tool of financial analysis.	14M
7.		Examine the following proposals and evaluate them based on: i. ARR method(ARR on original investment) ii.NPV method Initial investment is Rs.12,00,000/- each for all the two projects, discount factor is 10 %	14M

Year	Cash inflows(Rs.)	
	Project A	Project B
1	6,00,000	5,00,000
2	5,00,000	3,00,000
3	2,00,000	2,00,000
4	-	3,00,000
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Code No: R1621026 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS
(Common to EEE, ME, ECE ,EIE, ECC, AME, AE and Mining Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **Four** Questions from **Part-B**

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PART –A

1.	a)	Differentiate between short term and long term demand forecasting methods.	2M
	b)	Define cost. How are costs classified?	2M
	c)	List the features of Monopoly competition.	3M
	d)	What is partnership deed?	2M
	e)	What is double entry book keeping?	2M
	f)	Explain time value of money.	3M

PART -B

2.	a)	Discuss the nature of problems studied in managerial economics. What is the importance of the study of such problems in business management?	7M
	b)	What is promotional elasticity of demand? How does it differ from cross elasticity of demand?	7M

3. A Company reported the following results for two years 14M

Year	Sales	Profit
I	Rs. 40,00,000	Rs. 4,00,000
II	Rs. 50,00,000	Rs. 6,00,000

Calculate BEP, PV ratio, fixes cost and Margin of Safety.

4.	a)	Explain the concept of Return to Scale and Economics of Scale	7M
	b)	Explain Market Skimming and priority pricing methods.	7M

5. Define a joint stock company & explain its basic features, advantages & disadvantages 14M
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6. Calculate current ratio, debt-equity ratio and proprietary ratio with the help of following information 14M

Particulars	Amount (Rs.)	Particulars	Amount(Rs.)
Cash&Bank balances	10,00,000	Capital(6,00,000 shares of Rs.10/-)	60,00,000
Marketable securities	6,00,000	Reserves &Surplus	30,00,000
Inventory	8,00,000	Profit &loss A/c Cumulative	4,00,000
Debtors	20,00,000	Debentures	40,00,000
Creditors	10,00,000	Long term loan	20,00,000
Bills payable	2,00,000	Long term public deposits accepted	20,00,000
		Fixed assets	80,00,000

7. Compare and contrast the NPV and ARR methods of evaluating investment proposals and illustrate with examples. 14M

Code No: R1621044 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
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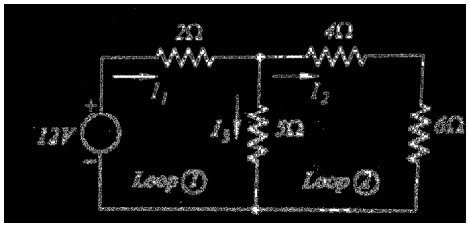
PART –A

1. a) Derive an expression of the energy stored in an inductor. 2M
   b) Why an impedance represented by a complex number? How is complex impedance dependent on frequency? 3M
   c) A coil of impedance $R + jX_L$ is in parallel with a capacitor of C = 10 μF. If R = 10 Ω and L = 0.1 H. find the frequency at which it resonates, if connected to a variable frequency source. 3M
   d) List out the applications and limitations of Millman's theorem. 2M
   e) State driving point impedance and driving point admittance. 2M
   f) Define transient response. 2M

PART -B

2. a) Prove that in a linear graph, every cut-set has an even number of branches in common with every loop. 7M
   b) In the network shown below, find all branch currents and voltage drops across all resistors. 7M



3. a) Explain the method of representing alternating quantities as phasor quantities. What are the advantages of phasor representation? 7M
   b) A resistance of 12 Ω and an inductance of 0.025 H are connected in series across a 50 Hz supply. What values of resistance and inductance when connected in parallel will have the same resultant impedance and pf? Find the current in each case when the supply voltage is 230 V. 7M
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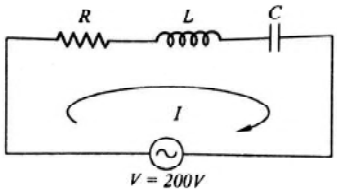
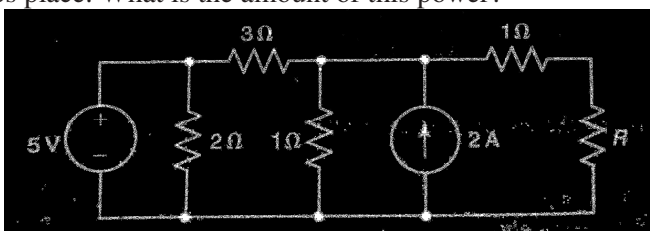
4. a) Explain about the concept of series R-L resonant circuit. 5M

   b) A series RLC circuit takes a maximum current of 0.3 A at 200 V, 50 Hz. If the voltage across the capacitor is 290V at resonance. Determine R,L,C and Q of the coil. 9M



5. a) Show that under the condition of maximum power transfer, the efficiency of the circuit is 50 %. 5M

   b) Find the value of R in the circuit shown in figure such that maximum power transfer takes place. What is the amount of this power? 9M

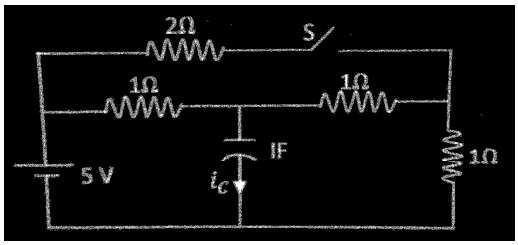


6. a) Derive expressions for the Y-parameters in terms of ABCD parameters of a two-port network. 7M

   b) Two two-port networks are connected in parallel. Prove that the overall y-parameters are the sum of corresponding individual y-parameters. 7M

7. a) Derive the non-homogeneous equation. 7M

   b) The following network is in steady state with S open. At t = 0, S is closed. Find $i_c(t)$ for t > 0. 7M



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II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

