

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 II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: **SPECIAL FUNCTIONS & COMPLEX ANALYSIS**Branch: **COMMON TO EEE,ECE**

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

1. Evaluate $\int_0^1 x^3 \sqrt{1-x} \, dx$ using $\beta - \Gamma$ functions.
2. Show that $J_{\frac{3}{2}}(x) = \sqrt{\frac{2}{\pi x}} \left(\frac{1}{x} \sin x - \cos x \right)$
3. Evaluate $\int_C \frac{z^2 - z + 1}{z - 1} dz$ where C is the circle $|z| = \frac{1}{2}$.
4. Find the Taylor's expansion of $f(z) = \frac{z-1}{z+1}$ about the point $z = 1$.
5. Find the invariant points of the transformation $\omega = \frac{1+z}{1-z}$.

PART-B

Answer ANY FIVE questions of the following

5x10 M= 50M

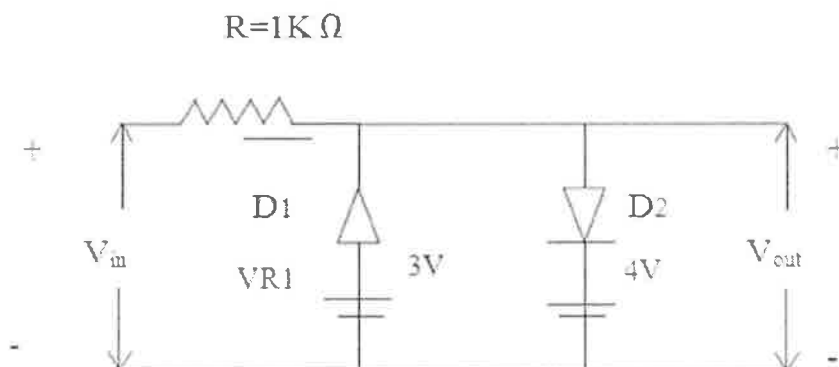
1. a) Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$
b) Prove that $\int_0^{\frac{\pi}{2}} \sin^2(\theta) \cos^4(\theta) d\theta = \frac{\pi}{32}$
2. Solve in series the equation $\frac{d^2 y}{dx^2} + xy = 0$
3. State and prove Rodrigue's formula.
4. a) Find the orthogonal trajectories of the family of curves $r^2 \cos(2\theta) = c$
b) Evaluate $\int_C \frac{dz}{z-a}$ where c is $|z-a| = r$.
5. a) Evaluate $\int_C \frac{e^{-z}}{z^2} dz$, C: $|z| = 1$.
b) State and prove Cauchy-Residue theorem.
6. a) Find the Laurent series expansion of the function $\frac{z^2-1}{(z+2)(z+3)}$ if $2 < |z| < 3$.
b) Expand $\frac{z}{(z^2-1)(z^2+4)}$ in laurent's series for $1 < |z| < 2$.
7. Find and plot the image of the triangular region with vertices (0,0) , (1,0), (0,1) under the transformation $W = (1-i)z + 3$.
8. Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $w = i, 0, -i$.

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1. Draw the circuit diagram of a one shot multivibrator?
2. Explain the criteria for a good differentiating circuit?
3. Sketch the circuit of a positive clamper.
4. Explain how the logic families are the entity of the logic gates?
5. What is practical clamping?

PART-B**Answer ANY FIVE questions of the following****5x10 M= 50M**

1. A 1kHz symmetrical square wave of $\pm 12V$ is applied to RC circuit having 1ms time constant. Calculate and plot the output for the RC configuration as
(i) High pass circuit (ii) Low pass circuit.
2. Discuss the response of RC high-pass circuit to different types of input voltages along with input and output waveforms.
3. Draw the circuit diagram of a DC restorer circuit with and without reference voltage and explain its operation for a sinusoidal input signal.
b) Explain the operation of the following double diode clipper and sketch the output wave form for a sinusoidal input with piece rise linear transistor curve shown below



4. a) Explain the working of a diode clamper explain its square wave response what is the effect of source resistance?
b) Explain the phenomenon of latching in a transistor switch?

