Code No.: 30228

MR13

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Principles of Electrical Engineering**

Branch: : E C E

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Write the expressions for time constant of an R-L circuit and R-C circuit.
2. Give the expressions for symmetry and reciprocity in case of impedance parameters
3. What is constant K filter
4. What is the function of a commutator in dc machine?
5. Draw phasor diagram of the transformer under no-load condition

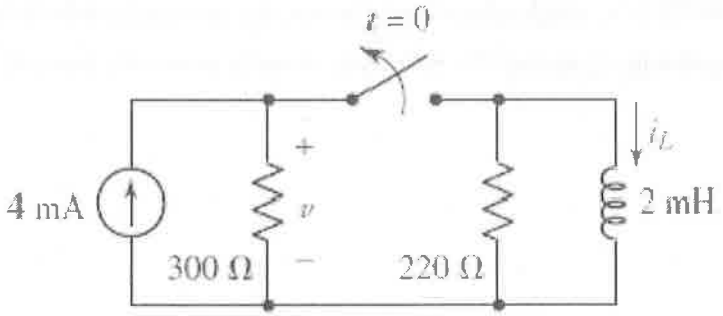
II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. What is the difference between steady state and transient response
2. Write about initial conditions of L and C in a RLC series circuit
3. Define symmetrical property in two port networks and write the same for h and y parameters.
4. Why Z-parameters are known as open circuit parameters and Y- parameters are short circuit parameters.
5. What are the various types of filters
6. What is Symmetrical Attenuator
7. Enumerate various losses in a dc motor?
8. Define critical field resistance and critical speed of a DC machine
9. What is the need of laminating the core of the transformer.
10. What are the various losses in transformer

PART-B

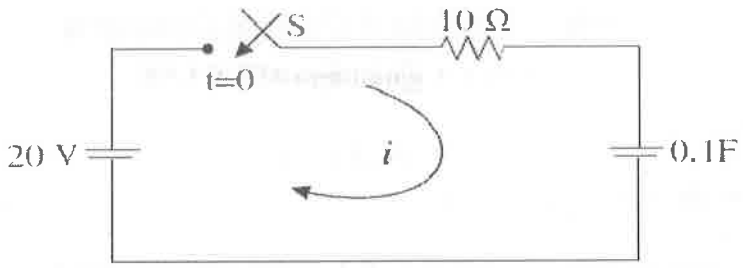
Answer ALL questions of the following **5x10 Marks= 50Marks**

1. With the assumption that the switch in the circuit of Fig. has been closed a long, long, long time, calculate $i_L(t)$ at (a) the instant just before the switch opens; (b) the instant just after the switch opens; (c) t = 15.8 μs; (d) t = 31.5 μs; (e) t = 78.8 μs.



(OR)

2. A series RC circuit consists of resistor of 10 Ω and capacitor of 0.1F as shown in Figure. A constant voltage of 20V is applied to the circuit at t=0. Obtain the current equation. Determine the voltages across the resistor and the capacitor.



3. Derive the condition for the symmetrical property in two port networks in case of admittance parameters

(OR)

4. Express z-parameters in terms of h-parameters?

5 Design the T section of an m-derived high pass filter having a design impedance of 300 and cut off frequency of 2000 Hz. The frequency of infinite attenuation is 1700Hz.

(OR)

6. Explain the variation of Attenuation, phase shift and characteristic impedance of m derived high pass filter?

7. A 10 kW, 250 V, 8-pole, 600 r.p.m lap-connected d.c. generator has 400 armature conductors. At rated voltage and current, armature ohmic losses are 150 watts. Compute the useful flux per pole?

(OR)

8. Derive an expression for the emf generated in a dc machine?

9. Explain the constructional details of a single phase transformer

(OR)

10. In a 20 kVA, 2000/200 V, single-phase transformer, the iron and full-load copper losses are 350 and 400 W respectively. Calculate the efficiency at unity power factor on (i) full load (ii) half full-load.

Code No.: **30403/40403** | **MR13/ MR14**

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Switching Theory And Logic Design**

Branch: **ECE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Convert octal number 764 to Binary
2. Simplify the Boolean function x'yz + x'yz' + xy'z' + xy'z without using K-map
3. What is Flip Flop?
4. How many flip-flops are required to design a Mod-12 counter?
5. Write the expression for next state of mealy model machine

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. What are the universal gates? Why they are called so?
2. Convert the following to decimal and then to octal $(999)_{10}$.
3. Simplify the following Boolean expression using K-Map. F = $\sum(0,2,4,6)$
4. What is a cell of k-map?
5. Draw the truth table for SRflip-flop.
6. Write short notes on Edge triggered Flip-Flop.
7. What is synchronous sequential circuit?
8. Define synchronous counters.
9. What do you mean by incompletely specified machine?
10. Draw the symbols of state box, decision box and conditional boxes of ASM chart.

