DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008; ISO 14001:2004 & OHSAS 18001:2007 Certified Institution

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, e-mail:info@diet.edu.in

STLD Question Bank

Academic Year : 2018-2019
Name of the Faculty : B.N. Srinivasarao
Designation : Sr. Asst. Professor & HoD
Department : ECE
Year/Semester : II Year– I Semester
Subject : Switching theory and logic design

UNIT – I: REVIEW OF NUMBER SYSTEMS & CODES:

1. a) Deduce X from the following? **5M**
   (i) $(BA0.C)_{16} = (X)_8$ (ii) $(10101100)_2 = (X)_{16}$
   (iii) $(FFE.C)_{16}=(X)_2$ (iv) $(7562)_8 = (X)_2$ (v) $(16.5)_{16} = (X)_{10}$
   b) i) Convert $(0011001.0101)_2$ to decimal and octal **2M+3M**
   ii) Convert the following to Decimal and then to octal
   (i) $(125F)_{16}$ (ii) $(10111111)_2$ (iii) $(392)_{10}$

2. a) Generate the Hamming code word for the message 1110010111 **5M**
   b) The message below has been coded in Hamming code. Decode the message for single error detection code (message = 4 bits).1001001 0111001 1110110 0011011 **5M**

3. a) Subtract the following decimal numbers by the 9's and 10's complement methods. **5M**
   i) 274 - 86 ii) 93 - 615 iii) 574.6 - 297.7 iv) 376.3 - 765.6
   b) Why is hexadecimal code widely used in digital systems? List out the digits used to represent the hexadecimal codes? **5M**

4. a) Perform the subtraction using 1's complement and 2's complement methods. **5M**
   (i) 11010 – 10000 (ii) 11010 – 1101 (iii) 100 - 110000
   b) How negative numbers are represented? Represent signed numbers from +7 to -8 using different ways of representation. **5M**

5. a) Convert the given expressions in standard SOP and POS forms respectively **5M**
   f (A,B,C)=AC+BA+BC
   y=A. (A+B+C)
   b) Realize an 2 input EX-OR gate using minimum number of 2 input NAND gates. **5M**

UNIT – II: MINIMIZATION TECHNIQUES

1. a) Reduce the following Boolean function to three literals and draw the logic diagram: $(x'y'+z)'+z+xy+wz$ **5M**
   b) a) Simplify the following using K- map and implement the same using NAND gates. **3M**
   Y (A, B, C) = Σ (0, 2, 4, 5, 6, 7)

c) Find the dual and complement of the following function: A*'BD'+B'(C'+D')+A'C'* **2M**

2 a) Using the Quine–McCluskey tabular method, find the minimum sum of products For **5M**

$Y = \Sigma (1, 2, 5, 8, 9, 10, 12, 13, 16, 18, 24, 25, 26, 28, 29, 31)$

(b) State and prove consensus theorem? Solve the given expression using consensus theorem **5M**

3. a) State De Morgans's theorems. **5M**

b) Prove that OR-AND network is equivalent to NOR-NOR network. **5M**

4. a) Define prime implicant and essential prime implicants of a Boolean expression **5M**

b) Minimize the following expression using K-map and realize using NOR gates. **5M**

$f = \pi M (1, 2, 3, 8, 9, 10, 11, 15)$

5. a) Simplify the logic functions from binary to seven segment display code converter **5M**

b) Simplify the following Boolean function using tabular method:

$F(A, B, C, D) = \_(0, 6, 8, 13, 14); d(A, B, C, D) = \_(2, 4,10)$ **5M**

UNIT – III: COMBINATIONAL LOGIC CIRCUITS DESIGN

1. a) Define encoder? List out the applications of it? **5M**

   b) Realize the function $f(A,B,C,D) = \Sigma (1,2,5,8,10,14)+d (6,7,15)$ using i) 8:1 MUX ii) 4:1 MUX **5M**

2. a) Design and draw the logic circuit diagram for full adder/subtractor. **5M**

   b) Define decoder. Construct 3x8 decoder using logic gates and truth table. **5M**

3 a) Draw the logic diagram of a 2 to 4 line decoder using NOR gates including an Enable input. **5M**

b) Construct the 4 bit parallel adder with look ahead carry generation. **5M**

4. a) Design and implement a 4 bit binary comparator using logic gates. **5M**

   b) Realize 4:16 decoder using 2:4 decoders. **5M**

5. a) Design a 1:8 demultiplexer using two 1:4 demultiplexer? **5M**

   b) Draw the logic diagram 4-bit binary adder-subtractor circuit and explain its operation. **5M**

UNIT – IV: INTRODUCTION OF PLD's

1. a) What is a PLD? Compare the three combinational PLDs? **5M**

b) Design an Excess-3 to BCD code converter using a PLA? **5M**

2. a) Design a combinational circuit using PAL for the following function

$y(A,B,C,D) = \sum (0,2,3,4,5,6,7,8,10,11,15)$ **5M**

b). Design a full adder circuit with a PAL. **5M**

3. a) Implement $f (A,B,C,D) = \sum (0,1,3,5,6,8,9,11,12,13)$ using PAL and explain its Procedure **5M**

b) Write the merits and demerits of PROM **5M**

4. a) Implement f (A,B,C,D) = ∑(0,1,4,5,6,7,9,10,12,13,15) using PLA and explain its Procedure **5M**

b) Implement the following Boolean functions using PLA. **5M**

(i) F1= ∑(0, 1, 2, 4)

(ii) F2= ∑(0, 5, 6, 7)

5 a) How PROM, EPROM and EEPROM technologies differ from each other. Discuss. **5M**

b) Implement the following multiple output functions using PROM **5M**

F1= Σm (0, 1, 4, 7, 12, 14, 15) F3= Σm (2, 3, 7, 8, 10)

F2= Σm (1, 3, 6, 9, 12) F4= Σm (1, 3, 5)

UNIT – V: SEQUENTIAL CIRCUITS I

1. a) Convert a D flip flop into SR flip flop and JK flip flop? **5M**

b) Explain the operation of 4-bit ring counter with circuit diagram, state transition diagram and state table. Draw the corresponding timing diagrams? **5M**

2. a) Draw the logic diagram of a JK flip- flop and using excitation table explain its operation. **5M**

b) What do you mean by triggering? Explain the various triggering modes with examples. **5M**

3.a) Design a mod-10 Ripple counter using T flip flops and explain its operation. **5M**

b) What are the different types of registers? Explain the Serial Input Parallel Output shift Register **5M**

4. a) What is race around condition and how to avoid it along with circuit diagram **5M**

b) Design a JK flip flop using AND gates and NOR gates. Explain the operation of the JK flip flop with the help of characteristic table and characteristic equation. **5M**

5. a) Give the transition table for SR, JK, D and T flip flops. Convert an SR flip flop into D flip flop. **5M**

b) Define the following terms of flip flop. **5M**

i) Hold time ii) Setup time iii) Propagation delay time

UNIT – VI: SEQUENTIAL CIRCUITS II

1. a) What are the capabilities and limitations of finite state machines? Explain. **5M**

b) What are the differences between Moore and Mealy machines? **5M**

2. a) Convert the following Mealy machine into a corresponding Moore machine? **5M**

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

b) Design a sequence detector that detects the overlapping sequence of 011010

using T flip-flops.

