R16

I B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024

Narasaraopeta Engineering College (Autonomous)

NEC Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CC1202

I B.Tech II Semester Supple Examinations, April-2024
INTEGRAL TRANSFORMS AND VECTOR CALCULUS
(Common to CE, EEE, ME, ECE & CSE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Find $L^{-1}\left[\dfrac{1}{s-a}\right]$.

(b) State Initial and Final value theorems of Z-transforms.

(c) Write the Dirichlet's condition for Fourier series.

(d) State Fourier integral theorem.

(e) Find p, if $(x+3y)i+(y-3z)j+(x+pz)k$ is solenoidal.

(f) State Stoke's theorem.

[2+2+2+2+2+2]

PART-B   4 X 12 = 48

2. (a) Find $L\left[e^{2t}+4t^3-\sin 2t\cos 3t\right]$.

(b) Find $L^{-1}\left[\dfrac{s}{(s^2+a^2)^2}\right]$ by applying convolution theorem.

3. (a) Find the Z-transform of ne^{an}.

(b) Apply the Z-transform, solve $y(n+2)+2\,y(n+1)+y(n)=0,$ given that $y(0)=y(1)=0$.

4. (a) Obtain the Fourier series for $f(x)=x$ in the interval $0<x<2\pi$.

(b) Find the half range sine series $f(x)=\cos x$ in $(0,\pi)$.

5. (a) Find the Fourier cosine transform of $f(x)=5e^{-2x}+2e^{-5x}$.

(b) Using Fourier Integral show that $e^{-ax}=\dfrac{2a}{\pi}\int_0^\infty\dfrac{\cos\lambda x}{\lambda^2+a^2}d\lambda.$

6. (a) Find $Curl\ \overline{F},\ \overline{F}=grad\left(x^3+y^3+z^3-3xyz\right)$.

(b) Find Directional Derivative of $\varphi=4xz^3-3x^2y^2z$ at (2, -1, 2) in the direction of $2\hat{i}-3\hat{j}+6\hat{k}$.

7. Verify Green's theorem in a plane for $\oint_C\left(3x^2-8y^2\right)dx+\left(4y-6xy\right)dy$ where C is the region

bounded by $x=0,\ y=0$ and $x+y=1$.

Subject Code: R16CC1204

I B.Tech II Semester Supple Examinations, April-2024
ENGINEERING CHEMISTRY
(Common to ECE & CSE)

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

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What is meant by sterilization of water?
   (b) What is vulcanization?
   (c) What are fullerenes?
   (d) What is cladding?
   (e) Define fluorescence.
   (f) Mention the constituents in paint.

                                                    [2+2+2+2+2+2]

PART-B

                                                    4 X 12 = 48

2. (a) Discuss scales and sludges. How can they be minimized?
   (b) Explain hot-lime soda process.

3. (a) Classify polymers giving examples.
   (b) Discuss conducting polymers.

4. (a) Discuss the working of photovoltaic cell.
   (b) Explain characteristics of liquid crystals and mention its applications.

5. (a) Discuss primary, secondary battery and fuel cell. Give examples.
   (b) Explain factors affecting rate of corrosion.

6. (a) Discuss working of bomb calorimeter.
   (b) Write notes on LPG and CNG.

7. (a) Explain Grothus Draper Law.
   (b) Explain applications of photochemistry.

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Subject Code: R16EE1208

I B.Tech II Semester Supple Examinations, April-2024
ENGINEERING GRAPHICS
(EEE)

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

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1.

(a) Trisect an angle of 90 degrees.

(b) Draw the projections of a point A which is 40 mm above the HP and 25 mm in front of the VP.

(c) Draw the projections of a 75 mm long straight line, parallel to and 30 mm above the HP and in the VP.

(d) Draw the projections of a circle of 50 mm diameter, having its plane vertical and inclined at 30 degrees to the VP. Its centre is 30 mm above the HP and 20 mm in front of the VP.

(e) Draw the projections of a pentagonal pyramid, base 30 mm edge and axis 50 mm long, having its base on the HP and an edge of the base parallel to the VP.