5. Explain the operation of Monostable Multivibrator with the asymmetrical triggering circuit with a neat sketch.
6. Design an Astable multi-vibrator to produce an un-symmetrical wave $T_1=0.5\text{ms}$ and $T_2=0.4\text{ms}$. The amplitude of square wave is 15V. Assume $h_{fe(\min)} = 20$, $I_{c(\text{sat})} = 5\text{mA}$ and $V_{CE(\text{sat})} = 0\text{V}$.
7. Discuss with necessary circuits, how basic gates AND, OR & NOT are obtained using universal NAND gates.
8. a) For a mono stable vibrato calculate the input pulse width for the design values of
 $R_C = 2\text{k}\Omega$ $R_B = 10\text{k}\Omega$ $C = 0.1\mu\text{F}$ $V_{CC} = 10\text{V}$ $V_{BE\text{ Sat}} = 0.8\text{V}$
b) Explain the operation of a stable relaxation circuit with necessary wave form.

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **DIGITAL ELECTRONICS**Branch: **ECE**

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

- Express the following numbers in decimal i) $(10110.0101)_2$ ii) $(16.5)_{16}$
- What is a Don't care?
- Realize a full adder circuit using 4x1 mux
- What is race around condition?
- What is a merger chart?

PART-B

Answer ANY FIVE questions of the following

5x10 M= 50M

- a) Explain any two binary weighted codes with example.
b) Perform the subtraction with the following unsigned binary numbers by taking the 2's

Complement of the subtrahend

i) 100-110000

ii) 1010-1101

- a) Convert AF3B to binary.
b) Obtain the 15-bit hamming code word for the 11-bit data word 11001001010.
- a) Express the following function in sum of min terms and product of max terms
$$F(A,B,C,D) = B'D + A'D + BD$$

b) Simplify the following Boolean expression using four-variable maps
$$w'z + xz + x'y + wx'z$$

- Design BCD to Gray code converter and realize using logic gates.
- a) Design a 16:1 mux using 2:1 muxs.
b) Design a combinational circuit for BCD to Excess-3 code converter.
- a) Explain the working of 4-bit asynchronous counter.
b) Define a ripple counter. Design a BCD ripple counter.
- a) Design 4 bit binary counter using D flip-flop.
b) Develop a HDL code for implementation of JK flip-flop.
- Design a sequence detector to detect a sequence 101 using mealy machine.

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **ELECTROMAGNETIC THEORY & TRANSMISSION LINES**

Branch: ECE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

1. State the continuity equation.
2. In cylindrical co-ordinates $B=2.0/r$ a_φ Tesla. Determine the magnetic flux (Φ) crossing the plane surface defined by $0.5 \leq r \leq 2.5$ m and $0 \leq z \leq 2.0$ m.
3. What is loss tangent? Discuss its significance.
4. Define Phase velocity and Group velocity and write its equations.
5. Write Relation between reflection coefficient and Input impedance of transmission line.

PART-B

Answer any FIVE questions of the following

5x10 M= 50M

1. Derive the dielectric –dielectric boundary conditions in static electric field.
2. a) A point charge, $Q_1 = 2 \mu\text{C}$ is at (2, 3, 6) and another charge, $Q_2 = 5 \mu\text{C}$ is at (0,0,0) in free space. Find the force on Q_1 due to Q_2 .
b) State Coulomb's law and derive the equation for force (F) that exists between two points charges Q_1 and Q_2 .
3. Write the following
 - a) Maxwell's equation in differential form
 - b) Magnetic boundary conditions
4. a) State Maxwell's equations for static EM fields in point & integral forms. Give their word statements. [6M]
b) Find H at the centre of a square current loop of side 'l' by using Biot-Savart's law? [4M]
5. a) Prove that $\frac{|E|}{|H|} = 120\pi\Omega$ for free space
b) Define Brewster angle and prove that $\theta_B = \tan^{-1} \sqrt{\frac{\epsilon_2}{\epsilon_1}}$. The Symbols have their usual meanings.
6. a) Explain about the propagation constant in transmission lines
b) A lossless transmission line has a capacitance of 50 PF/m and an inductance of 200 nH/m. find the characteristic impedance for section of a line 10 m long and 500 m long.
7. a) What the different types of losses in transmission lines.
b) A telephone line has $R = 30 \Omega/\text{km}$, $L = 100\text{mH}/\text{km}$, $G = 0$ and $C = 20\mu\text{F}/\text{km}$, at $f = 1 \text{ KHz}$. Obtain Z_o, γ and phase velocity.
8. a) A load of $100+j150 \Omega$ is connected to 75Ω lossless line, find
 - i) Reflection coefficient ii) VSWR iii) The Load admittance Y_L using Smith chart
 - b) A load of $(25-j50)\Omega$ is connected across a 50Ω line. Design a Short circuit stub in order to provide impedance matching between the two at a signal frequency of 60 M Hz.

