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-2017

SUBJECT: ELECTRONIC DEVICES AND CIRCUITS

Branch: **Common to EEE & ECE**

Time: 3 hours   Max. Marks: 75

PART – A

I . **Answer all the questions**   5x1M=5 Marks

1. What is sweep time in CRO?
2. Explain the term 'dynamic resistance'?
3. Define form factor?
4. Define pinch-off voltage?
5. what is meant by bias stability?

II. **Answer all the questions**   10x2M=20 Marks

1. Prove that the path of an electron in electric field is a parabola?
2. What is a Fermi level?
3. Explain Avalanche breakdown?
4. Define the term diffusion capacitance C_D of a diode?
5. List the applications of a photo diode?
6. Which type of diode capacitance is used in Varactor diode?
7. Write short notes on large signal current gain?
8. Why we call FET as a voltage controlled device?
9. What do you mean by biasing for zero current drift?
10. What are the different biasing methods of JFET?

PART-B

Answer all questions   **5x10 Marks= 50Marks**

1. i) Explain the function of vertical deflection system in a CRO with block diagram?
   ii) Explain about electrostatic deflection sensitivities?   [5+5]

(or)

2. 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]

3. i) Explain V-I characteristics of a PN junction diode?
   ii) Explain how a barrier potential is developed at the PN junction?   [6+4]

(or)

4. Explain the switching charecteristics of diode with the help of simple diode circuit?   [10]

5. Explain the V-I chareceteristics of tunnel diode with negative resistance region.state the applications?   [10]

(or)

6. Derive the expressions for Ripple factor,Regulation and Rectifier Efficiency for Half wave Rectifier?   [10]

7. Explain the input and output chareceteristics BJT in CB configuration?   [10]

(or)

8. With a neat sketch explain the drain source chareceteristic and transfer chareceteristics of enhancement type MOSFET?   [10]

9. Calculate the quiescent current and voltage of collector to base bias arrangement using the following data: V_{cc}=10v, R_b=100KΩ, R_C=2KΩ, β=50 and also specify avalue of R_b so that V_{CE}=7V?   [10]

(or)

10. What are requirements of FET biasing? verify these requirements in source self bias circuit?   [10]

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: **Mathematics-III**

Branch: **Common to EEE & ECE**

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer All Questions   5x1Mark=5Marks

1) In which case Frobenius method is preferred.

2) Write the Legendre's equation.

3) State necessary and sufficient conditions for f(z) to be analytic in Cartesian
   Co ordinates.

4) Write Taylor's series expansion of Cos Z.

5) Define conformal mapping.

II. Answer All Questions   10x2Marks=20Marks

1) Write the working procedure to solve the differential equations.

2) Write the complementary function for $\dfrac{d^2 y}{dx^2} + a^2 y = \sec ax$.

3) Write the value of $[J_{\frac{1}{2}}(x)]^2 + [J_{-\frac{1}{2}}(x)]^2$

4) Write the formula of generating function for $J_n(x)$.

5) Show that f(z) = xy + iy is everywhere continuous but not analytic.

6) State generalized Cauchy's integral formula.

7) Find the poles for $f(z) = \dfrac{z^2}{(z-1)(z+2)^2}$.

8) Find the residue for $f(z) = \dfrac{z}{z^2 - 4}$.

9) Define bilinear transformation.

10) Write the cross ratio property of four points.

PART-B

Answer all questions   5x10 Marks= 50Marks

1. Solve in series $xy^{11} + 2y^1 + xy = 0$ by using Frobenious method.

(OR)

2. Solve in series $(1 - x^2)\dfrac{d^2 y}{dx^2} - x\dfrac{dy}{dx} + 4y = 0$

3. Prove that $\frac{d}{dx}[xJ_n(x)J_{n+1}(x)] = x[J^2{}_n(x) - J^2{}_{n+1}(x)]$

(OR)

4. Express $x^3 + 2x^2 - x - 3$ in terms of Legendre polynomials.

5. Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz$ where C is the circle $|z| = 3$.