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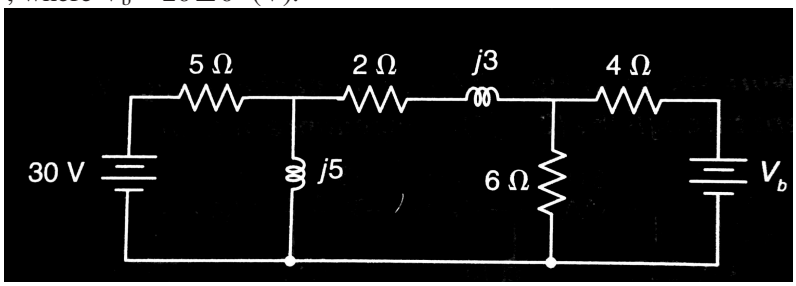
PART –A

1. a) Define V-shift and I-shift in the source transformation. 3M
   b) Why is a sinusoidal wave shape insisted for voltages and currents while generating transmitting and utilizing ac electric power? 2M
   c) Two coupled coils with self inductances of 1 H and 2 H are connected in series aiding. The resulting inductance L_{eq} is 4 H. Find the coefficient of coupling between them. 3M
   d) Mention some salient features of Tellegen's theorem. 2M
   e) What are the inverse transmission parameters and express their relations. 2M
   f) Define natural response 2M

PART -B

2. a) Explain the following 5M
      i) The current through an inductor cannot change instantaneously.
      ii) The voltage across a capacitor cannot change instantaneously.
   b) Determine the current through the impedance (2+j3) Ω in the circuit shown in figure , where $V_b = 20\angle 0^o$ (V). 9M



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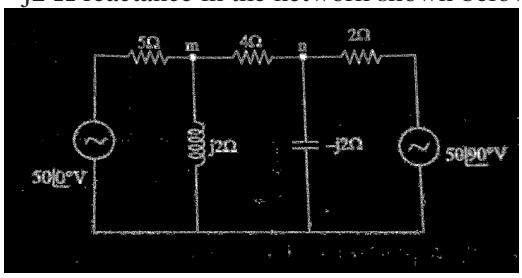
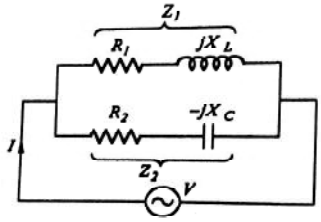
Code No: R1621044 **R16** SET - 2

3. a) Use nodal voltage method to find the voltage of nodes 'm' and 'n' and currents through j2 Ω and – j2 Ω reactance in the network shown below 7M



b) The impedances of a parallel circuit are $Z_1=(6+j8)\Omega$ and $Z_2=(8-j6)\Omega$. If the applied voltage is 120V, find (i) current and p.f of each branch (ii) over all current and p.f of the combination. (iii) Power consumed by each impedance. Draw a neat phasor diagram. 7M

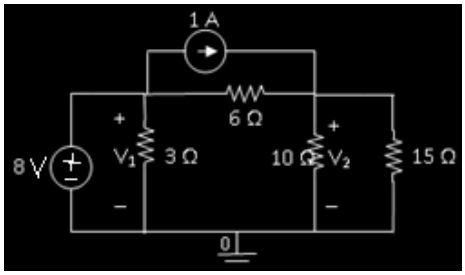


4. a) Derive the expression of the coefficient of coupling for the coupled circuit. 7M

b) Two inductively coupled coils have self inductances L_1= 50 mH and L_2= 200 mH. If the coefficient of coupling is 0.5 i) find the value of mutual inductance between the coils and ii) what is the maximum possible mutual inductance. 7M

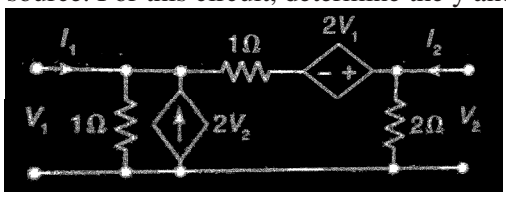
5. a) Write the applications of superposition theorem. 5M

b) Find the voltage across 10 Ω resistance using superposition theorem. 9M



6. a) The h-parameters of a two-port network are h_{11} = 35 ohm, $h_{12} = 2.6\text{x}10^{-4}$, h_{21} = -0.98, $h_{22} = 0.3 \text{ x } 10^{-6}$ mho. The input terminals are connected to a 0.0001 V sinusoidal and a 10^4 ohm resistance is connected across the output port. Find the output voltage. 7M

b) The network shown in figure contains both dependent current source and a dependent voltage source. For this circuit, determine the y and z parameters. 7M



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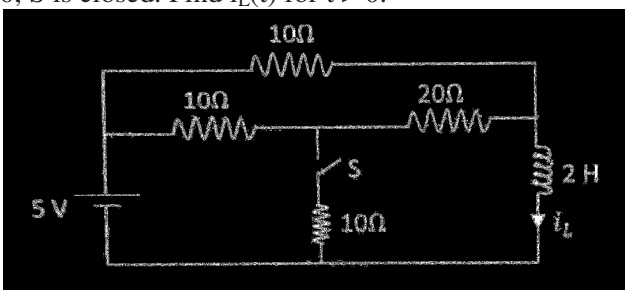
Code No: R1621044 **R16** SET - 2

7. a) Derive the homogeneous equation. 5M

   b) In the following network the switch s is open and steady state is reached. At t = 0, S is closed. Find $i_L(t)$ for $t > 0$. 9M



Code No: R1621044 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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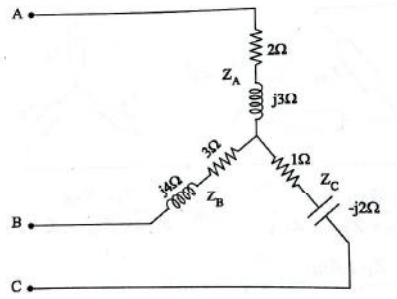
PART –A

1. a) Comment briefly on the choice between loop and node methods of analyzing a network. 3M
   b) Mention some important characteristics of an ideal capacitor. 2M
   c) Compare the properties of series and parallel resonance circuits. 3M
   d) State and explain the substitution theorem. 2M
   e) What do you understand by a reciprocal network? What is a symmetrical network? 2M
   f) State the advantages of Laplace transform application to the solution of electric circuits. 2M