(f) Draw the isometric view of a cone, base 40 mm diameter and axis 55 mm long when its axis is vertical.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) The foci of an ellipse are 90 mm apart and the minor axis is 65 mm long. Determine the length of the major axis and draw the ellipse by concentric circles method.

(b) Construct a diagonal scale of RF = 1/32 showing yards, feet and inches and to measure up to 4 yards.

3. (a) Two points A and B are in the HP. The point A is 30 mm in front of the VP, while B is behind the VP. The distance between their projectors is 75 mm and the line joining their top views makes an angle of 45 degrees with reference line xy. Find the distance of the point B from the VP.

(b) A 100 mm long line is parallel to and 40 mm above the HP. Its two ends are 25 mm and 50 mm in front of the VP respectively. Draw its projections and find its inclination with the VP.

4. The front view of a 125 mm long line PQ measures 75 mm and its top view measures 100 mm. Its end Q and the midpoint M are in the first quadrant, M being 20 mm from both the planes. Draw the projections of the line PQ.

5. Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the HP and inclined at 60 degrees to the VP, and its surface making an angle of 45 degrees with the HP.

6. A square prism, base 40 mm side and height 65 mm, has its axis inclined at 45 degrees to the HP and has an edge of its base, on the HP and inclined at 30 degrees to the VP. Draw its projections.

7. Draw the front view, top view and right side view for the following figure.

ISOMETRIC VIEW

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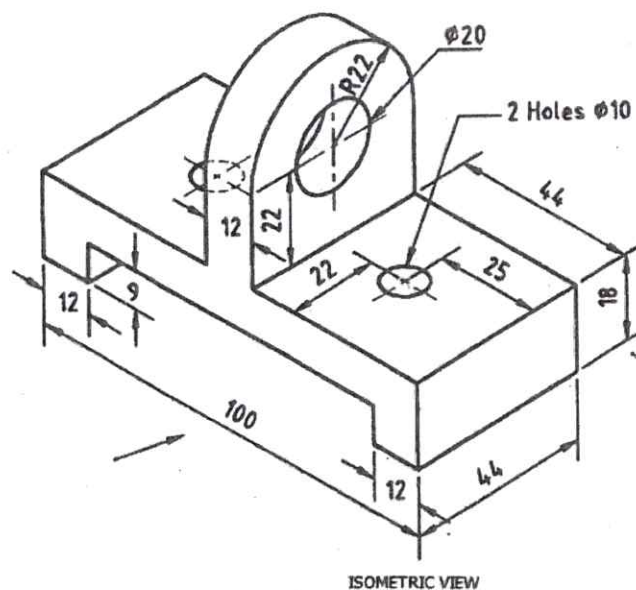
Subject Code: R16EC1210

I B.Tech II Semester Supple Examinations, April-2024
PROGRAMMING WITH C
(ECE)

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

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What is the variable?
   (b) Write the syntax of do while
   (c) Define recursion
   (d) List the Dynamic memory management functions in C
   (e) How does a structure differ from union?
   (f) What is the use of fseek() function?

                                                                              [2+2+2+2+2+2]

PART-B

                                                                              4 X 12 = 48

2. (a) Explain the structure of a C program
   (b) Write a C program which takes as input P,T,R. Compute the simple interest and display the result

3. (a) How string is declared and initialized ? Explain string input/output functions with an example
   (b) Implement a C program to find the reverse of an integer number and check whether it is palindrome or not

4. (a) Explain actual parameters and formal parameters with example
   (b) write a program to find nth term of Fibonacci series

5. (a) Explain the arithmetic operations on pointers with example.
   (b)Write a C program to swap two numbers using pointers

6. (a) Describe how to declare and initialize structure and its members with an example.
   (b) Explain how to access the elements of a union with an example.

