Code No.: 80M02

MR18 (2018-19-Batch)

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 REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **GENDER SENSITIZATION**

Branch: **EEE, ECE, CSE&IT**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions of the following **5x14 Marks= 70Marks**

1	Describe the major milestones in the history of gender equality in India.
2	a) Analyze the ways in which 'counter socialization' can help in bringing gender equality. b) Interpret the statement "Love and Acid Just Do Not Mix
3	a) Write the reasons for the preference of sons over daughters in our society. b) Predict the demographic consequences of a skewed sex ratio.
	OR
4	Show how Pinki Pramanik's case illustrates gender discrimination in the field of sports.
5	Express in your own words the message conveyed by the poem "Vantillu".
	OR
6	a) Discuss the "fact and fiction" of women's work. b) Interpret and explain the phrase "Share the Load".
7	Write the main provisions of the Sexual Harassment at Workplace (Prevention, Prohibition and Redressal) Act, 2013.
	OR
8	a) Infer the major reasons which make it difficult for women to talk about sexual harassment. b) Explain some of the most common forms of violence which women experience.
9	Analyze the role played by the Boosa Chaluvali in the flowering of Dalit literature.
	OR
10	a) Explain the contribution of Bathula Shyam Sunder to modern Telangana History. b) Show how Chityala Ailamma is related to Telangana Armed Struggle.

Code No.: 80B10

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II B.TECH I SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **SPECIAL FUNCTIONS AND COMPLEX VARIABLES**

Branch: **COMMON TO EEE & ECE**

Time: 3 hours | Max. Marks: 70

Answer ALL questions of the following | **5x14 Marks= 70Marks**

1. Solve in series the equation $(1-x^2)\frac{d^2y}{dx^2}+2x\frac{dy}{dx}-y=0$ about $x=0$.

(OR)

2. Obtain the series solution of the equation $x(1-x)y''-3xy'-y=0$ about x = 0.

3. a) Show that i) $P_n(1)=1$. ii) $P_n(-1)=(-1)^n$

   b) Prove that $P_n(-x)=(-1)^n P_n(x)$.

(OR)

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

   b) Prove that $\int_{-1}^{1}(x^2-1)P_{n+1}P'_n dx=\frac{2n(n+1)}{(2n+1)(2n+3)}$.

5. a) Prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|real\ f(z)|^2=2|f'(z)|^2$ where $w=f(z)$ is analytic.

   b) Show that the function $f(z)=\sqrt{|xy|}$ is not analytic at the origin, although Cauchy-Riemann equations are satisfied at the point .

(OR)

6. State and prove the Cauchy integral formula.

7. a) Find the Laurent series expression of the function $\frac{z^2-1}{(z+2)(z+3)}$ if $2<|z|<3$.

   b) Expand $f(z)=\frac{1}{z^2-3z+2}$ in the region $1<|z|<2$.

(OR)

8. Prove that $\int_{-\infty}^{\infty}\frac{x^2}{(x^2+a^2)(x^2+b^2)}\,dx=\frac{\pi}{a+b}\quad(a>0,b>0,a\neq b)$.

9. a) Find the image of infinite strip $0<y<\frac{1}{2}$ under the transformation $w=\frac{1}{z}$.

   b) Find the image of the unit circle $|z|=1$ under the linear fractional transformation W(z) = (z-i)/(1-iz).

(OR)

10. a) Find the bilinear transformation which maps the points $\infty, i, 0$ in the z-plane into $-1,-i,1$ in the w-plane.

    b) Find the image of the region in the z-plane between the lines $y=0$ and $y=\frac{\pi}{2}$ under the transformation $w=e^z$.

Code No.: 80401

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II B.TECH I SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

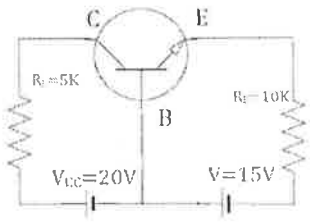
Subject: **ANALOG ELECTRONICS (Common to EEE & ECE)**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions of the following **5x14 Marks= 70Marks**

1. (a) Draw the transistor biasing circuit using fixed bias arrangement and explain its principle with suitable analysis.