5M

3. a) Design a synchronous sequential circuit which goes through the following states: 1, 3, 5, 3, 6, 1, 3, 5.. **5M**

   b) Reduce the number of states in the state table, and tabulate the reduced state table and give proper assignment **5M**

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

4. a) Draw the diagram of Mealy type FSM for serial adder. **5M**

   b) Obtain the state table and state diagram for a sequence detector to recognize the occurrence of sequence bits 110 & 001. **5M**

5. a) Explain about sequential circuits, state table and state diagram. **5M**

   b) Explain the procedure of Meelay to Moore conversion. **5M**

DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)
National Highway -5, Anakapalle, Visakhapatnam – 531002, A.P.
Phone: 08924-221111 / 221122, e-mail:hodece@diet.edu.in

Department of Electronics and Communication Engineering

IIB.Tech (ECE) Sem-IQUESTION BANK

Subject:**Electronic Devices & Circuits (R16)**

Faculty: **P.Poorna Priya, Assistant Professor, ECE Department**

Unit-I

1. a) Define Hall Effect? Derive the expression for Hall Voltage. (6M)
   b) The Resistivity of doped siliconmaterial is $9x10^{-3}\Omega$-m. The Hall coefficient is $3.6x10^{-4}$ m^3/C. Assuming single carrier conduction, find the mobility and density of charge carriers. (4M)
2. a) Derive the expression for Fermi Level in Intrinsic semiconductors. (6M)
   b) In a P-type semiconductor, the Fermi level is 0.3eV above the valence band at a room temperature of 300^0K. Determine the new position of the Fermi-level for temperatures of a)350^0K and b) 400^0K.(4M)
3. a) In a N-type semiconductor, the Fermi level lies 0.2eV below the conduction band. Determine the new position of the Fermi-level if the concentration of donor atoms is increased by a factor ofa)4 and b) 8. Assume kT=0.025eV. (4M)
   b)Derive the continuity equation for semiconductors. (6M)
4. a) Explain drift and diffusion currents in semiconductors. (5M)
   b) A sample of silicon at a given Temperature T in intrinsic condition has a resistivity of $25x10^4\Omega$-cm. The sample is now doped to the extent of $4x10^{10}$ donor atoms/cm^3 and 10^{10} acceptor atoms/cm^3. Find the total conduction current densityif an electric field of 4V/cmis applied across the sample. Given that μ_n=1250cm^2/V-s and μ_p=475cm^2/V-s at the given temperature. (5M)
5. a) Explain the concept of Charge densities in intrinsic and extrinsic semiconductors. (6M)
   b) Find the concentration of holes and electrons in N-type silicon at 300^0K, if the conductivity is 300S/cm. Also find these Values for P-type silicon. Given $n_i=1.5x10^{-10}/cm^3$, μ_n=1300cm^2/V-s and μ_p=500cm^2/V-s at the given temperature. (4M)

Unit-II

1. a) What is Tunneling phenomenon? (2M)
   b) Sketch and explain the Volt-Ampere characteristics of a tunnel diode indicating the negative resistance region. (8M)
2. a) Derive the diode current equation. (6M)
   b) The current flowing in a germanium PN junction diode at room temperature is $9x10^{-7}$A, when the large reverse voltage is applied. Calculate the current flowing when 0.1V forward bias is applied. (4M)

3. a) Prove that the transition capacitance of a PN junction diode is equal to that of parallel plate capacitance. (6M)
   b) Asilicon diode has reverse saturation current of 2.5μA at 3000K. Find the forward voltage for a forward current of 10mA. (4M)
4. a) Explain how a zener diode acts as a Voltage Regulator. (5M)
   b) Derive the expression for Contact Potential difference of a PN junction diode with the help of Energy band diagrams. (5M)
5. Write short notes on the following:
   a) UJT
   b) SCR
   c) Varactor diode

Unit-III

1. a) What is meant by Ripple Factor? Give its expression for Half and Full wave Rectifier. (4M)
   b) Derive the expression of ripple factor for a half wave Rectifier with shunt capacitance filter using appropriate analysis. (6M)
2. a) What is meant by PIV? Give its expression for Half and Full wave Rectifier. (4M)
   b)With a neat diagram, explain the operation of a Bridge Rectifier. (6M)
3. a)Define TUF of rectifiers? (3M)
   b) With a neat diagram, explain the operation of a Full Wave Rectifier and derive the r expression for Ripple Factor. (7M)
4. a) Derive the expression of ripple factor for a half wave Rectifier with shunt inductor filter using appropriate analysis. (7M)
   b) What is bleeder resistance? What are its effects? (3M)
5. a) Give the comparison of Half-wave, Full-wave and Bridge Rectifiers in terms of all the parameters. (5M)
   b) A Full wave single phase rectifier employs a π-section filter consisting of two 4μF capacitances and a 20H choke with internal resistance of 200Ω. The Transformer voltage to the center tap is $300V_{rms}$. The load current is 500mA. Calculate the dc output voltage and the ripple voltage. (5M)

Unit-IV

1. a) Derive the relationship between α and β of BJT?(4M)
   b) Explain the current components in a transistor? (6M)
2. a) What is Early effect? (2M)
   b) Draw the circuit diagram for CE characteristics of a Transistorand explain the input and outpot Characteristics? (8M)
3. a)What are advantages of JFET over BJT? (7M)
   b) Compare CE,CB and CC configurations ? (3M).
4. a) Draw and explain the Eber – Moll model of a transistor? (5M)
   b) Explain the working of JFET with diagram and draw its drain and transfer characteristics?(5M)
5. a) Explain the working of Enhancement mode MOSFET with a neat diagram and explain its characteristics?(6M)
   b) An n-channel JFET has I_{DSS}=10mA and V_P=-2V. Determine the drain-to-source resistance r_{DS} for i) V_{GS}=0V, ii) V_{GS}=-0.5V (4M)

Unit-V

1. a) What is the need of biasing and stabilization? (5M)

b) Define operating point? Explain load line analysis?(5M)

2. a) A CE amplifier which uses the self bias method, Calculate the operating point and stability factor when the parameters are V_{CC} = 12V, R_1=5kΩ, R_2=10kΩ, R_C=3kΩ, R_E =1kΩ and β= 50 assuming the transistor is silicon?(6M)
   b) Derive the expression for stability factor of self bias circuit?(4M)
3. a) What is Thermal Runaway? (3M)
   b) Derive an expression for a transistor to avoid thermal Runaway?(7M)
4. a) Derive the expression for stability factor of fixed bias circuit?(4M)
   b) In Silicon transistor with the fixed bias method, Calculate the operating point and stability factor when the parameters are V_{CC} = 9V, R_C =3kΩ, R_B =8kΩ and β= 50 and V_{BE}= 0.7V (6M)
5. a) Explain about the compensation techniques of stabilizing BJT?(4M)
   b) Explain voltage divider bias method of FET?(6M)

Unit-VI

1. a) Give the h-parameter conversion formulae for CB and CC configuration in terms of CE?(7M)
   b) What are the advantages of h-parameters?(3M)
2. a) What are the advantages of CE Amplifier? (2M)
   b) Derive the expressions for voltage gain,current gain, input impedance and output impedance of CE amplifier using h- parameter model?(8M)
3. a) A FET amplifier in CS configuration uses a load resistance of 250 kΩ and transconductance is 0.5mA/V. Find voltage gain if drain resistance (r_d) = 200 kΩ. (4M)
   b) Explain a FET amplifier in the common source configuration with neat circuit?(6M)
4. a) What are the advantages of h-parameters? (3M)
   b) Compare CS, CD and CG of FET amplifiers? (7M)
5. Draw generalized Transistor equivalent model in h-parameters and derive A_V. A_I,,R_i,Y_o, A_{VS} and A_{IS}? (10M)

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTU, Kakinada)

NAAC ACCREDITED

II B.TECH - I SEM Question Bank

Subject Name: MEFA **Branch: ECE** **Faculty: Mr. A.KIRANKUMAR**

UNIT-1

1. Define Managerial Economics. Explain its Nature And Scope.
2. Discuss the importance of Managerial Economics in decision making.
3. What is Managerial Economics? Explain its focus areas.
4. Explain the role of a Managerial Economist in a Business Firm.
5. Define 'Demand' and explain the types of demand?
6 Explain the price elasticity of demand ? and explain the measures of price elasticity of demand?
7 What is Demand Forecasting? Explain the various methods involved in demand forecasting?
8 Define the concept of supply and explain the law of supply ?.

UNIT-II

1. Define iso quant and costs and explain types of iso quants.
2. Define 'Cost'. How are costs classified? Explain any five important cost concepts useful for managerial decisions.
3. a)Define the concept of COBB-Douglas and leontief production function ?
   b)explain the concept of law of variable proportinal theory with suitable diagram?

