MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

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

Subject: <u>ENGINEERING MATHEMATICS</u>

Branch: Common to **ALL**

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. Determine the rank of $A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$

2. State modal and spectral matrices

3. Find the solution of $\frac{dy}{dx} = \frac{y}{x} - cosec\frac{y}{x}$, *(put y/x = z)*

4. Solve $(D^2 + 6D + 9)y = 2e^{-3x}$.

5. Find $L\{cos^3 2t\}$

PART-B

Answer any FIVE questions of the following   5x10 M= 50M

1. Test for consistency and hence solve $x + y + z = 6$, $x - y + 2z = 5$,
   $3x + y + z = 8$, $2x - 2y + 3z = 7$

2. a) Explain Gauss – Jacobi's method to solve linear system of equations.
   b) Solve the system of equations $x + 3y - 2z = 0$, $2x - y + 4z = 0$, $x - 11y + 14z = 0$

3. a) Find the eigen values and eigen vectors of the matrix $\begin{pmatrix} 5 & 4 \\ 1 & 2 \end{pmatrix}$

   b) If the Eigen values of a square non singular matrix A are λ_1, λ_2, $\lambda_3 \dots \lambda_n$ then prove that
   Eigen values of A^{-1} are $\frac{1}{\lambda_1}$, $\frac{1}{\lambda_2}$, $\frac{1}{\lambda_3} \dots \frac{1}{\lambda_n}$

4. Determine the Eigen values and Eigen vectors of the matrix $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$

5. a) Find the differential equation by eliminating A and B from $y = e^x(A\cos x + B\sin x)$
   b) Solve $y(1 + xy)dx + x(1 - xy)dy = 0$

6. a) Solve $(D^3 - 3D^2 + 3D - 1)y = x^2 e^x$.
   b) Solve $(D^2 - 2D + 4)y = e^{2x} Cosx$

7. Using Laplace transforms solve $(D^2 + 5D + 6)y = 5e^x$. Given that $y(0) = 2$, $y'(0) = 1$

8. a. Evaluate $\int_0^\infty te^{-3t} \sin t\, dt$ b. Find $L\left(\frac{1-e^t}{t}\right)$

Code No.: **50B02**

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

Subject: **APPLIED PHYSICS-I**

Branch: Common to **ALL**

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

PART – A

Answer ALL questions of the following   5x2M=10 M

1. Mention the necessary conditions for constructive interference.
2. Give the differences between Three and Four level pumping schemes.
3. What is piezo electric effect and inverse piezo electric effect?
4. Distinguish between damped and forced vibrations.
5. What are fermions and write two examples of Fermi-Dirac statistics?

PART-B

Answer any FIVE questions of the following   5x10 M= 50M

1. a) Discuss Young's experiment demonstrating interference of light?
   b) Explain the formation of Newton's rings and derive the expressions for diameter of bright and dark rings.
2. a) Explain briefly how a diffraction grating can be used as monochromator
   b) The diameter of 16th and 9th dark rings in Newton's rings experiment are 0.37cm and 0.28cm respectively. Calculate the radius of curvature of the given plano convex lens, if the wavelength of the light used is 6000 A°.
3. Describe the construction and working of a Ruby laser system.
4. a) Write a note on attenuation factors in optical fibers. **[6+4]**
   b) Discuss the applications of lasers in welding, data storage, optical signal processing and nuclear fusion.
5. a) Explain the methods to detect ultrasonics
   b) Sabine's formula
6. Deduce the expressions for velocity, acceleration, Kinetic energy and Potential energy of a simple harmonic oscillator.
7. a) Distinguish Resisting force and Restoring force.   **[2+5+3M]**
   b) Discuss the case of under damped harmonic oscillator
   c) Write a short note on resonance
8. a) Discuss in detail Fermi-Dirac statistics.
   b) Apply Fermi-Dirac distribution law to electron gas to obtain the energy distribution

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

Subject: **COMPUTER PROGRAMMING**

Branch:COMMON TO CE,ME

Time: 3 hours
Max. Marks: 60

PART – A

Answer ALL questions of the following
5x2M=10 M

1. When should a type cast not be used?
2. Why do array subscript start at 0 instead of 1?
3. Why is a function prototype required?
4. What is the difference between calloc () and malloc ()?
5. What is EOF? When is EOF used?

PART-B

Answer ANY FIVE questions of the following
5x10 M= 50M

1. a) i)Write the rules for constructing Algorithm.

   ii) What is an Identifier and list the rules for constructing an Identifier.

   b) Write short notes on Type Conversions with examples.