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. Draw the logic symbol and construct the truth table for each of the following gates.

   a) Three input AND gate b) Three input NAND gate c) three input OR gate

   d) Three input NOR gate e) Three input EX.OR gate.

OR

2. a) Implement all basic logic gates using Universal gates. **7M**

   b) Explain minimal SOP and POS forms. **3M**

3. Simplify the following Boolean expression using K-Map and implement the simplified expression using only NAND gates. F(A, B, C, D) = $\sum(0,2,5,7,8,9,10,13,15)$

OR

4. Minimize the following using tabular method. f(w,x,y,z) = Em(1,4,8,9,13,14,15) + Eq(2,3,11,12)

5. a) Define and explain the JK,RS,T and D flip-flop.

   b) Write the characteristic, excitation tables for JK, RS, T and D flip-flops.

OR

6. Convert the following a) JK Flip Flop to T Flip Flop b) RS Flip Flop to D Flip Flop

7. Design a 3-bit synchronous binary up counter using T Flip-Flop.

OR

8. Design a counter with the following binary sequence: 0, 1, 3, 7, 6, 4 and repeat. Use JK flip-flops

9. Design a control logic through ASM chart for the sequence detector which detects 1100 and resets flip flop F to 0 and flip flop E to 1. The patterns come from 4 bit counter A.

OR

10. a) What is serial binary adder? Explain its working with the help of a state diagram.

    b) Write about implementation of binary multiplier.

Code No.: **30402/40402** | **MR13/ MR14**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Probability Theory And Stochastic Processes**

Branch: **ECE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Define conditional probability?
2. Define Gaussian distribution function?
3. Define probability distribution function for two random variables?
4. Define mean ergodic process?
5. State any two uses of spectral density.

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. What are the conditions to be satisfied for the statistical independence of three events A, B and C?
2. State Baye's Theorem.
3. Write any two properties of density function?
4. Find the mean value of uniform random variable.
5. State Joint Characteristic Function.
6. How interval conditioning is different from point conditioning.
7. Derive the power spectral density at zero frequency is equal to the area under the curve of the autocorrelation $R_{xx}(\tau)$?
8. Write the condition two WSS process X (t) and Y (t) are jointly wide sense stationary?
9. Write the bandwidth expression for a bandpass process.
10. Find the power density spectrum of $R_{XX}(\tau) = A/2 \cos(\omega_0\tau)$.

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

Q1. A shipment of components consists of three identical boxes. one box contains 2000 components of Which 25% are defective, the second box has 5000 components of which 20% are defective and the Third box contains 2000 components of which 600 are defective. A box is selected at random and a Component is removed at random from the box. What is the probability that this component is defective? What is the probability that is came from the second box?

(OR)

Q2. a) Explain total probability and conditional probability theorems with properties.
b) Explain discrete and continuous sample spaces with examples.

Q3. Prove that density function of the sum of the two statistically independent random variables is the convolution of their individual density functions.

(OR)

Q4. a) Verify that the characteristics function of a random variable is having its maximum magnitude at $\omega = 0$, and find its maximum value.
b) State and prove properties of moment generating function of a random variable X.

Q5. (a) Define and explain joint distribution function and joint density function of two random variables X and Y.

(b) State and prove the properties of joint distribution function.

(OR)

Q6. a) Random variables Z and W are defined by $Z = X + aY$, $W = X - aY$. Where 'a' is a real number. Determine 'a' such that Z and W are orthogonal.

b) Verify that the density of the sum of two independent random variables is equal to the convolution of their individual densities.

Q7. a) Explain the significance of auto correlation.

b) Find auto correlation function of a random process whose power spectral density is given by $4/(1+(\omega 2/4))$.

(OR)

Q8. a) A random process is defined as $X(t)=A \sin(\omega t + \theta)$, where A is a constant and θ is a random variable uniformly distributed over $(\pi,-\pi)$, check X(t) is stationary.

b) If x(t) is a stationary random process having mean = 3 and auto correlation function: $R_{XX}(\tau) = 9 + 2e^{-|\tau|}$. Find the mean and variance of the random variable.

Q9. a) Briefly explain the concept of cross power density spectrum.

b) Find the cross correlation of functions $\sin \omega t$ and $\cos \omega t$.