7. (a) List and explain various file functions available in C.
   (b) Create two text files and write a program to add the contents of one file at the end of another

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Subject Code: R16EC1211

I B.Tech II Semester Supple Examinations, April-2024
NETWORK ANALYSIS
(ECE)

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

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Give the statements of Kirchhoff's voltage and current law. Write applications also
   (b) Write the expression for total impedance of the circuit having (i) only resistance (ii) pure inductor (iii) Pure capacitor (iv) R-L parameters (v) R-C parameters (vi) R-L-C parameters. Write the expression for phase difference in all the above cases.
   (c) What is meant by resonant frequency of RLC series circuit?
   (d) State superposition theorem.
   (e) Define self, mutual inductance and coefficient of coupling.
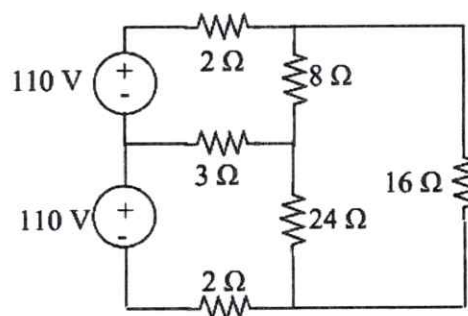   (f) Define time constant of RC circuit.
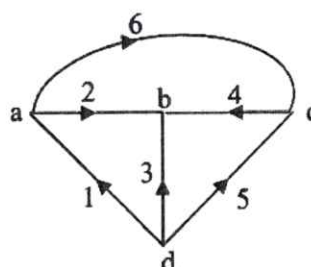
   [2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. For the circuit shown in figure, find all the branch currents using nodal analysis. Also show that total power delivered is equal to total power dissipated.
   12M

3. (a) Define incidence matrix. For the graph shown in figure, find the complete incidence matrix.
   6M

(b) Explain the following terms: i) Average Value ii) RMS Value iii) Form factor iv) Peak factor
6M

4. (a) A voltage of V(t)=100sinωt is applied to a circuit flowing through then circuit is
   i(t)=15sin(ωt-30 0). Determine the average power delivered to the circuit   6M

   (b) Explain the effect of variation of frequency of supply voltage on the current, power factor,
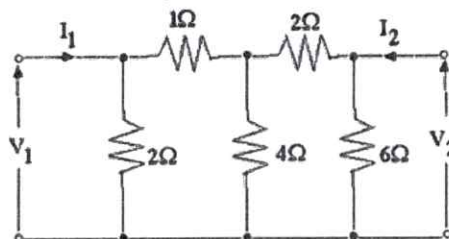   and voltage drops in an R–L–C series circuit 6M

5. (a) Find the value of RL so that maximum power is delivered to the load resistance shown in
   below Figure   6M
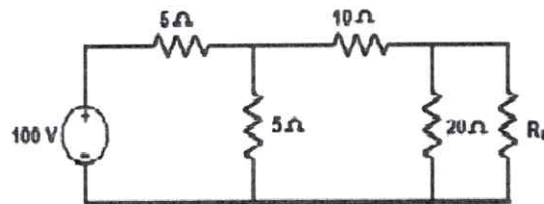
   (b) Compute the current in 23 ohm resistor using super position theorem for the circuit shown in
   Figure   6M
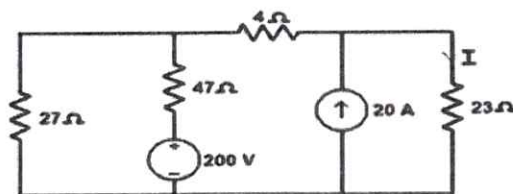
6. (a) Find the y-parameters for the network given in Figure   6M

   (b)) Two identical coils with L=0.02H have a coefficient of coupling of 0.8. Find mutual
   inductance and the two equivalent inductances with the two coils connected in series aiding and
   series opposing. Derive the equations employed.   6M

7. For an R-L series circuit, a sinusoidal voltage v(t)= Vm sin(ωt + φ) is applied at t=0. Find the
   expression for transient current.   12M

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Subject Code: R16CS1213

I B.Tech II Semester Supple Examinations, April-2024
MATHEMATICAL METHODS
(CSE)

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

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define the rank and nullity of a matrix.

(b) Use the Cayley-Hamilton theorem, to find the inverse of $\begin{bmatrix} 2 & 3 \\ 3 & 5 \end{bmatrix}$.

(c) Evaluate $\int\limits_{0}^{1}\int\limits_{0}^{1}\int\limits_{0}^{1} e^{x+y+z}\,dx\,dy\,dz$.

(d) Give the geometrical interpretation of an approximating real root of the equation by the method of false position.

(e) Define the terms interpolation and extrapolation.

