Code No.: 50H16

MR15-2015-16 & 2016-17 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 SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Environmental Science**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Define eco system.
2. What are the major impacts due to over usage of ground water?
3. What are sources of soil pollution?
4. What are green house gases?
5. Write a note on Clean Development Mechanism

PART-B

Answer any 5 questions of the following **5x 10 Marks= 50Marks**

1. a) Give the classification of Ecosystem.
   b) "The flow of energy is one –way and continuous in an ecosystem". **Justify.**
2. a) List the main components of an Ecosystem. And briefly describe the functions of each.
   b) Difference between Food chain & Food web?
3. Explain genetic biodiversity, species diversity and eco system biodiversity
4. Discuss the major advantages of metallic and non metallic minerals.
5. a) Discuss various measures to control vehicular pollution.
   b) Discuss how solid waste can be managed by industries
6. a) Write short note on how does soil pollution affect soil productivity?
   b) Explain the adverse effects of air pollution.
7. Discuss the potential and contribution of these gases to global warming phenomenon
8. Explain the following
   a) Role of Information Technology in Environment.
   b) Environmental education

Code No.: **50403**

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

Subject: **Electronic Circuit Analysis**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. What is the coupling method required to amplify the DC signals in a multistage amplifiers? Give reasons.
2. Derive an expression for gain with feedback A_f in terms of gain without feedback A and desensitivity factor D.
3. State the frequency of RC phase shift oscillator?
4. What is a heat sink and why it is used?
5. Explain the necessity of using stabilization circuits in tuned amplifiers?

PART-B

Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. a) Explain the different coupling mechanisms used in multistage amplifiers.

   b) Derive the expression for current gain, input resistance, voltage gain of a generalized transistor amplifier.
2. Draw the circuit diagram of cascode amplifier and also derive the expressions for A_I , A_V , R_I & R_0 (use approximate model for analysis of the circuit).
3. a) Explain in detail about sampling circuits in Feed back amplifiers.

   b) What are the different types of feedback amplifiers? Give their equivalent circuits?
4. a) List the steps required to carry out the analysis of a feedback amplifier.

   b) Derive the expression for input and output resistance of voltage shunt feedback amplifier.
5. a) Draw the block diagram and derive the expression for frequency of oscillations for Hartley oscillator. **[6]**

   b) A Hartley Oscillator circuit having two individual inductors of 0.5mH each, are designed to resonate in parallel with a variable capacitor that can be adjusted between 100pF and 500pF. Determine the upper and lower frequencies of oscillation. **[4]**
6. a) Explain the operation of Colpitts oscillation with a neat circuit diagram and deduce the expression for frequency of oscillations. **[7]**

   b) A Colpitts Oscillator circuit having two capacitors of 24nF and 240nF respectively are connected in parallel with an inductor of 10mH. Determine the frequency of oscillations of the circuit. **[3]**
7. In a series fed Class-A power amplifier, explain the importance of the position of operating point on output signal swing. Show that the conversion efficiency is 25%.
8. Draw the circuit diagram of a double tuned circuit and explain its working and derive the expression for Bandwidth?

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MR15-2015-16 & 2016-17 Batch

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

Subject: **Principles of Electrical Engineering**

Branch: **ECE**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Write the laplace transform of second order differential equation.
2. Write the expression of 'Z' parameters in terms of 'Y' parameters.
3. Write the expressions for the transfer function and the corner frequency of the High pass filter.
4. State and briefly explain Tellegen's theorem.
5. What are the two components of no load current incase of a transformer?

PART-B

Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. a) Explain the procedure to find the solution of a differential equation using Laplace transform method

   b) Explain the transient response of series RL circuit?

2. A) Prove that the unit of (L/R) is second.

   B)A coil of resistance of 30 Ω and inductance of 0.6H is switched on a 240V supply.

   a) Calculate the rate of change of current (i) at the instant of closing of the switch when t=0 (ii)at time t=2(L/R)

   b)the magnitude of final steady state current.

3. a) Through derivation, express the z parameters in terms of the ABCD parameters.

   b) For a two-port, let A = 4, B = 30Ω, C = 0.1℧ and D = 1.5. Calculate the input impedance

   $$Z_{in} = \frac{V_1}{I_1}$$, when:

   i. the output terminals are short-circuited,
   ii. the output port is open-circuited,
   iii. the output port is terminated by a 10Ω load

4. (a) Why impedance parameters are called open circuit parameters?

   (b) Find Z – parameters for the network shown in figure 1.