(b) Find the quiescent point for the given figure.



(OR)

2. Summarize the different FET Biasing Techniques.

3. (a) In a single stage CB amplifier circuit, $R_E = 20K\Omega$, $R_C = 10K\Omega$, $V_{EE} = -20V$, $V_{CC} = 20V$, $R_L = 10K\Omega$ and $R_S = 0.5K\Omega$. Find AI , Ri , Ro, AV.

(b) What are the advantages of common collector amplifier? Explain how the input resistance of the CC amplifier can be enhanced further.

(OR)

4. (a) Draw the CC amplifier and derive the expression for AI, RI, AV, YO

(b) Describe about Millers theorem.

5. (a) Briefly discuss about classification of Amplifiers.

(b) With necessary circuit, explain working of low frequency response of CE Amplifier.

(OR)

6. (a) Derive the expression for voltage gain of a common source FET amplifier with and without source resistance included in the circuit.

(b) In the CS amplifier RL=5K, RG=10 Mohms, μ=50 and rd = 35K. Evaluate voltage gain, input impedance and output impedance.

7. (a) Give the block diagram of a general feedback amplifier. State the function of each block.

(b) Discuss quantitatively about the effect of negative feedback on

i) Gain ii) Bandwidth iii) Distortion.

(OR)

8. (a) An amplifier has a input resistance of 200 K ohms, with a certain negative feedback introduced in the above amplifier the input resistance is found to be 20 M ohms and overall gain is found to be 1000. Calculate the loop gain and feedback factor.

(b) Briefly describe about different negative feedback connections.

9. (a) Derive and explain Barkhausen criterion.

(b) Draw the circuit diagram and derive the expression for frequency of oscillation and condition for sustained oscillations of

i) Colpitts oscillator ii) Hartley Oscillator

(OR)

10 (a) Draw the circuit diagram of RC-Phase shift oscillator using BJT and derive the expressions for frequency of oscillations and condition on gain.

(b) Describe about the Classification of Oscillators.

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II B.TECH I SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **Signal and Systems**

Branch: **ECE**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions **5x14 = 70M**
All Questions carries equal marks

1. a) A rectangular function is defined as: $x(t) = A\ for\ 0 < t < \pi/2$
$= -A\ for\ \pi/2 < t < 3\pi/2$
$= A\ for\ 3\pi/2 < t < 2\pi$
Approximate the above function by $A\ cost$ between the intervals $(0,2\pi)$ such that the mean square error is minimum.

b) Explain the approximation of a function by a set of mutually orthogonal functions.

(OR)

2. a) Determine the Trigonometric Fourier series of $x(t) = t^2$ over the interval [-1, 1].

b) Define and draw the following signals i) unit impulse ii) signum
iii) unit step iv) unit ramp.

3. a) Find the Fourier transform of the following signals and draw its spectrum
$i)\ x(t) = e^{-at}u(t)$ $ii) x(t) = sgn(t)$

b) State and prove the following properties of Fourier transform
i) Time differentiation ii) Convolution in time domain.

(OR)

4. a) State and prove the sampling theorem for band limited signals.
b) Determine the Nyquist rate and interval corresponding to the signal
$x(t) = 1 + \cos 2000\pi t + \sin 4000\pi t$

5. a) Explain the ideal characteristics of LPF, HPF, BPF and BSF.
b) Define auto correlation and explain its properties.

(OR)

6. a) Determine the convolution of the signals using Fourier transforms
$x_1(t) = e^{-at}u(t)\ ;\ x_2(t) = e^{-bt}u(t)$

b) Deduce the relation between convolution and correlation.
c) Determine the autocorrelation function and energy spectral density of
$x(t) = e^{-at}u(t)$

7. **a)** Determine the System Transfer function of the system described by the differential Equation $d^2y(t)/dt^2+8dy(t)/dt+14y(t)=4dx(t)/dt+7x(t)$.

b) State and prove the following properties of Laplace transforms:
i) Differentiation in time domain ii) Final value theorem.