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **ANALOG COMMUNICATIONS**Branch: **ECE****Time: 3 hours****Max. Marks: 60****PART – A****Answer ALL questions of the following****5x2M=10 M**

1. Compare AM and DSB-SC system.
2. Draw and explain the spectrum of VSB modulated wave.
3. Discuss Image Frequency.
4. What is AGC control? What are its functions?
5. Write merits and demerits of PAM.

PART-B**Answer ANY FIVE questions of the following****5x10 M= 50M**

1. a) Define modulation index and percentage of modulation of AM?
b) Derive the power relations in the AM wave.
2. Compare various Amplitude Modulation Techniques.
3. a) Explain coherent detection of SSB signals.
b) Explain about Hilbert Transformation.
4. a) Describe the principle of VSB Modulation.
b) VSB modulation.
5. a) Explain the concept of direct method of FM.
b) A FM signal having frequency deviation of 75KHZ and $f_m=15\text{KHZ}$ find out the modulation index of FM.
6. Compare figure of merit of DSB-SC and SSb-SC.
7. a) Explain the principle of single tone Frequency Modulation.
b) Indirect FM.
8. a) Explain the working of tuned ratio frequency receiver with the help of a block diagram.
b) List out of advantages and disadvantages of TRF receiver.

Code No.: 50584

MR15

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: COMPUTER ORGANIZATION & OPERATING SYSTEMS

Branch: ECE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

1. What is an Interrupt? Explain why it has importance.
2. Give difference between Virtual and Cache memory.
3. What is Priority Interrupt?
4. What is dual mode operation of operating system?
5. Explain about File Allocation Methods?

PART-B

Answer any FIVE questions of the following

5x10 M= 50M

1. a) What are data representations? Explain different types of data representation with example.
b) What is instruction cycle? Explain with flow chart.
2. What is Micro Operation? Explain briefly about all Micro Operations.
3. a) Explain the basic organization of micro programmed control unit.
b) Explain about the micro programmed control organization.
4. a) Explain about IO Processor
b) What is DMA? Discuss about DMA controller.
5. Explain Briefly about Standard Serial Communication Protocols.
6. Find the number of page faults for following page reference string using the FIFO and LRU page Replacement policies.
Reference string: 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5 (assume page frame = 3)
7. a) What is Demand Paging and how it is implemented? Explain.
b) Explain the Address Translation in Virtual Memory.
8. a) What is File System? Illustrate the File System Implementation.
b) Explain about File Sharing and Access Methods.

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **HUMAN VALUES & PROFESSIONAL ETHICS**Branch: **COMMON TO EEE,ECE,CSE**Time: **3 hours**Max. Marks: **60****PART – A**Answer **ALL** questions of the following**5x2M=10 M**

1. What is self-confidence and how it drives an individual towards his/her goal?
2. List out few variety of Moral Issues.
3. 'Sense of humor plays an important role in mental wellbeing and maintaining good human relations of an individual'. Substantiate the statement.
4. What is meant by Humanistic Universal Order?
5. Discuss briefly about respect for authority.

PART-BAnswer **ANY FIVE** questions of the following**5x10 M= 50M**

1. Discuss in detail of the following. a) Integrity b) Work Ethics.
2. a) What happens if an individual loses his integrity?
b) Define moral character.
3. Explain Kohlberg's theory of moral development.
4. In our behavior, we generally observe our intention and others lack of competence. Does it lead to mutual happiness? What is the alternative? Explain with the help of an example.
5. Most precious thing in the world is 'Time'. Substantiate the statement with suitable examples.
6. Discuss the following briefly.
 - a) Sense of Humour
 - b) Commitment.
7. Right understanding in the individuals in the individuals is the basis for harmony in the family, and is the building block for harmony in the society. Give your comments.
8. What are the general procedures for implementing the right to due process, differentiate human rights and professional rights?