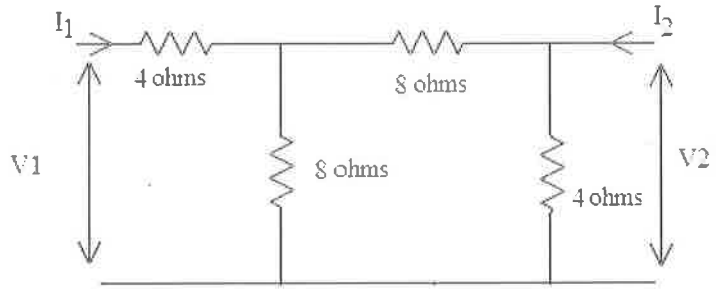

Figure. 1

5. a) Explain T – type attenuator and also design a T – type attenuator to give an attenuation of 40dB and to work in a line of 400Ω impedance.

   b) Write briefly on Lattice attenuator.

6. a) Design a symmetrical π-type attenuator?
   b) Design M-derived T-section low pass filter.

7. a) Give a brief Treatise on salient features of Millman's theorem.

   b) Determine the voltage across 6Ω resistance using superposition theorem in the figure below.

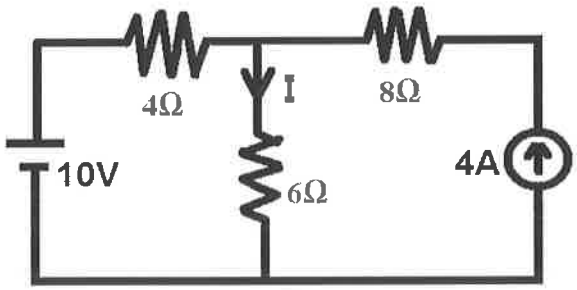

Figure 4

8. a) Give a brief Treatise on the operation of single phase Transformer.

   b) Derive the equivalent impedance at secondary side if primary is transformed to secondary side.

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

Subject: **Signals and Systems**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Classify continuous time signals.
2. State Sampling theorem.
3. Define transfer function of LTI system.
4. Find Laplace transform of delta impulse function.
5. State and prove Time reversal property in Z-transform.

PART-B

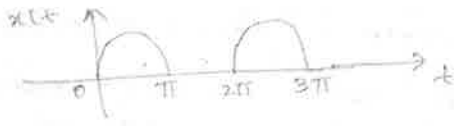
Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. a) Prove that the signals $\sin(n\omega_o t)$ and $\cos(n\omega_o t)$ are orthogonal to each other over the interval $(t_o, t_o+\frac{2\pi}{\omega_o})$
   b) Write short notes on Orthognal functions.

2. a) Define and sketch the following elementary signals
   i. Unit impulse signal ii. Unit step signal iii. Signum function
   b) Write short notes on causal and non-causal system.

3. a) Write short notes on Nyquist Rate.
   b) Write short notes on Hilbert transform

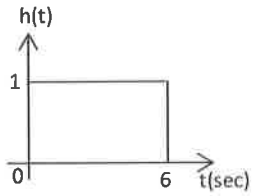
4. a) Find the trigonometric Fourier series of function below.

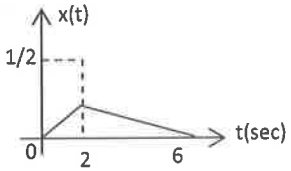


b) Verify time differentiation and duality properties of Fourier Transform.

5. a) Define the linearity, time invariant and casual properties of a system.
   b) Find the convolution of the following sequences x[n] and h[n],
   x[n]={1, 2, 3, 4} and h[n]={1, 1, 2, 3}
   ↑ ↑

6. a) The impulse response and the excitation function of a LTI causal system are shown in Fig below. Then
find the graphical convolution of x(t) with h(t).





b) Write short notes on Distortionless transmission of LTI system

7. a) If $x(z) = \frac{1}{(Z^2+3Z+2)}$, $|z|>2$, find x(n).

b) Determine inverse Laplace transform of $x(s) = \frac{1}{(s+3)(s+5)}$ $Re(s)> -3$

8. a) Find the Z-transform of the following sequences

i) $x(n) = [u(n) - u(n-5)]$

ii) $x(n) = \left(\frac{2}{3}\right)^n u(n)$

b) Find the impulse response of the Discrete system response $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n)$

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

Subject: **PROBABILITY THEORY AND RANDOM PROCESS**

Branch: **ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. What is the probability of getting 53 Mondays in a leap year?
2. Define correlation coefficient.
3. What is meant by Mean Ergodic process?
4. Why Fourier Transform is not used to describe the random process?
5. What is linear time invariant system?