4) explain the economies of scale and returns to scale with tabular diagram?

5 a) State and explain Break-Even analysis and explain its importance.
   b) What are its limitations? Use suitable diagrams.

6 You are required to calculate.

i) Margin of Safety
ii) Total sales
iii) Variable cost from the following figures;

Fixed costs Rs. 12, 000; Profit Rs. 1, 000; Break-Even Sales Rs.60, 000

4. a) The information about Raj and Co., are given below.

i) Profit-Volume Ratio (P/V Ratio) is 20%
ii) Fixed costs Rs. 36000
iii) Selling price per Unit Rs. 150

b) Calculate:

a. BEP (in Rs.) b) BEP (in Units) c) Variable Cost per Unit d) Selling Price per Unit

5. A company reported the following results for two periods.

Period	Sales	Profit
I	Rs.20,00,000	Rs.2,00,000
II	Rs.25,00,000	Rs.3,00,000

Ascertain the BEP, P/V Ratio, Fixed cost and Margin of Safety.

6. Sales are Rs. 1, 10,000 Yielding a profit of Rs. 4,000 in period-I; Sales are Rs. 1, 50,000 with a profit of Rs. 12,000 in period-II. Determine BEP and Fixed Cost.
7. The P/V Ratio of Matrix Books Ltd is 40% and the Margin of safety is 30%. You are required to work out the BEP and Net Profit, if the Sales Volume is Rs.14,000
8. A Company prepares a budget to produce 3, 00,000 Units, with fixed costs as Rs. 15, 00,000 and average variable cost of Rs.10 per unit. The selling price is to Yield 20% profit on Cost. You are required to calculate

a) P/V Ratio b) BEP in Rs and in Units.

9. You are given the following information about two companies in 2000

Particulars	Company A	Company B

Sales	Rs.50,00,000	Rs.50,00,000
Fixed Expenses	Rs.12,00,000	Rs.17,00,000
Variable Expenses	Rs.35,00,000	Rs.30,00,000

You are required to Calculate (For Both Companies)
1) BEP (in Rs.) 2) P/V Ratio 3) Margin of safety

UNIT-III

1. a) What is perfect competition? What are its features?
   b) How is market price determined under conditions of Perfect Market Competition?
2. a) Explain in detail, the important features of perfect competition
   b) How can determine the price under monopoly?
3. a) Explain the features of Monopoly.
   b) How can a get profits under short and long run under monoploy with suitable diagram?
4. What are the features of Monopolistic Competition? How can a firm attain equilibrium position?
5. Compare and contrast between Perfect competition and Monopoly.
6. Explain in detail about Maris and Williamson's models.
7. a) What are the causes for the emergence of Monopoly?
   b) How is the equilibrium position attained by a monopolist under varying cost conditions? Explain briefly on Limit Pricing, Market Skimming,?
8. Write in detail about Internet Pricing- Flat rate pricing, Usage Sensitive, Transaction based pricing, Priority pricing.

UNIT-IV

1. a) What are the different types of Business organizations?
   b) What are the features of Sole trader form of Organization?
2. a)explain the features and phases cof business cycles in detail?
   b)define the concept of patnership firm and type s of patners?
3. a) What are the salient features of Partnership firm .
   b) What are the advantages and limitations of partnership firm?
4. a) What do you mean by Joint Stock Company? What are the salient features?
   b) Describe the advantages and disadvantages of Joint Stock Companies?
5. a) Analyses the Formation of Joint Stock Company?
   b) What are the different types of companies?
6. Distinguish between the Joint Stock Company and Partnership.
7. What are the objectives behind starting public sector enterprises in the country? To what extent have they fulfilled these objectives?
8. Analyse the problems of the public sector enterprises and suggest remedial measures for their improvement.

UNIT-V

1. Give a brief account on the important records of Accounting under Double Entry System and discuss briefly the scope of each?
2. Explain the purpose of preparing the following accounts/statements and also elaborate the various items that appear in each of them.
   a) Trading Account b) Profit & Loss Account c) Balance Sheet
3. Explain the following adjustments and illustrate suitably with assumed data.
   a) Closing stock b) Outstanding expenses c) Prepaid Income d) Bad debts
4. (a) Define the concepts 'Accounting', Financial Accounting and Accounting System'.
   (b) Explain the main objectives of Accounting and its important functions.
5. What do you understand by Double Entry Book Keeping? What are its advantages?
6. What is Trial Balance? Why it is prepared?

Illustration I

Journalize the following transactions and post them into Ledgers

Jan 1. Commenced business with a capital of Rs. 10000

,, 2. Bought Furniture for cash Rs. 3000

,, 3. Bought goods for cash from 'B' Rs. 500

,, 4. Sold goods for cash to A Rs. 1000

,, 5. Purchased goods from C on credit Rs.2000

,, 6. Goods sold to D on credit Rs. 1500

,, 8. Bought machinery for Rs. 3000 paying Cash

,, 12. Paid trade expenses Rs. 50

,, 18. Paid for Advertising to Apple Advertising Ltd. Rs. 1000

,, 19. Cash deposited into bank Rs. 500

,, 20. Received interest Rs. 500

,, 24. Paid insurance premium Rs. 200

,, 30. Paid rent Rs. 500

,, 30. Paid salary to P Rs.100

Illustration-III

During January 2003 Narayan transacted the following business.

Date	Transactions	Amount
2003		
Jan.1	Commenced business with cash	40000
,, 2	Purchased goods on credit from Shyam	30000
,, 3	Received goods from Murthy as advance for goods ordered by him	3000
,, 4	Paid Wages	500
,, 5	Goods returned to shyam	200
,, 6	Goods sold to Kamal	10000
,, 7	Goods returned by Kamal	500
,, 8	Paid into Bank	500
,, 9	Goods sold for Cash	750
,, 10	Bought goods for cash	1000.
,, 11	Paid salaries	700
,, 12	Withdrew cash for personal use	1000

Journalize the above transactions and prepare cash Account

Illustration V:

From the following list of balances prepare a Trial Balance as on 30-6-2003

		Rs.			Rs.
i	Opening Stock	1800	xiii	Plant	750
ii	Wages	1000	xiv	Machinery tools	180
iii	Sales	12000	xv	Lighting	230
iv	Bank loan	440	xvi	Creditors	800
v	Coal coke	300	xvii	Capital	4000
vi	Purchases	7500	xviii	Misc. receipts	60
vii	Repairs	200	xix	Office salaries	250
viii	Carriage	150	xx	Office furniture	60
ix	Income tax	150	xxi	Patents	100
x	Debtors	2000	xxii	Goodwill	1500
xi	Leasehold premises	600	xxiii	Cash at bank	510
xii	Cash in hand	20			

Illustration VI

Prepare a Trial Balance from the following Data for the year 2003.

	Rs.		Rs.
Freehold property	10800	Discount received	150
Capital	40000	Returns inwards	1590
Returns outwards	2520	Office expenses	5100
Sales	80410	Bad debts	1310
Purchases	67350	Carriage outwards(sales exp)	1590
Depreciation on furniture	1200	Carriage inwards	1450
Insurance	3300	Salaries	4950
Opening stock	14360	Book debts	11070
Creditors for expenses	400	Cash at bank	2610
Creditors	4700		

Illustration: VII

The following is the Trial Balance of Abhiram, was prepared on 31st March 2006. Prepare Trading and Profit& Loss Account and Balance Sheet.

	Debit Rs.	Credit Rs.
Capital	------	22000
Opening stock	10000	------
Debtors and Creditors	8000	12000
Machinery	20000	-------
Cash at Bank	2000	-------
Bank overdraft	------	14000
Sales returns and Purchases returns	4000	8000
Trade expenses	12000	-------
Purchases and Sales	26000	44000
Wages	10000	-------
Salaries	12000	-------
Bills payable	-------	10600
Bank deposits	6600	-------
TOTAL	110600	110600

Closing Stock was valued at Rs.60, 000

1. Explain the meaning of the 'Analysis of Financial Statements'. Discuss briefly the different type of analysis.
2. How are ratios classified for the purpose of financial analysis? With assumed data, illustrate any two types of ratios under each category
3. As a financial analyst, what precautions would you take while interpreting ratios meaningfully?