2. a) Write a program to perform all arithmetic operations using Switch-Case statement.

   b) Write a C program that prints the highest and lowest element in one-dimensional array.

3. a) Write a c program to find the GCD of two numbers.

   b) Write a C program to check whether a number is a power of 2 or not.

4. a) Explain following String manipulation functions.

   i)Strcmp()   ii)Strupr()

   b) Write a program to demonstrate Call-by-value.

5. a) What is the advantage of using register storage class? What are the restrictions with register storage class?

   b) Write a C program that prints the Fibonacci Series using recursion?

6. a) How Arrays are closely related to Pointers, explain?

   b) How to perform Structure manipulations using functions, explain?

7. a) Explain File status functions with suitable example.

   b) Explain Insertion sort with suitable example.

8. a) Write the definition, declaration and initializations of Structures and Unions.

   b) Explain the use of following pre-processor directives

   i) Include   ii)define.

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

Subject: **APPLIED CHEMISTRY**

Branch:**COMMON TO CE,ME,MINING**

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. Write the different units for hardness.
2. Write any two factors that influence the corrosion of metals.
3. What are the repeat units of (i) PVC and (ii) Nylon 6,6.
4. Define calorific value. Give its units.
5. Write about bio Surfactants.

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. a) Explain phosphate and carbonate conditioning? Give the chemical reactions involved.

   b) Discuss about the chlorination and ozonisation methods of disinfection of water.

2. a) What is hardness of water? How is it expressed? Give its various units and their interconversions.

   b) What are boiler troubles? Write an account on priming and foaming.

3. a) Describe the factors effecting rate of corrosion by nature of metal and nature of environment

   b) What are fuel cells? Explain the principle and working of H_2-O_2 fuel cell.

4. a) What are conducting polymers? Write its classification and applications.

   b) Give brief account on compounding of plastics.

5. Briefly write about the moulding constituents of a plastic. With schematic diagrams, explain any two moulding methods for fabricating plastic into desired-shaped articles.

6. Write a short note on :a) Bio Sensors   b) Wind Energy.

7. Explain proximate analysis of coal and write significance of each constituent.

8. a) Write Applications of Nano materials.

   b) Give the characteristics of composites? Give the applications of plastic reinforced Composites.

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

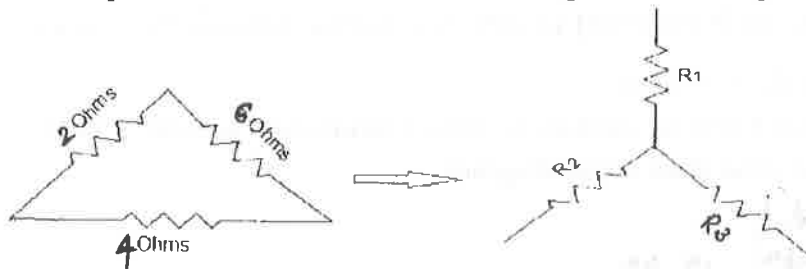Subject: **ELECTRICAL CIRCUITS**

Branch:ECE

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2M=10 M

1. Find the equivalent resistance for the following network using star - delta transformation.


2. Define a) Tree b) Oriented Graph.
3. Explain the Faradays' laws of electromagnetic induction.
4. Define (i) Phase (ii) Phase difference.
5. What is resonance? Write the expression to calculate resonant frequency for parallel RLC circuit.

PART-B

Answer ANY FIVE questions of the following   5x10 M= 50M

1. a) Define resistance and what are the factors effecting of resistance.
   b) A battery consists of five cells, each having an emf of 1.2V and internal resistance of 0.4Ω joined in series. If battery is connected to 6Ω load then find the load current.

2. a) Explain the differences between Practical sources and Ideal sources.
   b) Obtain the equivalent resistance R_{ab} for the circuit shown in below Fig, Find the current **i** for the input voltage of 140 V ?
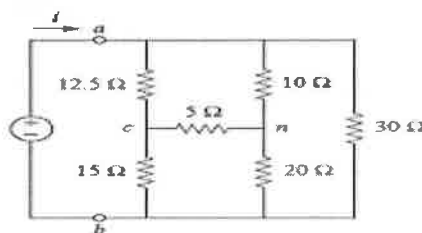