(f) Write Newton-cote's quadrature formula.

$$[2+2+2+2+2+2]$$

PART-B

$$4 \times 12 = 48$$

2. (a) Determine the rank of a matrix $A=\begin{bmatrix} 2 & 1 & 2 & 1 \\ 6 & -6 & 6 & 12 \\ 4 & 3 & 3 & -3 \\ 2 & 2 & -1 & 1 \end{bmatrix}$ by reducing ¿ normal form.

(b) For what values of a and b do the equations $2x+3y+5z=9, 7x+3y-2z=8$, $2x+3y+az=b$ have (i) no solution (ii) a unique solution (iii) an infinite number of solutions.

3. Find the rank, index, and signature of the following quadratic form by reducing it into canonical form using orthogonal transformation $x^2+2y^2+4z^2+4xy+6yz+2zx$.

4. (a) Evaluate $\int\limits_{0}^{1}\int\limits_{0}^{\sqrt{1-x^2}}\int\limits_{0}^{\sqrt{1-x^2-y^2}} \dfrac{dz\,dy\,dx}{\sqrt{1-x^2-y^2-z^2}}$ by changing to spherical polar coordinates.

(b) Evaluate $\int\limits_{0}^{\infty}\int\limits_{x}^{\infty} \dfrac{e^{-y}}{y}\,dy\,dx$.

5. (a) Find the real root of the equation $2x-\log_{10}x=7$ which lies between 3.5 and 4, correct to four decimal places, using the method of false position.

(b) Using the Newton-Raphson method, derive a formula for finding the kth root of a positive number N and hence compute the value of $(25)^{\frac{1}{4}}$ correct to four decimal places.

6. (a) Use Newton's divided difference formula to find $f(x)$ from the following data:

x	0	1	2	4	5	6
F(x)	1	14	15	5	6	19

(b) Prove that $hD = \log(1+\Delta) = -\log(1-\nabla) = \sinh^{-1}(\mu\delta)$.

7. (a) Find an approximate value of $y(0.5)$ correct to four decimal places by modified Euler's method, given that $\dfrac{dy}{dx} = x + y^2$, $y(0) = 1$.

(b) Evaluate $\displaystyle\int_{0}^{\pi/2} \sqrt{\sin x}\, dx$ using (i) Trapezoidal rule (ii) Simpson's 1/3 rd rule taking $h = \pi/12$.

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Subject Code: R16CS1215

I B.Tech II Semester Supple Examinations, April-2024
ELECTRONIC DEVICES AND LOGIC DESIGN
(CSE)

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

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) List out different applications of diode
(b) If the transistor has an α of 0.98, find the value of β and if β is 200 find α
(c) Explain Barkhausen criterion of an Oscillators
(d) Explain the De-Morgan's law in detail
(e) Why a multiplexer is called a data selector? Draw the 2x1 MUX
(f) Write the differences between combinational and sequential circuits

                                                        [2+2+2+2+2+2]

PART-B

                                                        4 X 12 = 48

2. (a) Draw the circuit diagram of Open circuited PN junction and explain its operation [6+6]
(b) Draw the circuit diagram of Full wave rectifier and explain its operation along with wave forms

3. (a) Draw the construction diagram, operation characteristics and parameters of JFET [6+6]
(b) For the NPN transistor connected in CE configuration with V_{CC}=9 V, V_{BB}=4V, I_C = 5 m A, V_{CE}=5 V, β=50 and V_{BE}=0.7 V. Find β and RB

4. (a) What is Biasing? Explain the need of it. List out different types of biasing methods [6+6]
(b) Draw the circuit diagram of RC phase shift oscillator and explain its operation

5. (a) Reduce the following function using k-map technique [6+6]
        $F(A,B,C,D)=\pi(0,2,3,8,9,12,13,15)$
(b) What is the difference between canonical form and standard form? Explain

6. (a) Draw the logic diagram of a JK flip- flop and using excitation table explain its operation [6+6]
(b) Draw the logic diagram of a SR latch using NOR gates. Explain its Operation using excitation table

7. (a) Draw the circuit diagram of Universal shift register and explain its operation
(b) Draw the circuit diagram of Ring counter and explain its operation [6+6]

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