4. What are the limitations of Ratio Analysis? Does ratio analysis really measure the financial performance of a company?

UNIT-VI

1. What are the components of Working capital? Explain each of them.
2. a) What is the important of capital?

   b) What factors determine the working capital requirements of company?
3. a) What is the importance of Capital budgeting?

   b) How do the discounting models differ from non-discounting models?
4. Explain in detail about traditional and modern techniques of Capital Budgeting.
5. Examine the following three proposals and evaluate them based on
   a) PBP Method
   b) ARR Method. (ARR on original Investment)

   Initial Investment is Rs.10, 00,000/- each for all the three projects.

Year	Cash inflows (Rs.)		
	Project-A	Project-B	Project-B
1.	5,00,000	6,00,000	2,00,000
2.	5,00,000	2,00,000	2,00,000
3.	2,00,000	2,00,000	6,00,000
4.	-------	3,00,000	4,00,000

6. Determine the Pay Back Period for the information given below
   a) The project cost is Rs. 20,000
   b) The life of the project is 5 years
   c) The cash flows for the 5 years are Rs.10,000, Rs.12,000; Rs.13,000; Rs.11,000; and Rs. 10,000 respectively and
   d) Tax rate is 20%

7. Calculate the Net present value (NPV) of the two projects X and Y. Suggest which of the two projects should be accepted assuming a discount rate of 10%

Item	Project-A	Project-B
Initial Investment	Rs. 80,000	Rs. 1,20,000
Life Period	5 Years	5 Years
Scrap Value	Rs.4,000	Rs.8,000
(Annual Cash Inflows)	(CFAT)	(CFAT)
Year: 1	Rs.24,000	Rs.70,000
,, 2	Rs.36,000	Rs.50,000
,, 3	Rs.14,000	Rs.24,000
,, 4	Rs.10,000	Rs.8,000
,, 5	Rs.8,000	Rs.8,000

8. A Company has at hand two proposals for consideration. The cost of the proposals in both the cases is Rs. 5, 00,000 each. A discount factor of 12% may be used to evaluate the proposals. Cash inflows after taxes are as under.

Year	Proposals **X**(Rs.)	Proposals **Y**(Rs.)
1	1,50,000	50,000
2	2,00,000	1,50,000
3	2,50,000	2,00,000
4	1,50,000	3,00,000
5	1,00,000	2,00,000

Which one will you recommend under NPV method

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

---

Name of Subject : Network Analysis

Faculty Name : M Srikanth / DVSS Poojitha

Designation :Assistant Professor

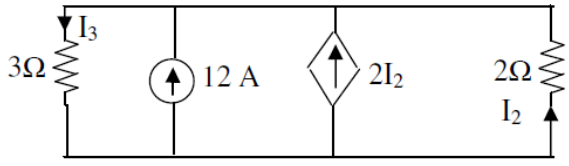
Year/Sem/section : II-I (A&B)

Branch : ECE

Regulation :R16

Unit -1

1. (a)Find the power delivered by each branch from the following figure

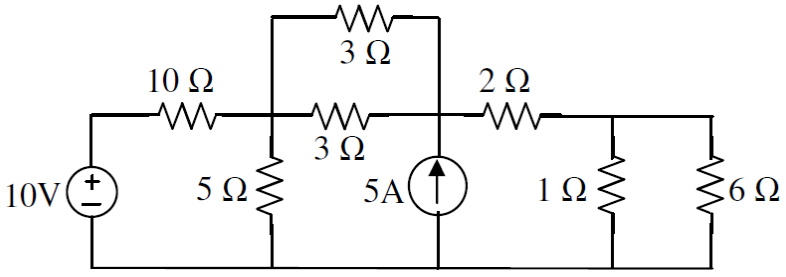


[3m]

(b)Explain the source transformation with an example [7]

2. (a)A resistor is connected across the terminals of a 20 μf capacitor which has been previously charged to a potential difference of 500 v. If the potential difference falls to 300 v in 0.5 minutes, calculate the resistance in the circuit.[3]

(b)Determine the voltage at each node of the circuit with an example



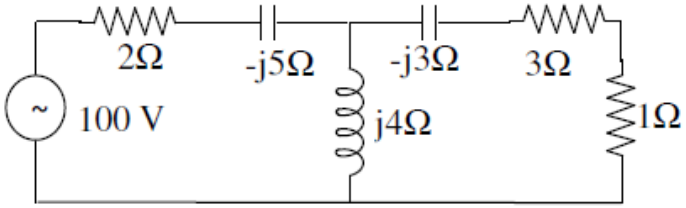
[7]

3. (a)Draw the graph corresponding to the following incidence matrix

$$A=\begin{bmatrix} -1 & 0 & 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & -1 & 0 & 0 & 0 & 0 & -1 & 1 \\ 0 & 0 & -1 & -1 & 0 & -1 & 0 & -1 \\ 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 \end{bmatrix}$$ [3]

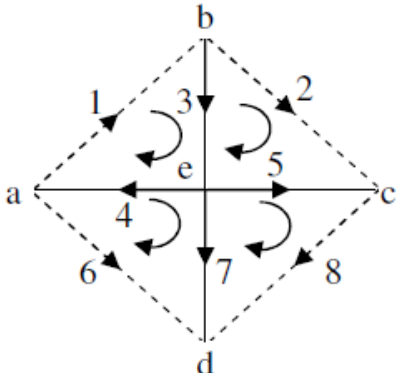
(b)Explain the rms value and average value of alternating quantity. Derive necessary Expressions. [7]

4. (a)In the following network shown in figure, determine (i) mesh currents (ii) power supplied by the source (iii) power dissipated in each resistor.



[7]

(b)Write the fundamental cut-set matrix for the following network graph



[3]

5. (a)A series circuit has two pure elements. The voltage and current in circuit are $100\cos(314t + 30^\circ)$ v 0 $v = t +$, and $10\sin(314t + 70^\circ)$ a 0 $i = t +$. Find elements in the circuit.
(b)Determine form factor and peak factor of the following figure

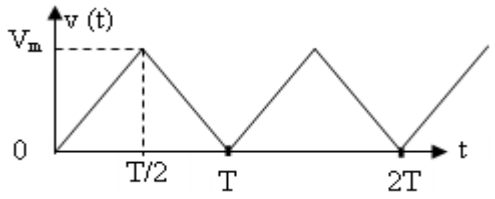


Figure 2 [7]

6. (a)Find the total power delivered in the circuit using mesh current method

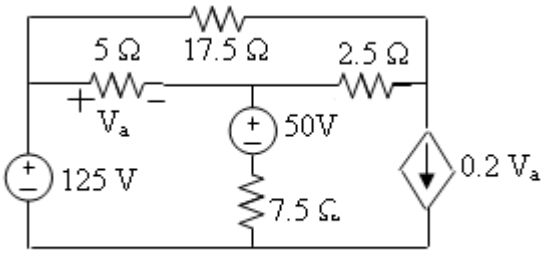
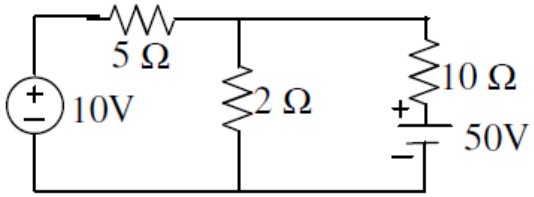


Figure 3 [7]