(OR)

Q10. a) Discuss the properties of cross power density spectrum.

b) Discuss the relation between cross power spectrum and cross correlation function.

Code No: **30401/40401**

MR13 & MR14

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Electronic Devices and Circuits**

Branch: **Common to EEE & ECE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. What is Hall Effect?
2. What is the cut in voltage for Silicon diode?
3. How many layers are available in SCR?
4. Define Emitter efficiency?
5. Define Self-biasing?

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Write the applications of CRO?
2. Prove that the path of an Electron in electric field is a parabola?
3. What is mean by Barrier Potential?
4. Mention some applications of PN Diode?
5. Derive the expression for ripple factor of Full wave rectifier?
6. Write advantages and disadvantages of Tunnel diode?
7. What are different features of FFT?
8. Draw the circuit symbols of NPN and PNP Transistor?
9. Derive the relation between α and β?
10. Define biasing and load line?

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

Q1. Explain the operation of C.R.O with neat diagram? (10M)

(OR)

Q2. i) Derive the expressions for acceleration, velocity of a charged particle placed in an electric field E?

ii) Derive the expression for continuity equation? [5+5]

Q3. (a) Define Static Resistance and Dynamic Resistance.

(b) Determine forward Resistance of PN junction diode when forward current is 5mA at T=300^{0}K.Assume silicon diode. [5+5]

(OR)

Q4. (i) With the help of necessary sketches explain the potential distribution in an open circuited PN junction?

ii) Determine the value of forward current in the case of a p-n junction diode, with $I_0=10\mu A$. V_F =0.8V at T=300^{0}K. Assume silicon diode. [5+5]

Q5. Draw the circuit of Full Wave Rectifier and find out the Ripple factor,% of regulation, efficiency and PIV. (10)

(OR)

Q6. Describe the following briefly

i) Principle of operation of a photodiode?

ii) Energy band structure and V-I characteristics of a tunnel diode? [4+6]

Q7. (a) Explain different current components in a Transistor with diagrams. (5+5)

(b) Draw the input and output characteristics of BJT in Common collector configuration.

(OR)

Q8. With neat sketches explain the operation of Depletion type MOSFET. (10)

Q9. (a) Derive the expression for Stability Factor 'S'.

(b) Draw a Fixed bias circuit and derive the expression for Stability Factor. (5+5)

(OR)

Q10 . Explain the operation of following Biasing Techniques. (5+5)

i) Fixed bias

ii) Self bias

Code No.: **30201/40201** | **MR13/ MR14**

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: **Electrical Circuits**

Branch: **Common to EEE & ECE**

Time: 3 hours **Max. Marks: 75**

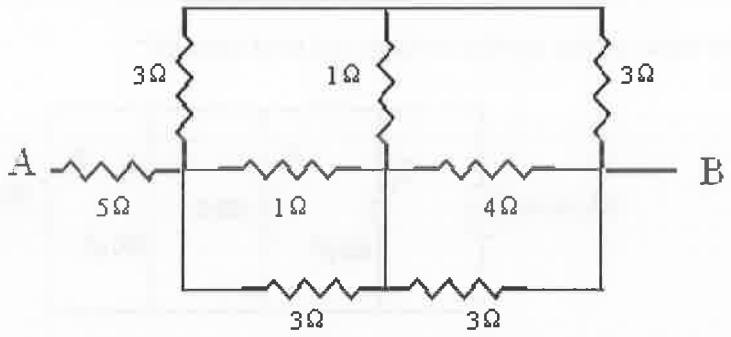
PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Define Kirchhoff's Laws?
2. Define Peak factor and Form factor?
3. Explain Faraday's laws of electromagnetic induction?
4. Define tree?
5. Define the statement of compensation theorem (DC)?

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Find the equivalent resistance between the terminals A & B for the network shown in the figure?

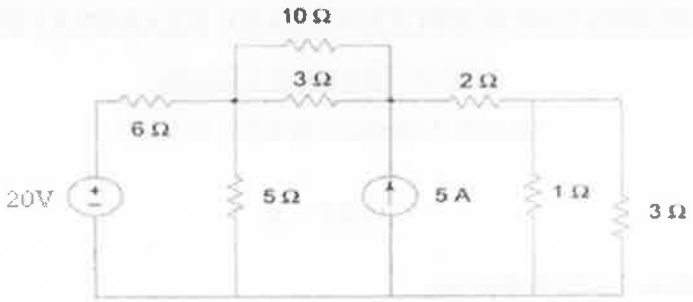


2. Define active and passive elements?
3. Compare the differences between Series Resonance and Parallel Resonance?
4. Define Resonance and Q-factor?
5. Compare the analogy of magnetic circuits and electric circuits?
6. Two identical coupled coils have an equivalent inductance of 80mH when connected series aiding and 35mH in series opposing. Find L_1, L_2, M and K?
7. Define i) Node ii) Loop and explain them by taking an example?
8. What is duality? What are dual quantities?
9. Illustrate the statement of Milliman's theorem (DC)?
10. What are the limitations of Super Position theorem?