(OR)

6. Find a and b if $f(z) = (x^2 - 2xy + ay^2) + i(bx^2 - y^2 + 2xy)$ is analytic. Hence find f(z) in terms of Z.

7. Obtain the Taylor series expansion of $f(z) = \frac{e^z}{z(z+1)}$ about $Z = 2$.

(OR)

8. Show that $\int_0^{2\pi} \frac{d\theta}{2 + \cos\theta} = \frac{2\pi}{\sqrt{3}}$.

9. Find the bilinear transformation which maps the points (2, i, -2) in to the points (1, i, -1).

(OR)

10. Find the image of the domain in the Z –plane to the left of the line x= - 3 under the transformation $w = z^2$.

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II B.Tech I Semester Supplementary Examinations, NOVEMBER-2017

SUBJECT: Electrical circuits

Branch: Common to EEE & ECE

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer All Questions   5x1Mark=5Marks

1. Find the voltage across the two resistances for the given circuit.
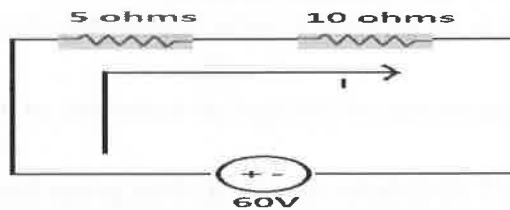

2. Explain the significance of J notation.
3. Define Magnetic flux Density.
4. Define oriented Graph.
5. Write the limitations of super position theorem.

II.   Answer the following.   10x2M=20 Marks

1. Write short notes on super node and super mesh.
2. Write Short notes on Source Transformation.
3. Explain about Active, Reactive and Apparent powers.
4. Derive the Expression for Complex power.
5. State and explain the laws of Magnetism.
6. Derive the relation between M.M.F, Reluctance and the flux.
7. Write down the Procedure to construct the Dual of Network.
8. What is an Incidence Matrix? What are the properties of complete incidence matrix?
9. State Reciprocity theorem?
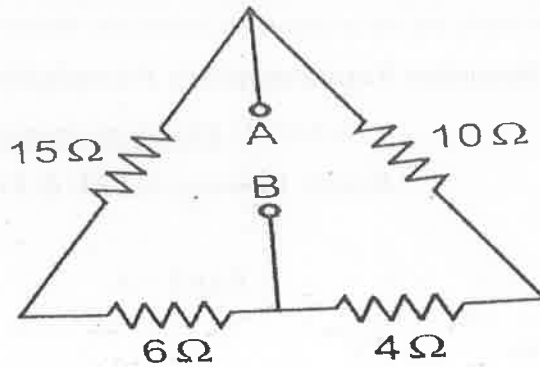10. Explain Tellegen's Theorem for D.C Excitations?

PART-B

Answer all questions   5x10 Marks= 50Marks

1. a) Derive the VI Relationships for Passive Elements?   [4+6]
   b) For the circuit shown in fig find the current through 20 Ω Resistance.
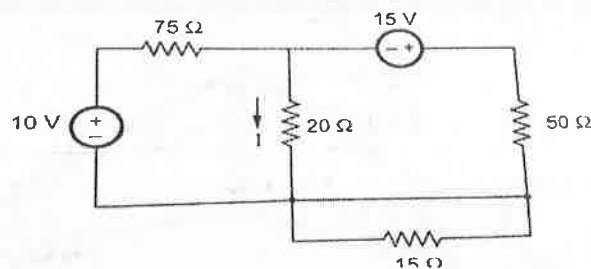
2. a) Explain the voltage division and current division rules.   [5+5]

     b) Find the Equivalent Resistance between points A-B.

3. a) Find the R.M.S value of i) $v(t)=25\cos wt+15\sin Wt$ [5+5]

           ii) $i(t)=100\sin wt-10\cos 2wt$

     b) Derive the Expression for $i(t)$ for R-L series circuit when Excited by a sinusoidal source.