PART-B

Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. a) State and prove Bayes theorem of probability **[6M]**
   b) In a single throw of two dice what is the probability of obtaining a sum of at least 8. **[2M]**
   c) A card is drawn from a pack of 52 cards, find the probability of getting a king or heart or a red card **[2M]**

2. a) Box1 contains 2000 diodes of which 10 percent are defective. Box2 contains 3000 diodes of which 5 percent are defective. Two diodes are picked from a randomly selected box. Find
      (i) The probability that both diodes are defective?
      (ii) If both diodes are defective, what is the probability that they came from box1?
   b) Write the combined sample space if you toss a coin and throw a die at same time.

3. a) How do you find marginal distribution function and marginal density function from the joint distribution and joint density function respectively.
   b) Discuss marginal distribution functions.

4. Find the density function of the random variable Z= X+Y, where X and Y are two independent uniform random variables over (-2.1) and (-1,1) respectively.

5. a) Prove that the random process $X(t)= A \cos(\omega_c t+ \theta)$ is WSS if it is assumed that ω_c is a constant and θ is a uniformly distributed variable in the interval $(0,2\pi)$.
   b) Explain the concept of Ergodicity in detail.

6. a) Write short notes on Ergodic process
   b) Find the mean and Auto correlation function of the Random process $X(t) = A\cos(wt+ \theta)$ where A and w are constants, θ is a random variable uniformly distributed on the interval $(0,2\Pi)$

7. a) If the PSD of X(t) is $S_{xx}(w)$. Find the PSD of dx(t)/dt
   b) X(t) is a stationary random process with spectral density Sxx(w). Y(t) is another independent random process $Y(t) = A\cos(wt + \theta)$, where θ is uniformly distributed over the range $(-\pi, \pi)$. Find the spectral density function of $Z(t) = X(t).Y(t)$
   ]
8. Find the autocorrelation function of response of an LTI system and cross correlation function of input and output of an LTI system.

Code No.: **50B08** | **MR15-2015-16 & 2016-17 Batch**

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

Subject: **Elementary Calculus & Transforms**

Branch: **Common to CE, ME, EEE & ECE**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Find the Smallest positive period T of the following functions : cos x, sin x, cos 2x, sin 2x, cos πx, sin πx, cos 2πx, sin 2πx.
2. Find the Z-transform of n^2a^n.
3. Sketch the region of integration in the double integral $\int_0^{2a}\int_{\sqrt{2ax-x^2}}^{\sqrt{2ax}} f(x,y)\,dy\,dx$.
4. Sate Cauchy's Mean Value theorem.
5. State Green's theorem.

PART-B

Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. Express the function $f(x)=\sqrt{1-\cos x}$ in $-\pi < x < \pi$ as Fourier series. **[10M]**
2. Find the Fourier series of the function $f(x)=\begin{cases}-a, & when\ -l<x<0\\ a, & when\ \ 0<x<l\end{cases}$ **[10M]**

3.a) Solve the partial differential equation (y+z)p – (z+x)q = x-y **[5M]**

b) Find the inverse Z-transform of $\frac{3z^2-18z+26}{(z-2)(z-3)(z-4)}$. (5 M)

4. a) Solve the partial differential equation: $q^2 = z^2 p^2 (1 - p^2)$. **[5M]**
   b) Form the partial differential equation from: $f(x^2+y^2, z-xy) = 0$. **[5M]**
5. Trace the curve r = a sin3θ, a>0
6. Trace the curve $x^2 y^2 = a^2(y^2 - x^2)$
7. Using Lagrange Method of Multiplier, find the minimum values of the function A(r, h) = $3\pi r^2 + 2\pi r h$ subject to the constraint : $\pi r^2 h + \frac{2}{3}\pi r^3 - 400 = 0$.
8. a) By transforming to triple integral, evaluate $\iint_S (x^3\,dydz + x^2 y\,dzdx + x^2 z\,dxdy)$ where S is the closed surface consisting of the cylinder $x^2+y^2=a^2$ and the circular discs $z=0$ and $z=b$. **[5M]**

   b) Using Green's theorem, evaluate $\oint_C (y-\sin x)\,dx + \cos x\,dy$,where C is the plane triangle enclosed by the lines $y=0, y=\pi/2$ and $y=2x/\pi$.