PART -B

2. a) Explain duality in electrical engineering. State the steps followed in finding the dual of a network. 7M
   b) For a half wave rectified alternating current find i) Average value, ii) RMS value, iii) Form factor, and iv) Peak factor. Find the average and RMS values when I_m is 3A. 7M

3. a) Obtain the star connected equivalent circuit of the delta connected circuit. 7M
   b) Obtain the delta connected equivalent for the star connected circuit shown in figure 7M



4. a) Explain the impedance transformation in an ideal transformer to achieve maximum power transfer. 7M
   b) Two coils connected in series have an equivalent inductance of 0.4H when connected in aiding, and an equivalent inductance of 0.2H when the connection is opposing. Calculate the mutual inductance of the coils. 7M

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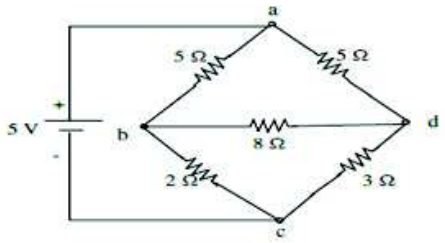
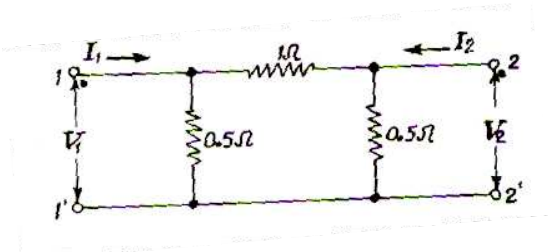
5. a) State Thevenin's theorem, and write the applications. 5M

   b) Find the current through 8 Ω resistance for the network shown using Thevenin's theorem. 9M

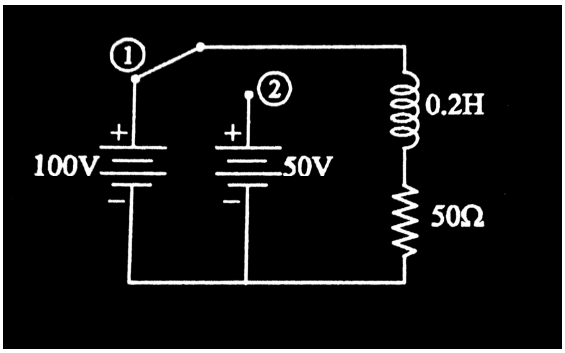


6. a) Two two-port networks are connected in cascade. Prove that the overall transmission parameter matrix is the product of individual transmission parameter matrices. 7M

   b) Construct ABCD parameters. 7M



7. In the series circuit shown in figure the switch is closed on position 1 at t = 0. At t = 1 ms, the switch is moved the position 2. Obtain the equations for the current in both intervals and draw the transient current waves. 14M



Code No: R1621044 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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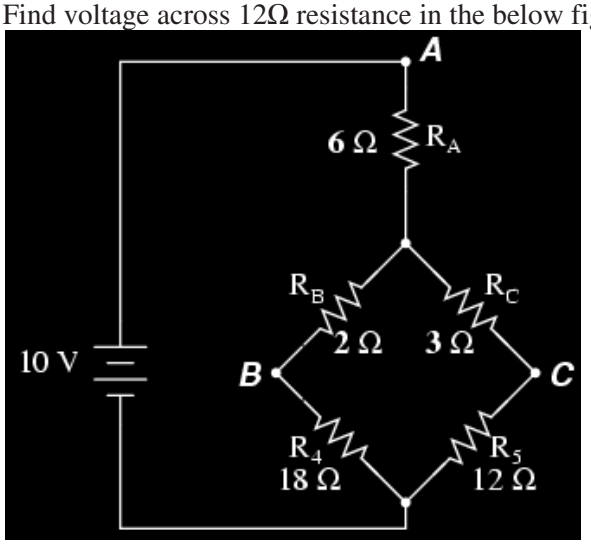
PART –A

1. a) What is the difference between circuits and networks? 2M
   b) Draw the phasor diagrams for resistor, ideal inductor and ideal capacitor. 2M
   c) At resonance, the current is maximum in a series circuit and minimum in a parallel circuit. Why? 2M
   d) Discuss about Norton's theorem and write its applications. 2M
   e) What are transmission parameters? Where are they most efficiently used. 3M
   f) Write the expression for transient current for series RL and RC circuits? 3M

PART -B

2. a) Show that for a network graph with P separate parts, n nodes and b branches, the number of chords C is given as C = b – n + P 7M
   b) Find voltage across 12Ω resistance in the below figure. 7M



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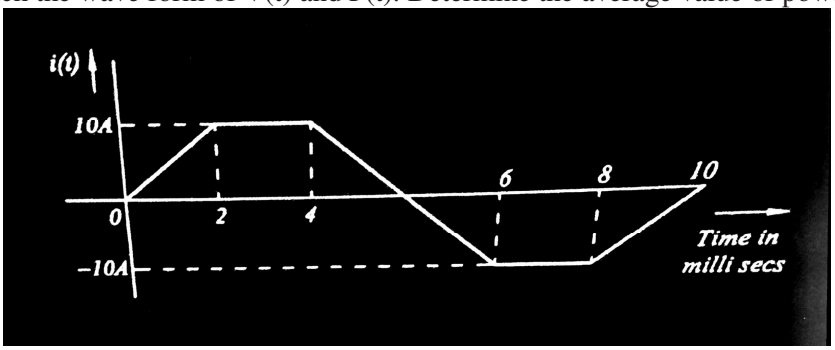
3. a) Explain about the steady state analysis of resistance in parallel combination with sinusoidal excitation. 7M

   b) A pure inductance of 3 mH carriers a current of the waveform shown in figure. Sketch the wave form of V(t) and P(t). Determine the average value of power. 7M

