R19

I B.TECH II SEM

SUPPLEMENTARY EXAMINATIONS

SEPTEMBER 2023

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BCC2TH02 DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Time: 3 hours (Common to CE, EEE, ME, ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Mark
1		Unit-I	
	a	i) Solve $\frac{dy}{dx}-\frac{x}{1+x^2}y=x\sqrt{y}$.	[6M
		ii) A constant electromotive force E volts is applied to a circuit containing a constant resistance R ohm in series and a constant inductance L henries. If the initial current is zero, show that the current build-up to half its theoretical maximum in $\frac{L\log 2}{R}$ seconds.	[6M
		OR	
	b	i) Solve $(2y+3xy^2)dx+(x+2x^2y)dy=0$.	[6M
		ii) Prove that the system of confocal conics $\frac{x^2}{a^2+\lambda}+\frac{y^2}{b^2+\lambda}=1$, λ being a parameter, is self-orthogonal.	[6M
2		Unit-II	
	a	i) Solve $x^2\frac{d^2y}{dx^2}-3x\frac{dy}{dx}+y=\left[\frac{1+\sin(\log x)}{x}\right]\log x$.	[6M
		ii) In an L-C-R circuit, the charge q on a plate condenser is given by $L\frac{d^2q}{dt^2}+R\frac{dq}{dt}+\frac{q}{C}=E\sin pt$. The circuit is tuned to resonance so that $p^2=\frac{1}{LC}$. If initially the current i and the charge q be zero, show that, for small values of $\frac{R}{L}$, the current in the circuit at time t is given by $\frac{Et}{2L}\sin pt$.	[6M
		OR	
	b	i) Solve $\left(\frac{dy}{dx}-1\right)^2\left(\frac{dy}{dx}+1\right)^2=x+e^x+\sin^2\frac{x}{2}$.	[6M
		ii) Solve the following simultaneous equations: $\frac{dx}{dt}+4x+3y=t$, $\frac{dy}{dt}+2x+5y=e^t$.	[6M
3		Unit-III	
	a	i) Form the partial differential equation by eliminating arbitrary functions from $z=xf(x+t)+g(x+t)$.	[6M
		ii) Solve $\left(\frac{y-z}{yz}\right)\frac{\partial z}{\partial x}+\left(\frac{z-x}{zx}\right)\frac{\partial z}{\partial y}=\left(\frac{x-y}{xy}\right)$.	[6M

		OR	
	b	i) Find the partial differential equation of all planes which are at a constant distance a from the origin.	[6M]
		ii) Solve $(y+z)\frac{\partial z}{\partial x}+(z+x)\frac{\partial z}{\partial y}=x+y$.	[6M]
4		Unit-IV	
	a	i) Find the angle between the normals to the surface $xy=z^2$ at the points $(4,1,2)$ and $(3,3,-3)$.	[6M]
		ii) Prove that $Curl(Curl\vec{V})=grad(\vec{V})-\nabla^2\vec{V}$	[6M]
		OR	
	b	i) Find the directional derivative of the function $\phi=x\,y^2+y\,z^3$ at the point $(2,-1,1)$ in the direction of the normal to the surface $x\log z-y^2+4=0$ at $(-1,2,1)$.	[6M]
		ii) Prove that $\nabla^2 f(r)=f''(r)+\frac{2}{r}f'(r)$, where $\vec{r}=x\hat{i}+y\hat{j}+z\hat{k}$.	[6M]
5		Unit-V	
	a	i) If $\vec{F}=2xz\hat{i}-x\hat{j}+y^2\hat{k}$, evaluate $\iiint_V \vec{F}\,dV$, where V is the region bounded by the surface $x=0, y=0, x=2, y=6$, $z=x^2, z=4$.	[6M]
		ii) Apply Green's theorem to prove that the area enclosed by a plane closed curve C is $\frac{1}{2}\int_C (x\,dy-y\,dx)$. Hence find the area of the ellipse whose semi-major and minor axes are of lengths a and b.	[6M]
		OR	
	b	Verify the Gauss-divergence theorem for $\vec{F}=y\hat{i}+x\hat{j}+z^2\hat{k}$ over the cylindrical region bounded by $x^2+y^2=a^2, z=0$, and $z=h$.	[12M]