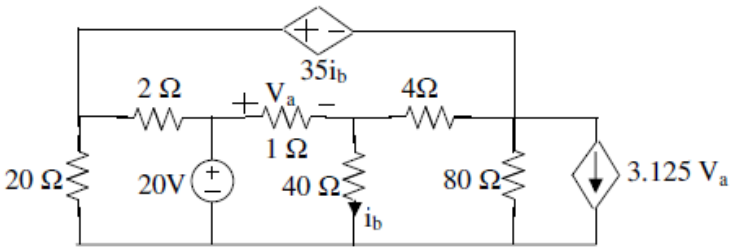
(b)Determine loop currents from the following circuit



[3]

7. (a)Define the following: (i) time period (ii) average value (iii) rms value (iv) form factor.[4]

(b)Use node voltage method to find the power developed by the 20v source in the circuit from the following figure



[6]

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

---

Unit - 2

1. (a)A coil of resistance r and inductance l is connected across 100 v, 50 hz supply. The current through the coil is found to be 2a and power Dissipated is 100 w. Find r and l. [4]

   (b)Show that the real power consumed by a purecapacitor and inductor is zero[8]

2. (a)A resistor r is connected in series with a capacitor c and the combination is connected across a 100 v, 50 hz supply. The voltage drop across the resistor is 60 v and power dissipated in the resistor is 108 w. Find r and c.[4]

   (b)For an rc series circuit, a sinusoidal voltage $v(t) = vm \sin\omega t$ is applied at t = 0. Find the expression for transient current. [8]

3. (a) A sinusoidal voltage $v(t) = 20 \sin 75t$ is applied suddenly to a series RL circuit with R= 20 Ω and L= 4 h. Find the instant at which transient current becomes zero.[8]

   (b)The resistor r in series with capacitance c is connected to a 50hz, 240 v supply. Find the value of c so that r absorbs 300 watts at 100 volts. Find also the maximum charge.[4]

4. (a)A series r-l-c circuit consists of 100 _ resistor and an inductor of 0.318 h and A capacitor of unknown value. This circuit is supplied by 230v, 50hz supply and draws a current of 2.3 a and the current is in phase with the supply voltage. find: (i) the value of the capacitor (ii) the power supplied by the source. [8]

   (b)A series rlc circuit has the following parameters: r = 10 ohms, l = 3h, c = 120 μf. calculate the resonant frequency. Under resonant condition, calculate current, power, and voltage drops across various elements, if the applied voltage is 100v.[4]

5. (a)An r-l series circuit has r=2.5 ohms and l=0.2 h. Find the power factor of the circuit if an alternating voltage of 230 30 v 0 ð is applied across the circuit.[3]

   (b)A coil with a resistance of 7_ and an inductance of 31.8 mh is connected to 230v, 50hz supply. Calculate (i) the circuit current (ii) phase angle (iii) power factor (iv) power consumed. [8]

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Affiliated to JNTUK, Kakinada)

NAAC Accredited Institute

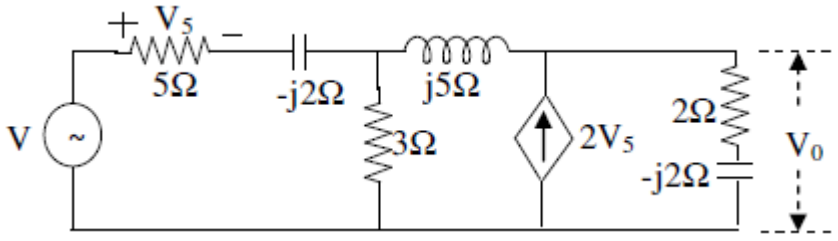
An ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Institute.

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

---

6. Find value of voltage v which results in $v_g=5\angle 0$ volts in the circuit shown in figure

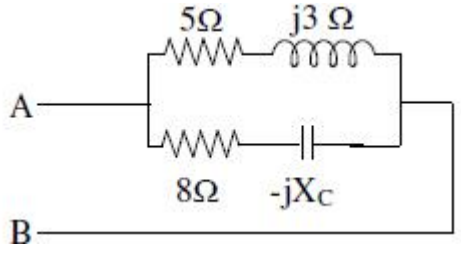


[8]

Unit - 3

1. (a)Give a comparison between series and parallel resonance.[3]
   (b)A series RLC circuit consists of a resistance of 25Ω, inductance 0.4 h, capacitance of 250 μf is connected a supply of 230v, 50 hz. Find the total impedance, current, power, power factor, voltage across coil and capacitance.[8]
2. (a)Show that the resonant frequency is thegeometric mean of two half power frequencies [8]
   (b)Define self inductance, mutual inductance and co-efficient of coupling in a coupled Circuit.[3]
3. (a)Derive the expressions for quality factor and bandwidth in a series rlc resonant circuit.[8]
   (b)Define quality factor and bandwidth. What is the importance of these parameters in series resonant circuits?[4]
4. (a)Two coupled coils have self-inductances l1=2 h and l2=6 h. The coefficient of coupling between them is 0.5. If a current 4sin(40 30) a 01 $i = t -$ flows through coil 1 and 2sin(40 30) a 02$i = t -$ flows through coil 2, find the voltages across coil 1 and 2, if the mutually induced e.m.f opposes the self induced e.m.f.[8]
   (b)An electrical circuit with R = 10 Ω, L= 0.1 h and C = 100 μf are all connected in parallel. The circuit is energized with supply at 230 v, 50 hz. Calculate (i) the impedance (ii) current taken from the supply (iii) power factor of the circuit and [4]

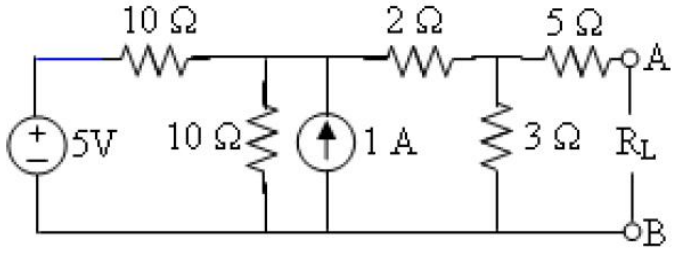
5. (a)What are the characteristics of parallel resonant circuits?[3]
   (b) For the circuit shown in figure 4, find the value of X_c in ohms for which the Circuit is under resonance condition.



[8]

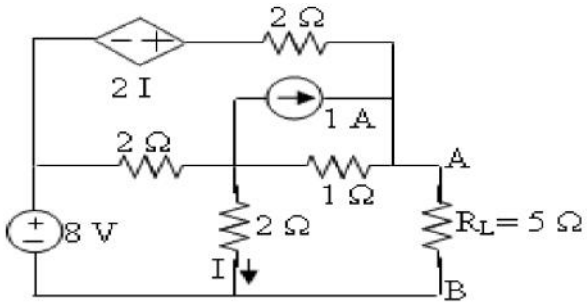
Unit – 4

1. (a)State thevenin's theorem and maximum power transfer theorem.[3]
   (b)Find the resistance r_l to be connected between the terminals a & b so that maximum power is developed acoss r_l .what is the maximum power delivered? From the following figure.