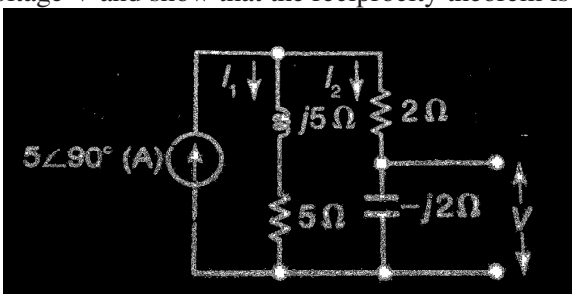


4. a) Derive the expression for bandwidth of series resonating circuit and its relation with Q. 5M

   b) An inductance of 0.5H, a resistance of 5Ω and a capacitance of 8μF are in series across a 220V ac supply. Calculate the frequency at which the current flowing through the circuit becomes maximum. Also, find bandwidth, half power frequencies and voltage across capacitance at resonance. 9M

5. a) State the reciprocity theorem as applied to a network and give a proof of the same for a general network. Mention two networks where this theorem is not applicable. 6M

   b) In the circuit shown in figure, find voltage V. Interchange the current source and resulting voltage V and show that the reciprocity theorem is verified. 8M

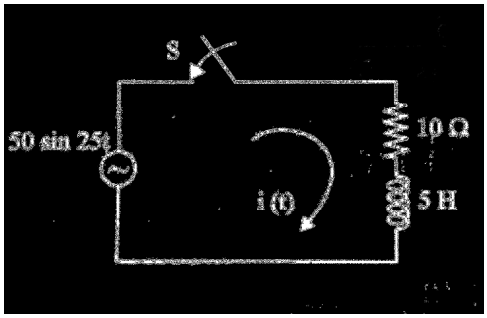


6. a) Define open circuit parameters. Explain how the open circuit parameters can be obtained for a given two port network. 7M

   b) A two port network has the following parameters: Z_{11}=6 Ω, Z_{12}=Z_{21}=3 Ω and Z_{22}=4 Ω. Calculate hybrid parameters 7M

7. a) Determine the DC response of RL and RC circuit and sketch the voltage transients. 7M

   b) The circuit shown in figure consists of series RL elements. The sine wave is applied to the circuit when the switch is closed at t = 0. Determine the current i(t). 7M



Code No: R1621045 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
RANDOM VARIABLES & STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are the conditions for a function to be a random variable? [2M]
   b) Define various types of transformation of Random variables. [2M]
   c) Show that var(X+Y) = var(x)+var(Y), if X&Y are statistical independent random variables. [3M]
   d) Differentiate between Random Processes and Random variables with an example [2M]
   e) If the Auto correlation function of wide sense stationary X(t) is $RXX(\tau)=4+2e^{-2\tau}$. Find the area enclosed by the power spectrum density curve of X(t). [3M]
   f) Define linear system and write the expression for output response. [2M]

PART -B

2. a) Write the properties of Gaussian density curve. Find the maximum value of Gaussian density function [8M]
   b) A random variable X has the distribution function [6M]

$$F_X(x)= \sum_{n=1}^{12} \frac{n^2}{650} u(x-n)$$

Find the probability of a) $P\{-\infty < X \leq 6.5\}$ b) $p\{X>4\}$ c) $p\{6< X \leq 9\}$

3. a) State and prove the chebychev‟s inequality theorem? [7M]
   b) If X is a discrete random variable with a Moment generating function of Mx(0), find the Moment generating function of [7M]
   i) Y=aX+b ii)Y=KX iii) $Y=\frac{X+a}{b}$

4. a) State and explain the properties of joint density function [7M]
   b) State and prove the central limit theorem. [7M]

5. a) Explain the following [7M]
   i) Stationarity ii) Ergodicity
   iii) Statistical independence with respect to random processes
   b) A random process is given as X(t) = At, where A is a uniformly distributed random variableon (0,2). Find whether X(t) is wide sense stationary or not. [7M]

6. a) The power spectral density of a stationary random process is given by [7M]

$$Sxx(w) = A \quad -k < w < k$$
$$= 0 \quad \text{otherwise}$$

   Find the auto correlation function.
   b) Derive the relationship between cross-power spectral density and cross correlation function. [7M]

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7. a) The input to an LTI system with impulse response h(t)= $\delta t + t^2 e^{-at}$. U(t) is a WSS process with mean of 3. Find the mean of the output of the system. [7M]
   b) Write Short notes on Mean and Mean Squared Value of System response of a linear system. [7M]

Code No: R1621045 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
RANDOM VARIABLES & STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Give the classical axiomatic definitions of Probability [2M]

b) Find the variance of X for uniform density function. [3M]

c) The joint probability density function of X&Y is [3M]

$$f_{X,Y}(x,y) = \begin{cases} c(2x+y); & 0 \le x \le 2, 0 \le y \le 3 \\ 0; & \text{else} \end{cases}$$

Then find the value of constant c.

d) Prove that the Auto correlation function has maximum value at the origin i.e $|RXX(\tau)| = RXX(0)$ [2M]

e) If the Power spectrum density of x(t) is $S_{XX}(\omega)$, find the PSD of $\frac{dx(t)}{dt}$ [2M]

f) Define Effective Noise temperature and Average Noise Figure [2M]

PART -B

2. a) Define and explain the properties of CDF function of a random variable. [8M]

b) Assume that X is a continuous random variable with the following pdf: [6M]

$$fx(x) = f(x) = \begin{cases} A(2x - x^2), & 0 < x < 2 \\ 0, & Otherwise \end{cases}$$

i)What is the Value of A? ii) Find P[X >1] iii) Evaluate CDF function.

3. a) Find the Moment generating function of exponential distribution? [6M]

b) A continuous distribution is given by [8M]

$$F_x(x) = \frac{1}{x\sqrt{2}\pi} e^{-(logx)2}/2 \qquad x>0$$

$$= 0 \qquad x<0$$

Find the mean, standard deviation and co-efficient of skewness of this distribution

4. a) State and prove any three properties of joint characteristic function. [6M]

b) Random variables X and Y have a Joint Probability density function given by [8M]

$$f_{XY}(x, y) = \frac{1}{\pi} \text{ for } x^2+y^2 \le 1$$

$$= 0 \text{ otherwise}$$

Determine whether random variables x and y are
i) Statistically independent ii) Uncorrelated.

