Code No.: **70202** | **MR17**

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-2018

Subject: **Electrical Circuit Analysis And Synthesis**

Branch: **EEE**

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

PART – A

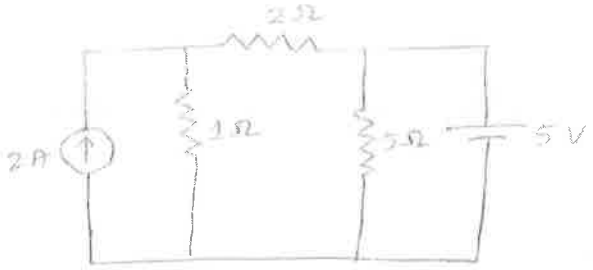
Answer ALL questions of the following **5x2Mark=10 Marks**

1. State Tellegen's theorem ?
2. Define Locus diagram?
3. Draw the equivalent circuit of a two port network in terms of z-parameters.
4. How inductor behaves immediately after closing the switch why?
5. List out the properties of positive real function.

PART-B

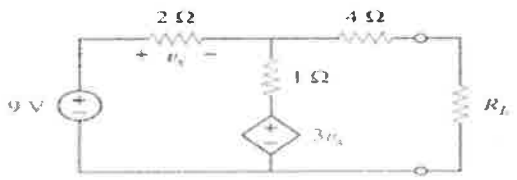
Answer ALL questions of the following **5x 10 Marks= 50Marks**

1. a) State and prove maximum power transfer theorem for an DC circuit.
   b) Determine the current flowing through 5 ohm resistor using thevenin's theorem



OR

2. For what value of R maximum power will be transferred to the load. Also find the value of maximum power. **10M**



3. Explain about three phase unbalanced loads.

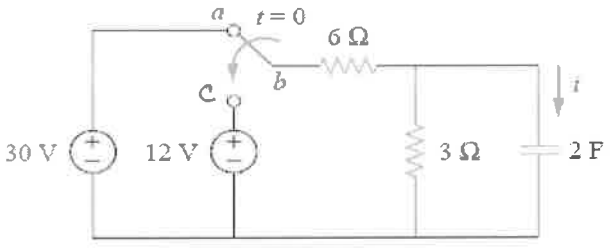
OR

4. Derive the relationship between line voltage and phase voltage in star connected system.
5. Explain the condition of reciprocity and symmetry of Z parameters with an example.

OR

6. **a)** Obtain the expression of ABCD parameters when two port networks in terms of H parameters.
   b) Explain the condition for Reciprocity of H parameters with an example.

7. **a.** The switch has been in position a for long time. At t=0 it moves to position **c** Calculate i(t) for t > 0. [5M]



b. Obtain the transient response of a series RC circuit with step input V. **5M**

OR

8. Derive an expression for current for an series RC circuit using Laplace approach when AC excitation is given for the system? Explain.

9. **a.** Synthesize $Z(s) = \frac{2S^5+12S^3+16S}{S^4+4S^2+3}$ using Cauer forms. **5M**

b. Is the following polynomial Hurwitz? **5M**

$P(s) = S^6+4S^5+8S^4+20S^3+19S^2+16S+12$

OR

10. Find the nature of the impedance function $Z(s) = \frac{(S^2+1)(S^2+3)}{S(S^2+2)(S^2+5)}$. Synthesize the network by (i) Foster Form-I and (ii) Foster Form-II.

Code No.: **70203** | **MR17**

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-2018

Subject: **Electromagnetic Fields**

Branch: **EEE**

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

PART – A

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

1. Define Electric field intensity and Electric flux density.
2. Define dielectric constant and electric susceptability
3. How right hand thumb rule is used in static magnetic fields.
4. Write the correlation between Lorentz force and principle of DC motor.
5. Define Poynting vector.

PART-B

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

1. State and explain coulomb's law and deduce the vector form of force equation between two point charges.

OR

2. Three concentrated charges of 0.25μC are located at the vertices of an equilateral triangle of 10 cm side. Find the magnitude and direction of the force on one charge due to the other two charges.