(OR)

8. **a)** Determine the Laplace transform and ROC of $x(t) = -e^{-2t}u(-t) + e^{-3t}u(-t)$ and sketch the ROC.

b) Determine the inverse Laplace transform of $X(s) = \frac{-3}{(s+2)(s-1)}$
if the ROC is : $-2<R\{s\}<1$

9. **a)** Solve the following difference equation $y(n)+2y(n-1)=x(n)$ with $x(n)=(1/3)^n u(n)$ and $y(-1)=1$.

b) State and prove the following properties of Z transforms
i) Time shifting ii) Differentiation in Z domain

(OR)

10. **a)** Determine the System function of a discrete system described by difference equation
$y(n)-1/3\ y(n-1)+1/5\ y(n-2)=x(n)-2\ x(n-1)$

b) Develop the relation between Z-Transform and DTFT.

Code No.: 80403

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II B.TECH I SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **Digital Electronics**

Branch: **ECE**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions **5x14 = 70M**
All Questions carries equal marks

1. a) Convert to hexadecimal and then to binary.
(i) 757.2510 (ii) 123.1710 (iii) 356.8910 (iv) 1063.510 [8M]
b) A = 101010 and B = 011101 are 1's complement numbers. Perform the following operations and indicate whether overflow occurs. (i) A - B (ii) A + B
Repeat the same assuming the numbers are 2's complement numbers. [6M]

(OR)

2. a) Construct a table for 7-3-2-1 weighted code and write 3659 using this code. [6M]
b) Construct a seven-bit error-correcting code to represent the decimal digits by augmenting the Excess-3 code and by using an odd-1 parity check. [8M]

3. a) Using the Quine-McCluskey method obtain all the prime implicants, essential prime implicants, and minimized Boolean expression for the function: [10M]
F (A, B, C, D, E) = Σ(4, 5, 6, 7, 9, 10, 14, 19, 26, 30, 31)
b) Draw a logic circuit for the function F = (A + B) (B + C) (A + C), using NOR gates only. [4M]

(OR)

4. a) Simplify and implement the following function with two-level NAND gate circuit:
$F(A,B,C,C) = A'B'C'D + CD + AC'D$ [6 M]
b) Prepare a Karnaugh map for the following functions: [8 M]
i) F = A + B + C'
ii) F = ABC + A'BC + B'C'

5. a) What is a look ahead carry generator? What is its importance? Draw a circuit for a 3-bit binary adder using a look ahead carry generator and other gates. [8M]
b) Show a full-adder can be converted to a full-subtractor with the addition of an INVERTER. [6M]

(OR)

6. a) Implement the Boolean function F (A, B, C, D) = Σ (1, 3, 4, 11, 12, 13, 15) using:
(i) decoder and external gates, and (ii) 8-to-1 MUX and external gates. [8M]
b) What is PLA? How does it differ from ROM? Draw and explain the block diagram of PLA. [6M]

7. a) Derive the characteristic tables and equations for JK, SR, T and D flip-flops. [8M]
b) Draw and explain a general Block diagram of a sequential circuit. Also, compare this with combinational circuit. [6M]

(OR)

8. a) What are the four basic types of shift registers? Draw a block diagram for each of them. [7M]
b) Design a MOD-16 Ripple counter using T flip-flops. [7M]

9. Draw the State Table, State diagram, Transition Table and Output table for a sequence detector 0101. Derive output and excitation functions and then implement these equations to yield the sequence detector.

(OR)

10. a) Explain the capabilities and limitations of finite state machines. [7M]
b) Draw the diagram of Mealy-type FSM for serial adder. [7M]

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II B.TECH I SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **PROBABILITY THEORY & STOCHASTIC PROCESSES**

Branch: **ECE**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions of the following **5x14 Marks= 70Marks**

1. a) A man matches coin flips with a friend. He wins 2 Rs if coins match and loses 2 Rs if they do not match. Sketch a sample space showing possible outcomes for this experiment and illustrate how the points map onto the real line x that defines the values of the random variable X="dollars won on a trial". Show a second mapping for a random variable Y="dollars won by the friend on a trial".

b) Explain total probability theorem and bayes theorem with properties.