5. a) Explain about the following random processes [6M]
i) Mean ergodic process ii) Correlation ergodic process iii) Gaussian random process

b) Prove that the random process $X(t) = A\,cos(\text{w}\,ct + \text{q})$ is wide sense stationary if it is assumed that wc is a constant and q is uniformly distributed variable in the interval (0,2π). [8M]

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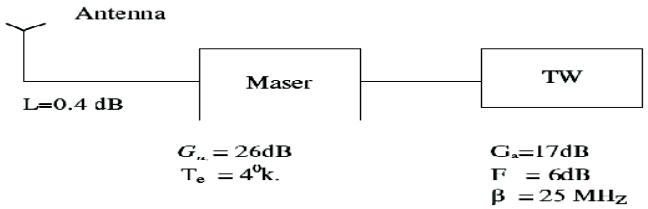
6. a) Calculate the power Spectral Density of a stationary random process for which the Autocorrelation is $R_{xx}(\tau) = \sigma^2 e^{-\propto|\tau|}$ [7M]

   b) State and prove the relationship between Power Density Spectrum and Autocorrelation Function [7M]

7. a) For the following receiver, calculate the effective noise temperature. [6M]



   b) Derive the relation between input PSD and output PSD of an LTI system [8M]

Code No: R1621045 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
RANDOM VARIABLES & STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) How you can differentiate mutually exclusive events and independent event? [3M]
   b) Define skew and skewness [2M]
   c) Define Marginal Distribution Functions [2M]
   d) List out the properties of Autocorrelation Function [3M]
   e) Define Wide Sense Stationary Process and write its conditions [2M]
   f) Write the expression for average noise figure of cascaded networks. [2M]

PART -B

2. a) In a binary communication system, the probability of bit error is 0.01. If a block of 8 bits are transmitted, find the probability that [8M]
   (a) Exactly 2 bit errors will occur
   (b) At least 2 bit errors will occur
   (c) More than 2 bit errors will occur
   (d) All the bits will be erroneous
   b) For real constants b>0, c>0 and any a , find condition on constant a and relationship between a and c (for given b) such that the function is a valid probability density [6M]

$$fx(x) = \begin{cases} a(1-(x/b)) & 0 \le x \le c \\ 0 & else\ where \end{cases}$$

3. a) Find the Mean and Variance of the Poisson RV [7M]
   b) Explain Nonmonotonic Transformations of Continuous Random Variable [7M]

4. a) If X and Y are independent, show that E[XY]=E[X] E[Y]. [7M]
   b) The joint density function of two random variables X and Y is [7M]

$$f_{XY}(x,y) = \begin{cases} \frac{(x+y)^2}{40} ; -1 < x < 1\ and\ -3 < y < 3 \\ 0;\ otherwise \end{cases}$$

   Find the variances of X and Y

5. a) Define a random process. Write the classification of random process by the form of its sample functions and explain [7M]
   b) Autocorrelation function of an ergodic stationary random process with no periodic component is given as $100+ 4/(1+6\tau^2)$. Find the mean and variance of the process. [7M]

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6. a) Prove that Power Density Spectrum and Autocorrelation Function forms a Fourier transform pair [7M]

   b) A random process Y(t) has the power spectral density [7M]

$$S_{YY}(\omega)=\frac{9}{\omega^2+64}$$

   Find i) The average power of the process
   ii) The Auto correlation function

7. a) Derive the equivalent Effective noise temperature of a cascaded network. [7M]

   b) Explain about Band limited random process and its properties. [7M]

Code No: R1621045 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
RANDOM VARIABLES & STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) State Bayes' Theorem [2M]
   b) What are the properties of Gaussian Random variable? [3M]
   c) State Central limit theorem [2M]
   d) Define a random process. Write the classification of random process by the form of its sample functions [3M]
   e) Explain about Statistical independence with respect to random processes [2M]
   f) What is the Mean-squared value of a linear system? [2M]

PART -B

2. a) Two boxes are selected randomly. The first box contains 2 white balls and 3 black balls. The second box contains 3 white and 4 black balls. What is the probability of drawing a white ball? [7M]
   b) Write the properties of Poisson distribution and density curve. Find the maximum value of Poisson density function [7M]

3. a) Explain about Monotonic Transformations for a Continuous Random Variable [7M]
   b) Find the Moment generating function of exponential distribution? [7M]

4. a) Explain the conditions to be satisfied by an ergodic random process [7M]
   b) Two statistically independent random variables X and Y have respective densities $f_X(x) = 5\ e^{-5x}\ u(x)$, $f_Y(y) = 2\ e^{-2y}\ u(y)$. Find the density of the sum W=X+Y. [7M]

5. a) Write all the properties of joint density function. [6M]
   b) A joint probability density function is [8M]

$$f_{xy}(x,y) = \begin{cases} \frac{1}{24} & 0 < x < 6, 0 < y < 4 \\ 0 & \text{else where} \end{cases}$$

Find the expected value of the function $g(X,Y)= (XY)^2$

6. a) Determine the cross-correlation function corresponding to the cross power spectrum $SXY(\omega)=8/(\alpha+j\beta)^3$, where α is a constant [7M]
   b) Derive the expression for power spectral density of a random process [7M]
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7. a) Prove that [7M]

$$F = F_1 + \frac{F_2 - 1}{ga_1} + \frac{F_z - z}{g_{a_1} g_{a_2}} + \ldots\ldots\ldots\ldots$$

for cascade of two-port networks

b) Write notes on modelling of thermal noise source [7M]

Code No: R1621043 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
SIGNALS & SYSTEMS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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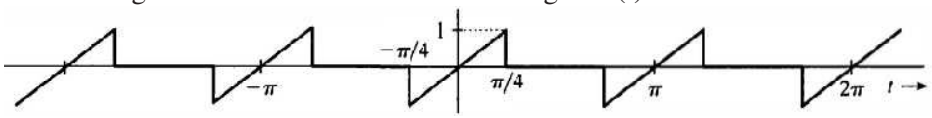
PART –A