3. Calculate the capacitance of a parallel plate capacitor having a mica dielectric, ε_r=6 and area of the plate 10 cm^2 and separated with a distance of 0.01 cm. Also find the energy stored in the capacitor if the potential difference is 200 V

OR

4. (a) Derive the continuity equation and write its physical significance
   (b) Calculate the angle refracted field lines in a slab of sulphur surface of permittivity 4. If the electric field in air (ε_r=1) above the sulphur slab is incident at an angle of 30^0 with the normal at the boundary between the two medium

5. Derive a general expression for the magnetic flux density B at any point along the axis of a long solenoid. Sketch the variation of B from point to point along the axis.

OR

6. Derive the expression for MFI due to infinite sheet of current using Ampere circuital law.

7. Derive the expressions for the force acting on a current carrying conductor placed in the magnetic field. A conductor of 6m long lies Z direction- with a current of 2A in a_z direction find the force experienced by the conductor if B=0.08 a_x T.

OR

8. a) Two long parallel conductors carries 100A,if the conductors are separated by 20mm. Find the force for meter length of each conductor.

   b) Describe vector Poisson's equations.

9. a) Derive Maxwell's IV equation in time varying fields.

   b) Write the Maxwell's equation for free space in differential form.

OR

10. a) Calculate the inductance of solenoid of 200 turns wound on a cylindrical tube of 6 Cm diameter the length of tube is 60 Cm and the solenoid is placed in air.

    b) Two mutually coupled coils are connected in series L_1=0.5H L_2=0.6H M=0.1H. A DC current of 2A is passed through the system in such a way that the current increases at a rate of 1A/s. What is the voltage developed across end points if the coils are connected in a magnetically aiding direction.

Code No.: 70B03 | MR17

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-2018

Subject: **Advanced Calculus**

Branch: **Common to CE, ME, EEE, ECE, CSE, IT**

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

PART – A

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

1. Obtain the Taylor series expansion of e^x about x = -1
2. Evaluate $\int_0^1 \int_0^y xye^{-x^2} dxdy$
3. Find a unit normal to the surface $xy^3z^2 = 4$ at the point $(-1,-1,2)$
4. Evaluate $\int_0^1 [ti + (t^2 - 2t)j + (3t^2 + 3t^3)k]\, dt$
5. Write the auxiliary equations of Charpit's Method

PART-B

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

1. a) Determine the functions $u = xy + yz + zx, v = x^2 + y^2 + z^2$ *and* $w = x + y + z$ are functionally dependent or not? If so find the relation between them.
   b) Find the extreme values of the function $f(x, y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$

   OR
2. Verify Rolles theorem for f(x) = $x^{2m-1}(a - x)^{2n}$ in [0, a] where a>0.
3. a) Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} dz\, dy\, dx$

   b) Using spherical polar co-ordinates find the volume of the sphere $x^2 + y^2 + z^2 = a^2$

   OR
4. Change the order of integration and evaluate $\int_0^b \int_{\frac{a}{b}\sqrt{b^2-y^2}}^{a} xydxdy$
5. a) Find the directional derivative of $f = x^2 - y^2 + 2z^2$ at the point $P(1,2,3)$ in the direction of the line PQ where Q is the point (5, 0, 4). Also calculate the magnitude of the maximum directional derivative.

   b) Find the constant a so that the vector field is solenoidal. $\vec{f} = (x+3y)\vec{i} + (y-2z)\vec{j} + (x-az)\vec{k}$

   OR
6. Show that the vector field A = $(x^2 + xy^2)i + (y^2 + yx^2)j$ is irrotational, and find scalar potential Function

7. Prove that $\vec{f}=\left(4xy-3x^2z^2\right)\vec{i}+2x^2\,\vec{j}-2x^3z\,\vec{k}$ is **a)** conservative field **b)** find the scalar potential of $\vec{f}$ **c)** find the work done in moving an object in this field from (0,0,0) to (1, 1, 1)

OR

8. Verify Greens theorem $in\ the\ xy-plane\ for\ \int_c$ e^x(siny dx + cosy dy)where c is rectangle with vertices (0, 0), (1, 0), (1, π/2), (0, π/2)

9. (a) Form a partial differential equation by eliminating the arbitrary constants a, b from $(x-a)^2+(y-b)^2=r^2$

   (b) Solve $z^2\left(p^2+q^2+1\right)=1$

OR

10. (a) Form the partial differential equations by eliminating the arbitrary function z = f(sin x + cos y).