(OR)

4. An Inductive coil having a resistance of 20 Ω and an inductance of 0.02 H is connected in series with 0.02µF calculate   [10]

     i) Resonant frequency? ii) Q factor of coil iii) Half power frequencies.

5. a) Explain Dot convention with neat circuit diagram.   [4+6]

     b) Two similar coils connected in series give a total inductance of 600 mH and when one of the coils is reverse, the total inductance is 300 mH. Determine mutual inductance and coefficient of coupling.

(OR)

**6.** a) Derive an Expression for coefficient of coupling.   [4+6]

     b) If a coil of 800 µH is magnetically coupled to another coil of 200 µH.The coefficient of coupling between two coils is 0.05. Calculate inductance if two coils are connected in,

         i) Series aiding ii) Series opposing iii) Parallel aiding iv) Parallel opposing

7. a) Differentiate between Planar and non-planar graph with suitable example.   [4+6]

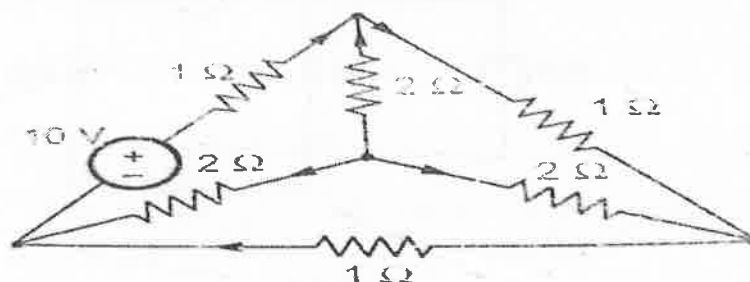   b) Draw dual network of the given planar network as shown in the fig.
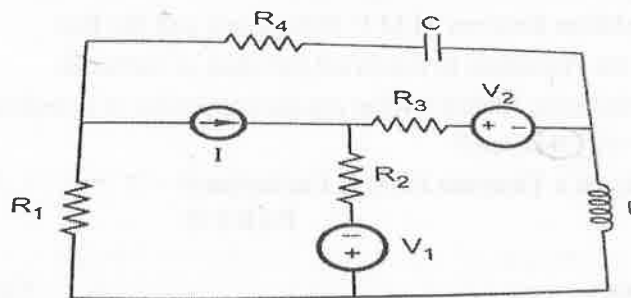
(OR)

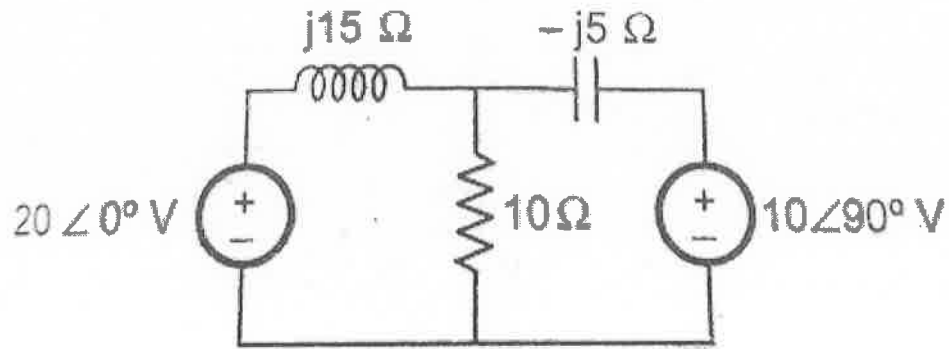**8.** a) Define Basic cutest with an example.   [4+6]

     b) For the circuit shown in fig draw the graph and write down the tie set matrix.

9. a) State and explain Millimans Theorem. [4+6]

b) Determine the current through 10Ω resistance of the network shown in fig by using superposition theorem.

(OR)

10. Verify the reciprocity theorem for the network shown in fig. [10]