1. a) Define an impulse function and plot δ(t+2) – δ(t-3). (2M)
   b) Define Hilbert transform of a signal x(t). (2M)
   c) Write short notes on band pass sampling. (3M)
   d) Write the conditions for distortion less transmission. (3M)
   e) Write time scaling property of Laplace transform. (2M)
   f) Find the Z transform of δ(n-2) (2M)

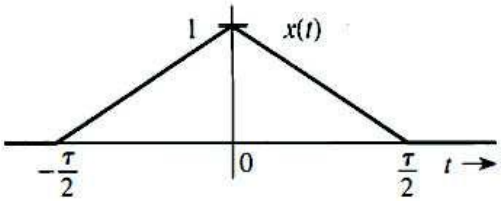
PART –B

2. a) Find the even and odd components of the signal x(t) = $\cos(\omega_o t+\pi/3)$. (7M)
   b) A function f(t) = $\begin{cases} 1 & 0 < t \leq 0.5 \\ -1 & 0.5 < t \leq 1 \end{cases}$ using f(t) = $c_1$sint +c_2 sin3t. Compute the coefficients c_1, c_2. (5M)
   c) Discuss orthogonality in complex functions. (2M)

3. a) Find the trigonometric Fourier series for the signal x(t) shown below. (7M)



   b) Compute the Fourier transform of the signal x(t) applying differentiation in time property of Fourier transform. (7M)



4. State and prove sampling theorem for band limited signals. (14M)

5. a) A system represented by y(t) = 2x(t-2) + 2x(t+2). (7M)
   i) Is the system time invariant? Justify your answer.
   ii) Is the system causal? Justify your answer.
   b) Explain detection of signal in the presence of noise using correlation. (7M)

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6. a) Find the inverse Laplace transform of (7M)

$$G(s) = \frac{4s}{(s+3)(s+8)}, \quad \sigma > -3$$

b) Find the Laplace transform of  (7M)

7. a) Using the z-domain differentiation property find the Z transform of (7M)

$$x[n] = n(5/8)^n \, u[n]$$

b) Find the inverse of (7M)

$$X(z) - \frac{z-1}{3z^2 - 2z + 2}, \quad |z| < 0.8165$$

Code No: R1621043 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
SIGNALS & SYSTEMS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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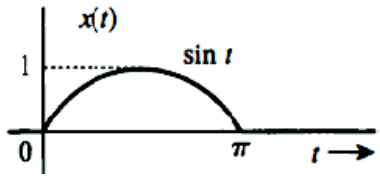
PART –A

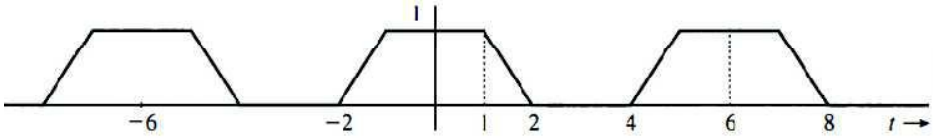
1. a) Define a unit step function and plot u(t-2) (2M)
   b) Write Direchlet's conditions. (3M)
   c) Discuss the effects of under sampling on recovery of signal. (2M)
   d) Explain the characteristics of ideal LPF. (2M)
   e) Write the constraints on ROC for different signals. (3M)
   f) Find the Z transform of δ(n+2) (2M)

PART –B

2. a) Find the even and odd components of the signal x(t) =sin2t + sin2t.cos2t + cos2t (7M)
   b) Discuss orthogonality in signals using relevant expressions. Explain the term complete set. Give examples of complete sets. (4M)
   c) Compute the energy of the signal x(t) shown below (3M)



3. a) Find the complex exponential Fourier series for the signal x(t) shown below (10M)



   b) State and prove differentiation in time domain property of Fourier transform. (4M)

4. a) Explain natural sampling with relevant waveforms and expressions. (7M)
   b) Explain reconstruction of signals from samples using relevant expressions. (7M)

5. a) A system is given by $y(t) = \frac{d}{dt}x(t-1)$, (7M)
   i) Check whether the system is BIBO stable. (Let x(t) be a square wave.)
   ii) Is the system causal? Justify your answer.
   b) Write the properties of autocorrelation function and prove two of them. (7M)

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6. a) Find the inverse Laplace transform of (7M)

$$G(s) = \frac{4}{(s+3)(s+8)}, \quad \sigma > -3$$

b) Find the Laplace transform of $e^{-\alpha t}\sin(\omega_0 t)\,u(t)$ (7M)

7. a) Using convolution property find the Z transform of (7M)

$$x[n] = (0.9)^n\,u[n] * (0.6)^n\,u[n]$$

b) Find the inverse Z transform of (7M)

$$X(z) = \frac{z^2}{(z-1/2)(z-3/4)}, \quad |z| < 1/2$$

Code No: R1621043 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
SIGNALS & SYSTEMS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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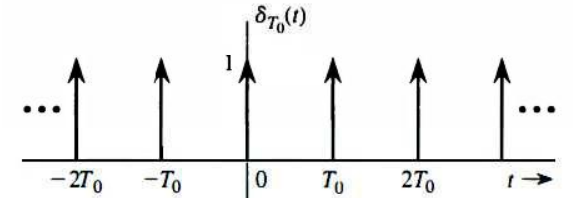
PART –A

1. a) Explain time reversal and draw time reversed unit step function. (2M)
   b) Express complex exponential Fourier coefficients in terms of trigonometric Fourier coefficients. (2M)
   c) State sampling theorem for band pass signals. (3M)
   d) Explain the characteristics of ideal HPF. (2M)
   e) Define region of convergence of Laplace transform. (2M)
   f) Compare Laplace, Fourier and z- transforms. (3M)

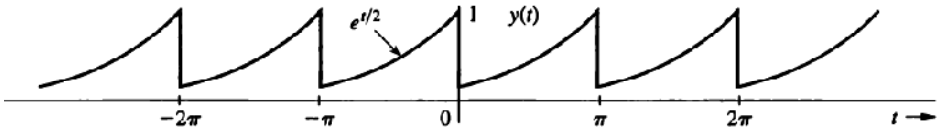
PART -B

2. a) Derive the expression for mean square error when a function is approximated by a set of orthogonal signals. (10M)
   b) Find the even and odd components of the signal x(t) = tu(t) (4M)