    (b) Solve the partial differential equation zpq = p+q

Code No.: **70401** | **MR17**

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-2018

Subject: **Electronics Circuits-1**

Branch: **Common to EEE & ECE**

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

PART – A

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

1. What is base width modulation in CB configuration?
2. List 2 advantages of FET over BJT.
3. List the advantages and disadvantages of fixed bias method.
4. Write the voltage and current equation for hybrid parameters.
5. Mention small signal parameters of JFET.

PART-B

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

1. a) Explain CE configuration with input and output characteristics. (7M)
   b) Convert β to α and α to β. (3M)

OR

2. a). Explain how transistor works as an amplifier?
   b). Explain the working of pnp transistor.
3. a) Explain the construction of N channel JFET. (6M)
   b) How does the FET behave for small and large values of V_{ds}? (4M)

OR

4. a) Draw the drain characteristics of a n-channel JFET and Explain it.
   b) Derive the relationship between transconductance (gm), drain resistance (rd) and amplification factor (μ).
5. a) Explain about Thermistor and Sensistor Compensation. (7M)
   b) Derive the expression for stability factor of self bias circuit. (3M)

OR

6. (a) What is an operating point? Explain. [6 M]
   (b) Explain the effect of R_S in voltage divider biasing circuit and sketch the Q point plot. [4 M]
7. a) Derive the h-parameters of single stage CE amplifier (8M)
   b) Compare input and output impedances of CE, CB and CC amplifiers (2M)

OR

8. Draw the circuit diagram of CC amplifier using hybrid parameters and derive the expressions for A_I, A_V, R_i and R_O.
9. a) Explain common source amplifier operation with frequency response curve. (8M)
   b) Write short notes on Amplitude distortion. (2M)

OR

10. Draw the small signal hybrid model of CE amplifier and derive the expressions for its Ai, Av, Ri and Ro.

Code No.: **70402** **MR17**

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, DECEMBER-2018

Subject: **Switching Theory & Logic Design**

Branch: **Common to EEE & ECE**

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

PART – A

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

1. Convert $(10110.0110)_2 = (?)_8$, $(A6)_{16} = (?)_{10}$, $(1266)_8 = (?)_{10}$.
2. Represent 2 input XOR gate in Standard POS Form?
3. A decoder with an enable input acts like a demultiplexer. Comment on this.
4. Draw the logic diagram of a D Latch with enable?
5. What is a FSM?

PART-B

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

1. a) Perform the following addition in Ex-3 Code.
   i) 37+28 ii) 247+359.
   b) What is the Hamming code? How is the Hamming code word detected and corrected?

OR

2. The message below coded in the 7-bit hamming is transmitted through a noisy channel. Decode the message assuming that at least a single error occurred in code word 0011011.

3. a)Simplify the expression $\pi M(2,8,9,10,11,12,14)$ and implement the real minimal expression in universal logic ?
   b) Identify all the Prime implicants and essential prime implicants of the following function using k-map $F(A,B,C,D)=\sum m(0,1,2,5,8,10,13,14,15)$.

OR

4. Use the tabulation procedure to generate the set of prime implicants and to obtain all minimal expressions for the following function
   $F(a,b,c,d,e) = \Sigma (0,1,3,8,9,13,14,15,16,17,19,24,25,27,31)$
5. Design a 3-bit Comparator circuit with neat sketch.

OR

6. a) Design 16:1 mux using 4x1 mux's?
   b) Explain the method of carry look ahead adder circuit with the help of its logic diagrams?

7. Design a 3- bit binary Synchronous Up counter with –T Flip-Flops?

OR

8. a.Convert a JK Flip Flop to a D Flip Flop ?

   b. Implement a 3 bit down counter using D Flip Flops ?

9. Write about the following terms with an example

   a) State Diagram

   b) State Table.

OR

10. Draw the state diagram to detect the sequence 101 from input sequence, design a sequential circuit using JK flip flop for the same?