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BCC2TH03 **ENGINEERING CHEMISTRY**

Time: 3 hours (Common to CE, ME, ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No.		Questions	Marks
1		Unit-I	
	a	i) Explain break point chlorination and alkalinity of water.	[6M]
		ii) State the differences between BOD and COD.	[6M]
		OR	
	b	i) Explain zeolite method for water softening with a neat diagram and chemical reactions.	[5M]
		ii) State the differences between hot lime soda process and cold lime soda process for water softening.	[4M]
		iii) Calculate the amount of lime required for softening of 5000 litres of hard water containing 72 ppm of $MgSO_4$.	[3M]
2		Unit-II	
	a	i) Explain the mechanism of cationic chain polymerization with an appropriate example.	[6M]
		ii) What is Vulcanization? What structural changes in rubber polymer occur during vulcanization? Mention the advantages of vulcanized rubber.	[6M]
		OR	
	b	i) State the characteristics of a good fuel.	[6M]
		ii) Mention the advantages of catalytic cracking over thermal cracking.	[6M]
3		Unit-III	
	a	i) How carbon nanotubes can be prepared using chemical vapour deposition method? Discuss properties and applications of carbon nanotubes.	[6M]
		ii) Write a short note on transmission electron microscopic (TEM) method.	[6M]
		OR	
		ii) State the differences between thermotropic and lyotropic liquid crystals. Also mention the applications of liquid crystals.	[12M]
4		Unit-IV	
	a	i) Construct a dry cell and explain its working principle with the help of chemical reactions involved in it.	[6M]
		ii) Discuss oxygen-ethnol fuel cell with discharge and recharge reactions	[6M]
		OR	
	b	i) Differentiate between chemical corrosion and electrochemical corrosion.	[6M]
		iii) Mention the essential ingredients of a paint. What are the requisites of a good paint?	[6M]
5		Unit-V	
	a	i) What are refractories? Explain refractoriness, thermal spalling and porosity of refractories	[6M]
		ii) Draw a flow diagram for the manufacture of Portland cement from raw material and write the chemical reactions involved in the process.	[6M]
		OR	
	b	i) What are lubricating oils? Mention the characteristics of a good lubricating oil.	[6M]
		ii) What is boundary lubrication? Write the characteristics for a lubricant to show boundary lubrication.	[6M]

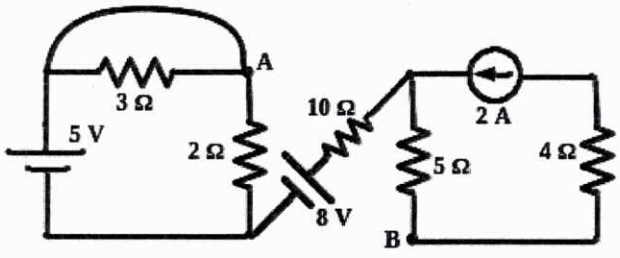
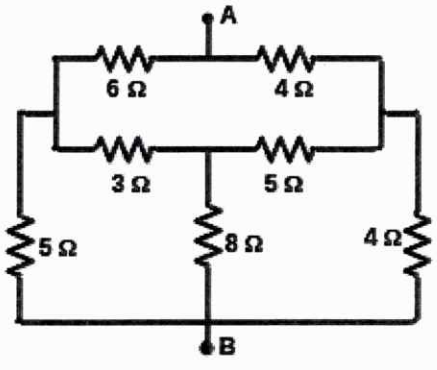
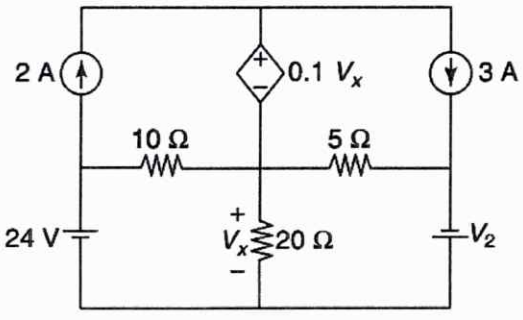
NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