3. a) Compute the Fourier transform of the signal represented below (7M)



   b) Find the trigonometric Fourier series for the signal y(t) shown below (7M)



4. a) Explain flat top sampling with relevant expressions and waveforms. (7M)
   b) What is Nyquist rate of sampling? A signal x(t) = 10sinc(500t), find its Nyquist rate. Where sinc(x) = $\frac{\sin(\pi x)}{\pi x}$ (7M)

5. a) Derive the relationship between autocorrelation function and energy spectral density of an energy signal. (7M)
   b) Stating the properties and relevant mathematical expressions check whether the following systems are LTI or not? (7M)
   i) y(t) = 2x(t) + 3x(3t)
   ii) z(t) = $(dw(t)/dt)^2$

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6. a) Find the inverse Laplace transform of (7M)

$$G(s) = \frac{s}{s^2 + 2s + 2}, \ \sigma > -1$$

b) Find the Laplace transform of $-te^{-\alpha t}\, u(-t)$ (7M)

7. a) Find the inverse Z transform of $X(z) = \ln(1+az^{-1})$; ROC $|z|>a$ (7M)

b) Find the Z transform and ROC of (7M)

$$x[n] = (0.8)^n u[n] + (0.6)^n u[-(n+1)]$$

Code No: R1621043 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
SIGNALS & SYSTEMS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define an even signal and check whether signum function is even or not?. (2M)
   b) Write duality property of Fourier transform. (2M)
   c) A signal x(t) = 5sin(250t) + 6 sin(200πt), find the sampling rate to avoid aliasing. (3M)
   d) Explain the characteristics of ideal BPF. (2M)
   e) Write the relationship between Laplace transform and Fourier transform of a signal. (2M)
   f) Find the Z transform of nδ(n). (3M)

PART -B

2. a) Find the even and odd components of the signal $x(t) = (1+t^2+t^3)\cos^2 10t$. (7M)
   b) Present the analogy between vectors and signals. (7M)

3. a) Find the Fourier transform of the signum function. (5M)
   b) Write the properties of Fourier series. (5M)
   c) Find the Fourier transform of $x(t) = e^{-a|t|}$ (4M)

4. a) Compare impulse sampling, natural sampling and flat top sampling with relevant diagrams. (7M)
   b) What is aliasing effect? Explain using relevant diagrams. Suggest the remedies to avoid aliasing. (7M)

5. a) Define cross correlation function, write its properties and prove any two of them. (7M)
   b) Derive the relationship between bandwidth and rise time. (7M)

6. a) Find the inverse Laplace transform of (7M)
   $G(s) = \frac{e^{-2s}}{s^2+2s+2}, \ \sigma > -1$
   b) Find the Laplace transform of $-e^{-at}\sin(\omega_0 t)\,u(-t)$ (7M)

7. a) Find the inverse Z transform of $X[z] = \frac{-z(z+0.4)}{(z-0.8)(z-2)}$ ROC $0.8 < |z| < 2$ (7M)
   b) Find the Z transform and ROC of $x[n] = (1.2)^n u[n] + (3)^n u[-n-1]$ (7M)

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Code No: R1621042 **R16** SET - 1

II B. Tech I Semester Regular Examinations, October/November - 2017
SWITCHING THEORY AND LOGIC DESIGN
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Convert the binary number 11011101 to gray code. (2M)
   b) Find the dual of the function: $A'B(C+D)+B'C'D+AB'C$. (2M)
   c) What is a de-multiplexer? Write its applications. (3M)
   d) Write the merits and demerits of PROM. (2M)
   e) What are the differences between Johnson and ripple counter. (2M)
   f) What is a state diagram? Describe with an example. (3M)

PART –B

2. a) Express the following numbers in decimal: (7M)
      (i) $(26.24)_8$
      (ii) $(16.5)_{16}$
   b) Generate the Hamming code word for the message 1110010111. (7M)

3. a) Implement the following Boolean function with only two input NOR gates: (7M)
      $F=(AB'+CD')E+BC(A+B)$
   b) Simplify the following Boolean function with the don't conditions *d* using K-map method: (7M)
      F(A, B, C, D)=Σ(4, 5, 7, 12, 13, 14); d(A, B, C, D)=Σ(1, 9, 11, 15)

4. a) Design a 4-bit binary comparator with basic gates. (7M)
   b) Implement the following Boolean functions with a decoder. (7M)
      (i) F1=Σ(3, 6, 7, 10, 13, 15)
      (ii) F2=Σ(1, 9, 12, 15)
      (iii) F3=Σ(2, 6, 8, 10, 14, 15)

5. a) Implement the following Boolean functions using PLA. (7M)
      (i) F1= Σ(0, 1, 2, 4)
      (ii) F2= Σ(0, 5, 6, 7)
   b) Design a full adder circuit with a PAL. (7M)

6. a) Draw the circuit of a JK master slave flip-flop with active high clear and active low preset and explain its operation. (7M)
   b) Design a Mod-10 counter using RS flip-flops (7M)
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7. a) What are the capabilities and limitations of finite state machines? Explain. (7M)

   b) Reduce the number of states in the following state table and tabulate the reduced state table. (7M)

PS	NS, O/P	
	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, 1
h	g, 1	a, 0

Code No: R1621042 **R16** SET - 2

II B. Tech I Semester Regular Examinations, October/November - 2017
SWITCHING THEORY AND LOGIC DESIGN
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Find the 10's complement of 2476.	(2M)
	b)	Define the essential prime implicants in a K-map method.	(3M)
	c)	What is a multiplexer? Write its applications.	(2M)
	d)	Compare PROM, PLA and PAL.	(3M)
	e)	Write the differences between the synchronous and asynchronous sequential circuits.	(2M)
	f)	Write the features of Moore machine.	(2M)