PART-B

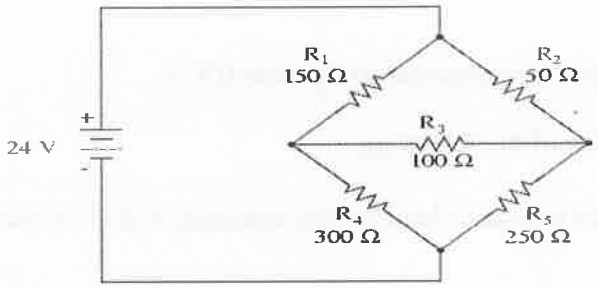
Answer ALL questions of the following **5x10 Marks= 50Marks**

1. Determine the voltages at each node by using nodal analysis for the circuit shown in the figure?

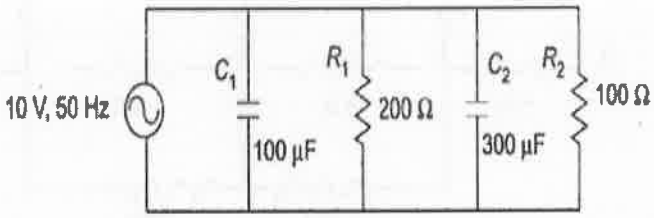


(OR)

2. Find the value of current for the network shown in the figure by using Star- delta / delta- star transformation?



3. For the parallel circuit shown in the figure, solve the current in each branch and total current. What is the phase angle between the applied voltage and total current?



(OR)

4. A series RLC circuit with R=100Ω, L = 0.5H, C=40µF has an applied voltage of $100\angle 0^0$ with variable frequency. Calculate the resonance frequency, current at resonance. Also calculate the Q-factor, upper and lower cutoff frequencies and bandwidth?

5. Derive an expression for equivalent inductance when two coils are connected in parallel Aiding?

(OR)

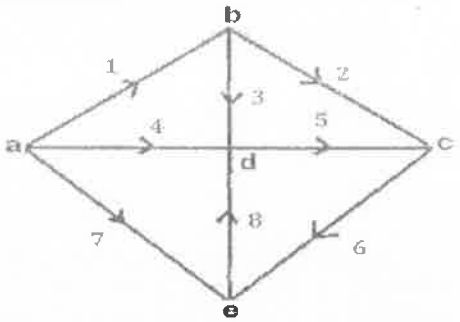
6. An iron ring of 20cm in diameter and $15cm^2$ in area of cross section is wound with coil of 400 turns. Determine the current in the coil to establish a flux density of $1.5wb/m^2$. If the relative permeability of iron is 800. In case if an air gap of 2.5mm is cut in the ring, what is the current in the coil to establish the same flux density. Neglect leakage flux.

7. Describe the procedure to construct the dual of a network with an example.?

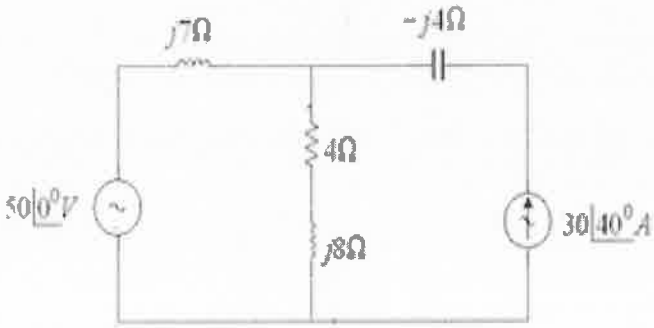
(OR)

8. a) Write short notes on connected graph and tie-set.?

b) For the following graph determine a cut-set matrix taking 3,4,5,8 as the twigs of the tree. a,b,c,d,e are the nodes of the graph.?



9. Determine voltage across 4+j8Ω as shown in the figure by using Super Position theorem.?



(OR)

Q10 By Using Thevenin's theorem, find the current through the 4Ω resistor?