(OR)

2. a) A certain large city averages three murders per week and their occurrences follows a Poisson distribution.

i). What is the probability that there will be five or more murders in a given week?

ii). On the average, how many weeks a year can this city expect to have no murders?

iii). How many weeks per year (average) can the city expect the number of murders per week to equal or exceed the average number per week?

b) In the experiment of throwing two fair dice, let A be the event that the first die is odd, B be the event that the second die is odd, and C is the event that the sum is odd. Show that events A, B and C are pair wise independent, but A, B and C are not independent.

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

b) The characteristic function for a Gaussian random variable X, having a mean value of 0, is $\Phi_X(\omega)$ =EXP(-sigma ^{2} /w ^{2}) Find all the moments of X using $\Phi_X(w)$.

(OR)

4. a) Derive expressions for mean and variance for binomial random variable.

b) Explain probability density function with four properties.

5. a) State and explain probability distribution function for two random variables.

b) State and prove any four properties of cross correlation function.

(OR)

6. a) The joint PDF of X and Y is $f_{(X,Y)}(x, y) = 5y/4$; $-1 \le x \le 1$, $x^2 \le y \le 1$, 0 otherwise. Find the marginal PDFs $f_X(x)$ and $f_Y(y)$.

b) Explain about central limit theorem.

7. a) State and prove the properties of Cross correlation function.

b) Find the mean and auto correlation function of a random process X(t)=A , where A is continuous random variable with uniform distribution over (0,1) .

(OR)

8. a) State and prove the properties of Autocorrelation function.

b) Show that the process X(t)= A Cos (w_0 t+θ) is wide sense stationery if it is assumed that A and w_o are constants and θ is random variable which is uniformly distributed over interval $[0,2\pi]$.

9. a) Derive the Relationship b/w power density spectrum and auto corelation function.

b) Derive the expression for average power of a random process x(t).

(OR)

10. Derive the expression for cross average power of a random process x(t) and y(t).

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II B.TECH I SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **Network Theory and Transmission Lines**

Branch: **ECE**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions of the following **5x14 Marks= 70Marks**

All Questions carry equal marks

1. State and Explain Reciprocity and Tellegen's theorems with suitable networks.

(OR)

2. a) Deduce the transient response of RLC series circuit excited by DC source.

b) The switch in the circuit (fig.1) has been closed for a long time. It is opened at t = 0. At $t = 0^+$, the current through the 1 μF capacitor is.

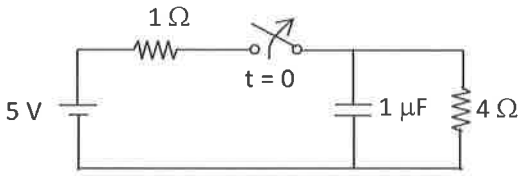

Fig. 1

3. Determine the h-parameters of the network for the figure (2) given below.

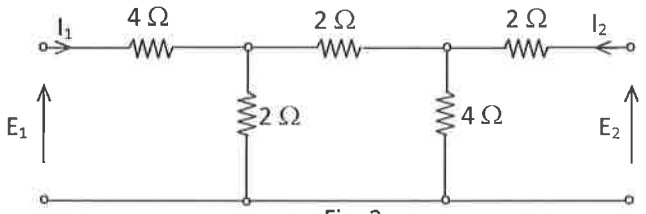

Fig. 2

(OR)

4. a) A two-port network is described by $V_1 = I_1+2V_2$ and $I_2= -2I_1+0.4V_2$. Find the impedance matrix.

b) Obtain the transmission line parameters when the two transmission networks having the transmission parameters A_1, B_1, C_1, D_1 and A_2, B_2, C_2, D_2 are connected in cascade.

5. For an R-L series circuit, with R varied from 0 to ∞, show that Current locus is a semi circle.

(OR)

6. Explain the following terms.

a) Faradays law of Electromagnetic Induction
b) Permeability
c) Magneto Motive force.
d) Mutual Inductance

7. A lossless Transmission line has a Capacitance of 60pF/m, and an Inductance of 200μH/m. Find the Characteristic Impedance for the section of a line of 50m long and 600m long.

(OR)

8. What are the primary and secondary constants of Transmission lines and explain their significance.

9. A low loss transmission line of 100Ω Characteristic Impedance is connected to a load of 400Ω. Calculate the Reflection Coefficient.

(OR)

10. Explain the significance and design of single stub Impedance Matching. Discuss the factors on which stub length depends.