PART –B

2.	a)	Convert the following number to Hexadecimal: (i) $(735.5)_8$ (ii) $(1011011)_2$	(7M)
	b)	Perform the following subtraction in binary using 1's and 2's complement method: $(677)_{10} - (899)_{10}$	(7M)
3.	a)	Find the complement and dual of the given function: xy+x(wz+wz′)	(7M)
	b)	Simplify the following Boolean function using tabular method: F(A, B, C, D)=Σ(2, 4, 6, 10, 12); d(A, B, C, D)=Σ(0, 8, 9, 13)	(7M)
4.	a)	Realize 4:16 decoder using 2:4 decoders.	(7M)
	b)	Implement the following Boolean function with 4X1 multiplexer and external gates. Connect inputs B and C to the selection lines. F(A, B, C, D)=Σ(1, 2, 4, 7, 8, 9, 10, 11, 13, 15)	(7M)
5.	a)	Draw the internal structure of 8X1 PROM and explain its operation.	(7M)
	b)	Give the realization of the following Boolean functions using PLA with 5 inputs, 4 outputs and 8 and gates. F1= Σ(0, 1, 2, 3, 11, 11, 13, 14, 15, 16, 17, 18, 19, 27, 28, 29, 30, 31) F2= Σ (4, 5, 6, 7, 8, 9, 10, 11, 20, 21, 22, 23, 30)	(7M)
6.	a)	Convert the JK flip into T flip-flop.	(5M)
	b)	Design a Mod-12 counter using D flip-flops.	(9M)
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7. a) Design a synchronous sequential circuit which goes through the following states: 1, 3, 5, 3, 6, 1, 3, 5. (7M)
   b) Convert the following Mealy machine into a corresponding Moore machine. (7M)

PS	NS, Z	
	X=0	X=1
A	C, 0	B, 0
B	A, 1	D, 0
C	B, 1	A, 1
D	D, 1	C, 0

Code No: R1621042 **R16** SET - 3

II B. Tech I Semester Regular Examinations, October/November - 2017
SWITCHING THEORY AND LOGIC DESIGN
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are the universal gates? Why they are called as universal gates? (3M)
   b) Find the complement of the function: $A'B(C+D)+B'C'D+AB'C$. (3M)
   c) Write the truth table of a full subtractor. (2M)
   d) Write the merits and demerits of PLA. (2M)
   e) Write the differences between the Combinational and sequential circuits. (2M)
   f) What is a state table? Describe with an example. (2M)

PART –B

2. a) Convert the following numbers to Binary: (7M)
      (i) $(27.315)_{10}$
      (ii) $(68BE)_{16}$
   b) Reduce the following Boolean function to four literals and draw the logic diagram: $(A'+C)(A'+C')(A+B+C'D)$ (7M)

3. a) Implement the following Boolean function with only two input NAND gates: $F=(AB'+D')E+C(A'+B')$ (7M)
   b) Simplify the following Boolean function with the don't conditions *d* using K-map method: (7M)
      F(A, B, C, D)=Σ(1,3,8,10,15); d(A, B, C, D)=Σ(0, 2, 9)

4. a) Design an excess-3 adder circuit and explain its operation. (7M)
   b) Implement the following Boolean function with 8X1 multiplexer and external gates: (7M)
      F(A, B, C, D)=Σ(1, 3, 4, 11, 12, 13, 14, 15)

5. a) Design a 3-bit binary to Excess-3 code converter using a PROM. (7M)
   b) Implement the following Boolean functions using PLA. (7M)
      (i)F1= Σ(0, 1, 2, 4)
      (ii)F2= Σ(0, 5, 6, 7)

6. a) What is the drawback of JK flip-flop? How is it eliminated in Master Slave flip-flop? Explain. (7M)
   b) Design a decade counter using T flip-flops. (7M)
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7. a) Obtain the state table and state diagram for a sequence detector to recognize the occurrence of sequence bits 110 & 001. (7M)
   b) Find the equivalence partition and reduced table for the given state machine. (7M)

PS	**NS, O/P**	
	X= 0	**X=1**
A	B, 0	E, 0
B	E, 0	D, 0
C	D, 1	A, 0
D	B, 1	E, 0
E	C, 0	D, 0

Code No: R1621042 **R16** SET - 4

II B. Tech I Semester Regular Examinations, October/November - 2017
SWITCHING THEORY AND LOGIC DESIGN
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Find the 2'c complement of the decimal number 97.	(2M)
	b)	What are the prime implicants in a K-map method?	(2M)
	c)	What is a decoder? Write its applications.	(2M)
	d)	Write the merits and demerits of PAL.	(2M)
	e)	What are registers? Write their applications.	(3M)
	f)	Write the features of Mealy machine.	(3M)

PART –B

2.	a)	Convert the following numbers to Octal: (i) $(1010.1010)_2$ (ii) $(FAFA)_{16}$	(7M)
	b)	Reduce the following Boolean function to three literals and draw the logic diagram: $(x'y'+z)'+z+xy+wz$	(7M)
3.	a)	Find the dual and complement of the following function: $A'BD'+B'(C'+D')+A'C'$	(7M)
	b)	Simplify the following Boolean function using tabular method: F(A, B, C, D)=Σ(0, 6, 8, 13, 14); d(A, B, C, D)=Σ(2, 4,10)	(7M)
4.	a)	Design a BCD adder circuit and explain its operation.	(7M)
	b)	Implement the following Boolean function with 4X1 multiplexer and external gates: F(A, B, C, D)=Σ(1, 3, 4, 11, 12, 13, 14, 15)	(7M)
5.	a)	Realize the following Boolean functions using a PROM (i) F1= Σ(0, 4, 7) (ii) F2= Σ(1, 3, 6) (iii) F3= Σ(1, 3, 4, 6)	(7M)
	b)	Design a BCD to Excess-3 code converter using a PAL.	(7M)
6.	a)	Convert JK flip-flop into D flip-flop.	(7M)
	b)	Design a modulo-10 ripple counter using RS flip-flops.	(7M)
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7. a) Design a sequence detector that detects the overlapping sequence of 011010 using T flip-flops. (5M)
   b) Draw the diagram of Mealy type state machine for serial adder and explain its operation. (9M)