3. a) Draw the dual network for the given network.
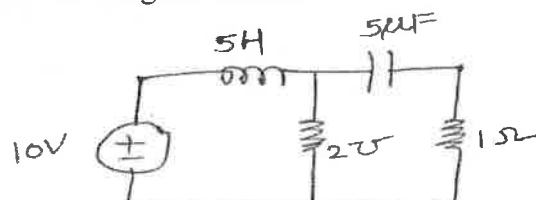
b) Draw the graph of the network shown in figure
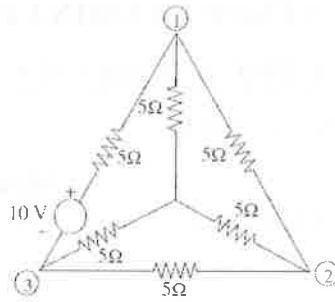
4. a) Distinguish between magnetic and electrical circuits.

   b) Explain following terms (i) Permeability (ii) Magneto motive force(iii) Reluctance.

5. a) In the circuit shown in Fig. Calculate

   (i)The total Impedance (ii) The total current (iii) Power factor (iv) The total S, P, Q

   (v) The total Admittance. Also draw vector diagram.
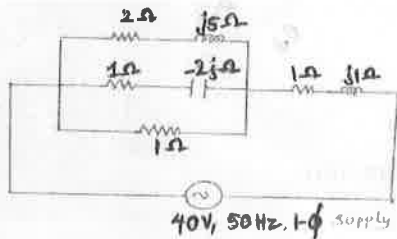
6. Explain AC through pure inductance and draw the phasor diagram & wave forms .

7. A series RLC circuit with R = 100 Ω, L = 0.5 H and C =40 μF has applied voltage of 100V with variable frequency. Calculate the resonant frequency, current at resonance, voltage across R, L and C. Also calculate the Q-factor and bandwidth.

8. A series RLC circuit with C=5 μF has an instantaneous voltage V=75 sin (300 t+ 60°) Volts and an Instantaneous current i=2 sin (300 t) ampere. Determine, R and L and quality factor of the circuit?

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

Subject: **ENGINEERING GRAPHICS**

Branch: Common to **CE & ME**

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

Answer Any FIVE questions out of EIGHT questions   5x12Mark=60 Marks

1. A rolling circle of diameter 50 mm, rolls without slipping on a horizontal ground. Trace only that part of locus traced by a point on the circumference of the rolling circle as it descends from the highest level until it touches the ground. Draw the tangent and normal at any point on the curve.

2. Construct a diagonal scale to read kilometers, hectameters and decameters and long enough to measure up to 6 kilometers. When a line of length 1 cm on the map represents a distance of 0.5 kilometers, calculate the RF and indicate a distance of 2.45 kilometers on the scale.

3. A line AB is inclined at 30^0 to HP. It's one end A is 20mm above HP and 40mm in front of the VP. The top view of the line is 70mm and is inclined at 40^0 to XY. Draw the projections of the line and determine its true length and its inclination with the VP.

4. a) The length of the top view of a line parallel to the V.P. and inclined at 45°to the H.P. is 50mm one end of the line is 12mm above the H.P. and 25mm in front of the VP. Draw projection of the line and determine its true length.

   b) Draw the projections of the following points on the same ground line, keeping the projections 25mm apart
      (i) A 25mm above the H.P and 45mm in front of the V.P.
      (ii) B 35mm above the H.P and 50mm behind of the V.P
      (iii)C 40mm below the H.P and30mm behind of the V.P
      (iv)D 30mm below the H.P and40mm infront of the V.P

5. a) A regular pentagon of 30 mm side has one of its sides on ground. Its plane is inclined at 45^0 to the HP. and perpendicular to VP. Draw its projections.

   b) A rhombus has its diagonals 100 and 60 long. Draw the projections of the rhombus. When it is so placed that its top view appears to be a square of diagonal 60 long and the vertical plane through the longer diagonal makes 30° with V.P.

6. A vertical cone of 40 mm diameter of base and height 50 mm is cut by a cutting plane perpendicular to V.P and inclined at 30° to H.P so as to bisect the axis of cone. Draw the development of the lateral surface of the truncated position of cone.

7. a) Draw the isometric projection of a pentagonal pyramid with its axis vertical with base side 40mm and height 75mm.

   b) Draw the isometric projection of a hexagonal pyramid of base side 25mm and height 60mm when it is resting on H.P such that an edge of the base is parallel to V.P.

8. Draw the front view, top view and side view of the object whose isometric view is shown in the Figure. (All dimensions are in mm).