[8]

2. (a)Determine the current through load resistance r_l from the following figure and also find maximum transfer to resistance R_L



[8]

   (b)State milliman's theorem and write its limitations.[3]

---

3. (a)State maximum power transfer theorem and write its limitations.[3]
   (b)Find the Nortons equivalent circuit

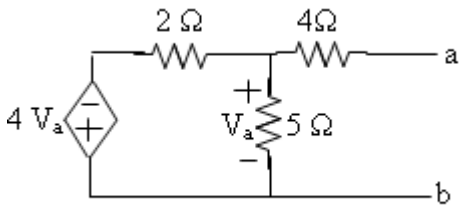
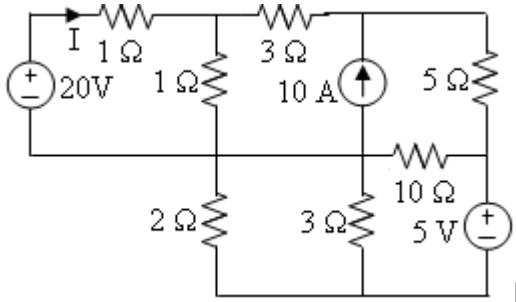


Figure 4 [8]

4. (a)State reciprocity AND compensation THEOREMS.[3]
   (b)Determine current i using superposition theorem



[8]

5. (a)Verify Tellegen's theorem

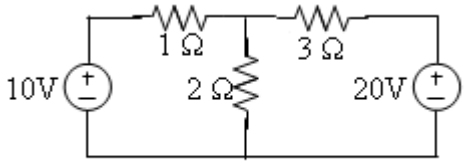
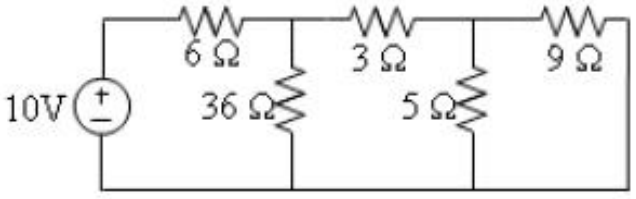


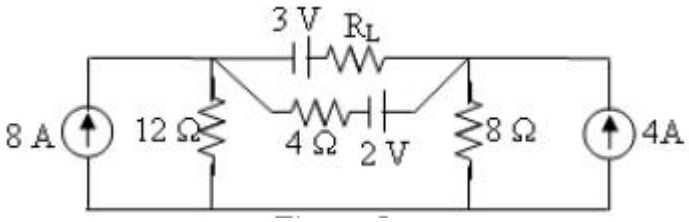
Figure 4 [5]

(b)Find current in 9Ω resister in the circuit from the following circuit when 5Ω resister is changed to 6Ω using compensation theorem



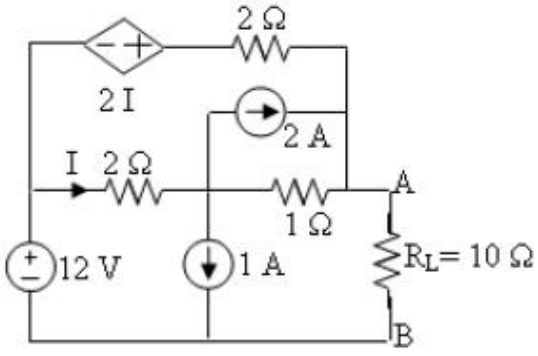
[5]

6. Obtain the maxmium amount of power transferred to R_L from the sources using maximum power transfer theorem in the circuit for the following circuit



[8]

7. Determine the current through r_l=10Ω for the following circuit using thevenins theorem and verify it by Nortons theorem. Find the value of R_1 for which maximum power will be transferred to it also determine the maximum power transfer

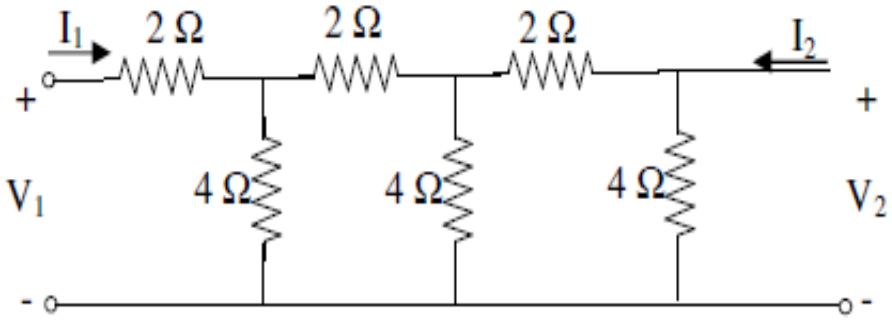


[8]

Unit – 5

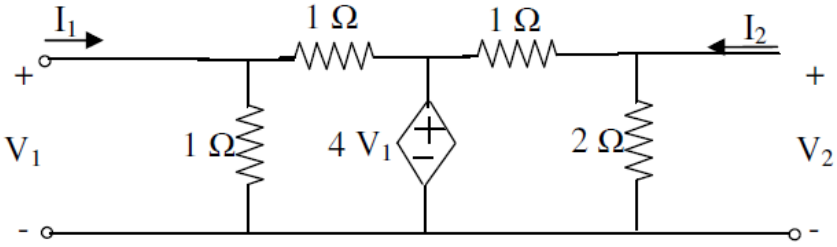
1. (a)Prove the conditions for symmetry and reciprocity of hybrid parameters[4]

   (b)Find abcd parameters and h-parameters of the following circuit.



[10]

2. (a)Derive Z-parameters as function of h-parameters.[6]
   (b)Prove the conditions for symmetry and reciprocity of transmission line parameters.[4]
3. (a)Why **Z**-parameters are known as open circuit parameters and Y-parameters are known as short circuit parameters?[4]
   (b)Derive H parameters as function of a ABCD parameters [8]
4. (a)Determine Z –parameters of the following circuit

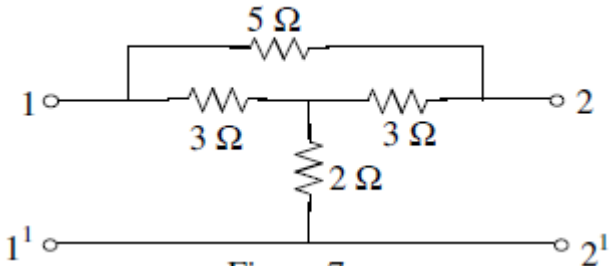


[8]

   (b)Prove the conditions for symmetry and reciprocity of inverse transmission parameters.[4]

5. (a)the **Z**-parameters of a two-port network are:
   Z11 = 25 Ω, z22 = 40 Ω, z12 = z21 = 20Ω.calculate **Y**- and **ABCD** parameters of the network. Also find equivalent t-network. [8]
   (b)Derive **Z**-parameters in terms of **Y**- parameters and **ABCD** parameters.[4]
6. Obtain the Admittance parameters of the following network and there by obtian the **ABCD** parameters

---



[8]

DADI INSTITUTE OF ENGINEERING & TECHNOLOGY
(Approved by A.I.C.T.E., New Delhi& Affiliated to JNTUK, Kakinada)
NAAC Accredited Institute
An ISO 9001:2008, 14001:2004 & OHSAS 18001:2007 Certified Institute
NH–5, Anakapalle, Visakhapatnam–531002, Andhra Pradesh
Phone: 08924-221111/221122/9963981111, E–Mail: info@diet.edu.in, Web: www.diet.edu.in

QUESTION BANK

Academic Year	:	2018-2019
Name of the Faculty	:	Mr. P. Ram Prasad
Designation	:	Assistant Professor
Department	:	Electronics & Communication Engineering
Year & Semester	:	II – I Semester
Regulation	:	R16
Subject	:	Random variables and Stochastic Process

UNIT-I

1. a. Write the properties of Gaussian density curve. Find the maximum value of Gaussian density function. **5M**

   b. The random variable X has the discrete variable in the set {-1,0.5,0.7,1.5,3}, the corresponding probabilities are assumed to be {0.1,0.2,0.1,0.4,0.2} plot its distribution function. **5M**

2. a. Explain about the distribution and density functions of Gaussian RV with neat sketches. **5M**

   b. If the probabilty density of a random variable is given by

$$f_X(X) = x \text{ for } 0 < x < 1$$
$$= (2 - x) \text{ for } 1 < x < 2$$

   Find (i) P{0.2<x<0.8} (ii) P{0.6<x<1.2} **5M**

3. a. Explain about the distribution and density functions of Binomial RV with neat sketches **5M**

   b. If the probability density of a random variable is given by

$$f_X(X) = C.\exp(-x/4) \quad \text{for } 0 \le x < 1$$
$$0 \qquad \text{Otherwise}$$

   Find the value of C evaluate $F_X(0.5)$ **5M**

4. a. Explain about the distribution and density function of Rayleigh RV with neat diagrams. **5M**
   b. Let X be a continous RV with density function

$$f_X(X) = \frac{X}{9} + K \quad \text{for } 0 \le X < 1$$
$$= 0 \qquad \text{Otherwise}$$

5M

5. a. Two dice are thrown. The square of the sum of the points appearing on the two dice is a RV X. Determine the values taken by the X and the considering probablities. **5M**
   b. State and prove the properties of probability density function. **5M**

6. a. Distinguish between discrete, continous and mixed random variables with suitable examples. **5M**
   b. A binary source generates digits 1 and 0 randomly with probabilities 0.6 and 0.4 respectively. What is the probablity that two 1's and three 0's will occur in a five digit sequence. **5M**
   Hint: Let X be the random varibale denoting the number of 1's generated in a five digit sequence.

UNIT – II

1. a. State and prove the properties of variance of a random variable. **5M**
   b. A random variable X has a pdf
   $$f_X(X) = 0.5\text{Cos}x \quad \text{for } -\Pi/2 < x < \Pi/2$$
   $$= 0 \qquad \text{otherwise}$$
   Find the mean value of the function $g(x)=4x^2$. **5M**

2. a. State and prove the properties of the characteristic function of a random variable. **5M**
   b. Let X be a random variable which can take on the values 1,2 and 3 with respective probabilities 1/3, 1/6, 1/2. Find its third moment about the mean. **5M**

3. a. What is meant by expectation? State and prove its properties. **5M**
   b.) If X is a discrete random variable with probability mass function given as below table

X	-2	-1	0	1	2
P(X)	1/5	2/5	1/10	1/10	1/5

Find (i)E(X) (ii)$E(X^2)$ (iii)E(2X+3) (iv) $E[(2X+1)^2]$. **5M**

4. a. State and prove properties of moment generating function **5M**
   b. Find the variance of X for a uniform probability density function. **5M**

5. a. Define characteristic function and list its properties. **5M**

b. Let $Y=X^2$ Find $f_Y(y)$ if X = N(0;1). **5M**

6. a. Let Y=aX+b. Find the PDF of Y, if X=N(μ;σ2). **5M**
   b. State and prove Chebychev's inequality. **5M**

UNIT-III

1. a. Explain central limit theorem with equal and unequal distributions **5M**
   b. The joint density function for X and Y is

$$f_{X,Y}(X,Y) = \frac{xy}{9} \quad \text{for } 0 < x < 2 \text{ and } 0 < y < 3$$
$$0 \quad \text{for otherwise}$$

   Find the conditional density functions. **5M**

2. a. Define joint probability density function. list out its properties. **5M**
   b. The joint density function of X and Y is given by

$$f_{X,Y}(X,Y) = ax^2 \quad \text{for } 0 < x < y < 1$$
$$0 \quad \text{for otherwise}$$

   Find 'a' so that the function is valid density function ii) find the marginal density functions. **5M**

3. a. Prove that sum of two statistically independent random variables is equal to the convolution of their individual density functions. **5M**
   b. The joint PDF of a bi-variate (X,Y) is given by

$$f_{X,Y}(X,Y) = kxy \quad \text{for } 0 < x < y < 1$$
$$0 \quad \text{for otherwise}$$

   where k is a constant. (i)find the value of k (ii)are X and Y are independent **5M**

4. For two random variables X and Y
   $f_{XY}(x,y)=0.3\,\delta(x+1)\,\delta(y)+0.1\delta(x)\,\delta(y)+0.1\delta(x)\,\delta(y-2)+0.15\delta(x-1)\,\delta(y+2)+0.2\delta(x-1)\,\delta(y-1)+0.15\delta(x-1)\,\delta(y-3)$
   Find (a) the correlation (b) the covariance (c) the correlation coefficient of X and Y (d) Are X and Y either uncorrelated or orthogonal. **10M**

5. a. If X and Y are independent, then show that E[XY]=E[X]E[Y] . **5M**
   b. Let X and Y be defined by X=cosΘ and Y=sinΘ, where Θ is a random variable uniformly distributed over[0,2π]. Show that X and Y are not independent. **5M**

6. a. Let *Z* is the sum of two independent random variables X and Y . Find the PDF of *Z*. **5M**
   b. List all the properties of jointly Gaussian random variables. **5M**

UNIT-IV

1. a. With neat sketches explain the classification of random process based on time t and amplitude of random variable x. **5M**
   b. Consider a random process *X(t)=A Cos* ω *t*, where ω is a constant and A is a random variable uniformly distributed over (0,1). Find the autocorrelation and autovariance of X(t). **5M**

2. a. Explain stationary and ergodic random processes **5M**
   b. Prove that random process X(t)= $\text{Cos}(\omega_c t+\theta)$ is WSS if it is assumed that ω_c is a constant and θ is uniformly distributed variable in the interval (0,2Π). **5M**

3. a. What is random process? Explain Gaussian random process. **5M**
   b. Given E[X]=6 and RXX(t, t+ τ)=36+25exp(- τ) for a random process X(t). Indicate which of the following statements are true. (i) is Ergodic (ii) is wide sense stationary. **5M**

4. a. What is autocorrelation function. List out its properties. **5M**
   b. A random process is described by $X(t) = A^2 \text{Cos}^2(\omega_c t+\theta)$. A and ω_c are constants and θ is a random variable uniformly distributed between is ±π. Is X(t) is a wide sense stationary. **5M**

5. a. Show that for a WSS process X(t), $R_{XX}(0)\geq R_{XX}(\mathcal{T})$. **5M**
   b. Given a random process X(t) =kt, where k is a random variable uniformly distributed in the range (-1, 1). Is the process ergodic? **5M**

6. a. A random process is given by X(t)=at+b, where b is a constant and a is an r.v uniformly distributed in the range (-2, 2). Is the process WSS? **5M**
   b. Derive an expression that relates autocorrelation function and autocovariance function. **5M**

UNIT-V

1. a. Define power density spectrum and write down its properties **5M**
   b. The PSD of X(t) is given by **5M**

$$S_{XX}(\omega) = 1+\omega^2 \text{ for } |\omega| < 1$$
$$0 \quad \text{otherwise}$$

2. a. Define cross power density spectrum. List out its properties. **5M**

b. Consider the random process $X(t) = A\ Cos(\omega_0 t + \theta)$ where A and ω_0 are real constants and θ is a uniformly distributed on the interval $(0,\Pi/2)$. Find the average power of X(t). **5M**

3. a. Derive the relation between cross power spectrum and cross correlation function. **5M**
   b. Find the average power of the WSS random process X(t) which has the power spectral density. $S_{XX}(\omega) = \frac{\omega^2 - 17}{(\omega^2 + 49)(\omega^2 + 16)}$ **5M**

4. a. Power spectrum and autocorrelation functions are a Fourier transform pairs. Prove this statement. **5M**
   b. A WSS random process X(t) which has the power spectral density, $S_{XX}(\omega) = \frac{\omega^2 - 17}{(\omega^2 + 49)(\omega^2 + 16)}$. Find autocorrelation and mean square value of process. **5M**
5. Show that the autocorrelation function and power spectral density forms Fourier transform pair. **10M**
6. State and prove Wiener-Khinchin relation **10M**

UNIT-VI

1. a. List out the properties of band-limited random process. **5M**
   b. Find the mean square value of the output response for a system having $h(t)=e^{-t}u(t)$ and input of white noise No/2. **5M**
2. a. Find output response of cross correlation when random process X(t) is applied to an LTI system having input response h(t). **5M**
   b. Find the noise bandwidth of a system having the transfer function $\left|H(\omega)^2\right| = \frac{1}{1 + (\frac{\omega}{\omega_0})^4}$ where ω_0 is a real constant. **5M**
3. a. Let Y(t) be the output of an LTI system with impulse response h(t). Find the cross-correlation between the input and output. **5M**
   b. Write notes on the following terms: i) Thermal noise ii) Narrowband noise. **5M**

4. a. Suppose that the input to a differentiator is the WSS random process. Determine the power spectral density of output. **5M**
   b. Derive the expression for noise figure of two-stage cascaded network. **5M**
5. a. Derive the relationship between autocorrelation of output random process of an LTI system when the input is a WSS process. **5M**
   b. Describe the method of modeling a thermal noise source **5M**
6. Write notes on the following
   (i) Band limited white noise **5M**
   (ii) Thermal Noise **5M**

DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008; ISO 14001:2004 & OHSAS 18001:2007 Certified Institution

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, e-mail:info@diet.edu.in

Department of Electronics & Communication Engineering

SUBJECT:SIGNALS &SYSTEMS **REGULATION:R16**

NAME OF THE FACULTY: Ms.K.SUMA **SEMESTER& BRANCH: II/I & ECE**

Unit 1

1(a) Find the even and odd components of the signal x(t) = $\cos(\omega t+\frac{\pi}{3})$

(b)A function f(t) = {1 for $0<t\leq 0.5$ & $0.5<t\leq 1$ using f(t) = c1sint +c2 sin3t. Compute the

coefficients c1, c2.

2(a) Find the even and odd components of the signal x(t) =sin2t + sin2t.cos2t +cos2t

(b) Discuss orthogonality in signals using relevant expressions. Explain the term

complete set. Give examples of complete sets.

3. a) Derive the expression for mean square error when a function is approximated by a set of orthogonal signals.

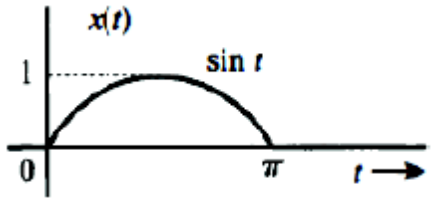
(b)Find the even and odd components of the signal x(t) = tu(t)

4(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.

5 (a) Discuss orthogonality in complex functions

(b) Compute the energy of the signal x(t) shown below



DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)

NAAC Accredited Institute

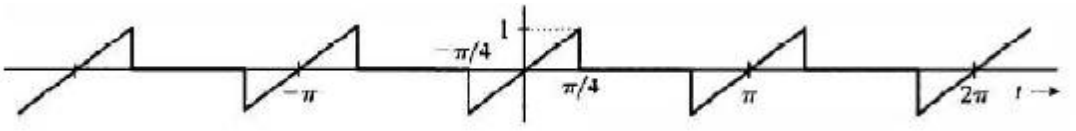
An ISO 9001:2008; ISO 14001:2004 & OHSAS 18001:2007 Certified Institution

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

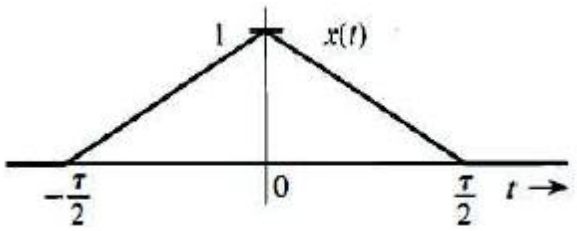
Phone: 08924-221111 / 221122/9963981111, e-mail:info@diet.edu.in

Unit 2

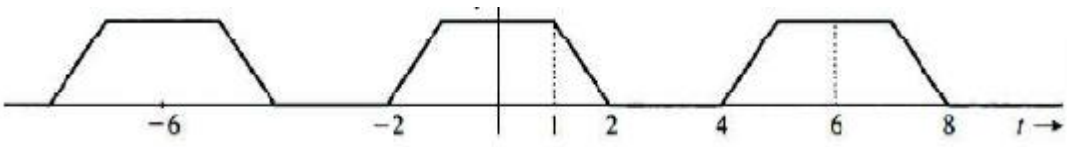
1(a) Find the trigonometric Fourier series for the signal x(t) shown below.



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

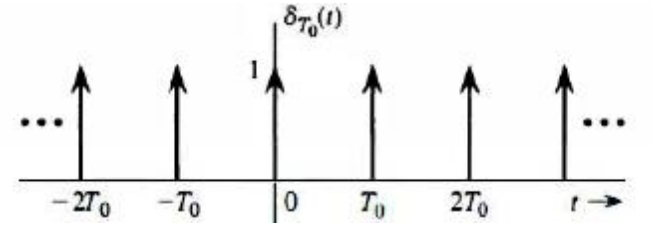


2(a) Find the complex exponential Fourier series for the signal x(t) shown below

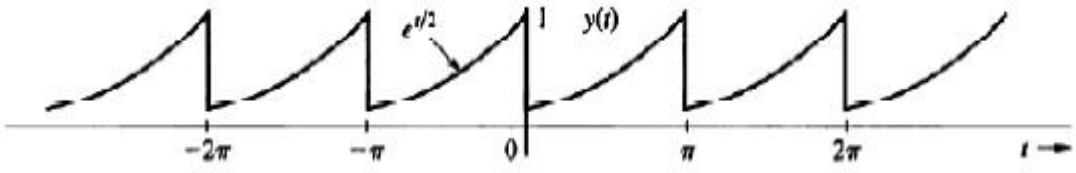


(b) State and prove differentiation in time domain property of Fourier transform.

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



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



4(a) Find the Fourier transform of the signum function. (5M)

(b) Write the properties of Fourier series. (5M)

5(a) Find the Fourier transform of x(t) = e-a |**t**|

(b)Write duality property of Fourier transform.

(c) A signal x(t) = 5sin(250t) + 6 sin(200_t), find the sampling rate to avoid aliasing.

Unit3

1(a) Compare impulse sampling, natural sampling and flat top sampling with relevant diagrams.

1(b) What is aliasing effect? Explain using relevant diagrams. Suggest the remedies to avoid aliasing.

2(a) Explain flat top sampling with relevant expressions and waveforms. (7M)

2(b) What is Nyquist rate of sampling? A signal x(t) = 10sinc(500t), find its Nyquist rate. Where sinc(x) = $\frac{sin(\pi x)}{\pi x}$

3(a)Explain natural sampling with relevant waveforms and expressions.

(b) Explain reconstruction of signals from samples using relevant expressions

4State and prove sampling theorem for band limited signals.

5(a) Write short notes on band pass sampling

(b) Discuss the effects of under sampling on recovery of signal.

(c)State sampling theorem for band pass signals.

Unit 4

1(a) Derive the relationship between autocorrelation function and energy spectral

density of an energy signal.

1(b) Stating the properties and relevant mathematical expressions check whether the

following systems are LTI or not?

i) $y(t) = 2x(t) + 3x(3t)$

2(a) Define cross correlation function, write its properties and prove any two of them.

2(b) Derive the relationship between bandwidth and rise time.

3(a) A system is given by y(t) = _

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.

4(a) A system represented by $y(t) = 2x(t-2) + 2x(t+2)$.

i) Is the system time invariant? Justify your answer.

ii) Is the system causal? Justify your answer.

4(b) Explain detection of signal in the presence of noise using correlation

5(a) Write the conditions for distortion less transmission.

(b) Explain the characteristics of ideal LPF

(c)Explain the characteristics of ideal HPF.

DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008; ISO 14001:2004 & OHSAS 18001:2007 Certified Institution

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, e-mail:info@diet.edu.in

Unit 5

1(a)Find the inverse Laplace transform of

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

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

2(a) Find the inverse Laplace transform of

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

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

3(a) Find the inverse Laplace transform of

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

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

4Find the inverse Laplace transform of

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

Unit 6

14(a) Using the z-domain differentiation property find the Z transform of

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

b) Find the inverse of

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

2(a) Using convolution property find the Z transform of

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

(b) Find the inverse Z transform of

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

DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)

NAAC Accredited Institute

An ISO 9001:2008; ISO 14001:2004 & OHSAS 18001:2007 Certified Institution

NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, e-mail:info@diet.edu.in

3(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

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

5(a)Find the inverse Z transform of

$$X[z] = \frac{-z(z+0.4)}{(z-0.8)(z-2)}$$

(b)Find the Z transform and ROC of $x[n] = (1.2)^n u[n] + (3)^n u[-n-1]$