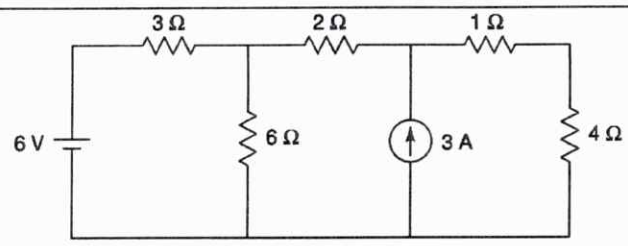
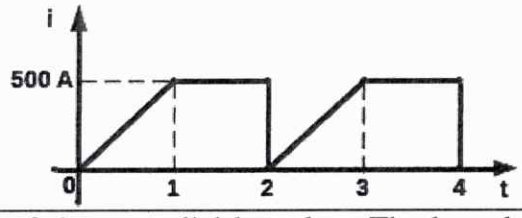
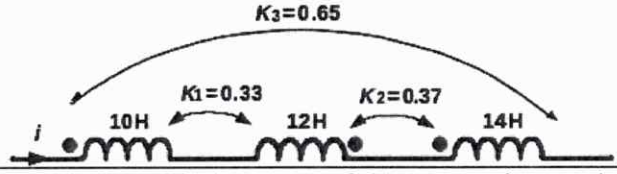
I B.Tech II Semester Supple. Examinations, September-2023

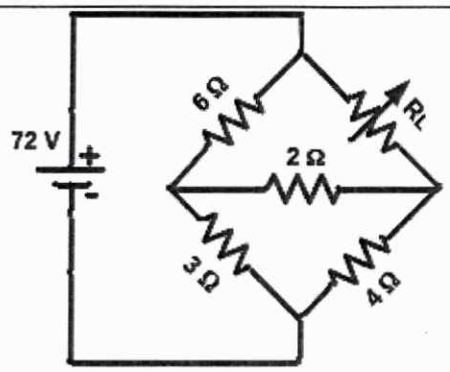
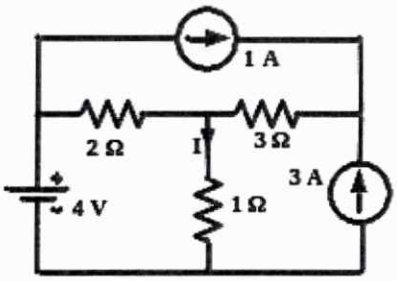
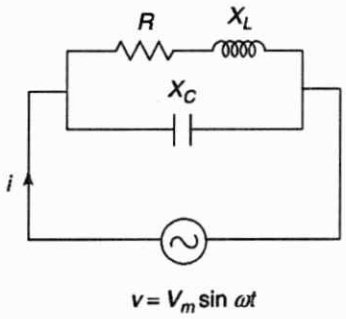
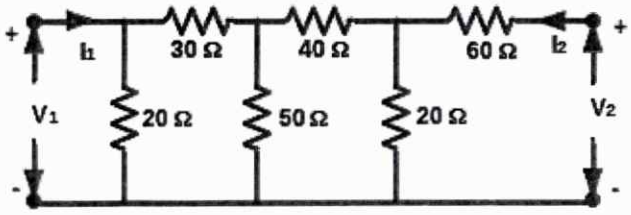
Sub Code: 19BEC2TH04 **NETWORK ANALYSIS**

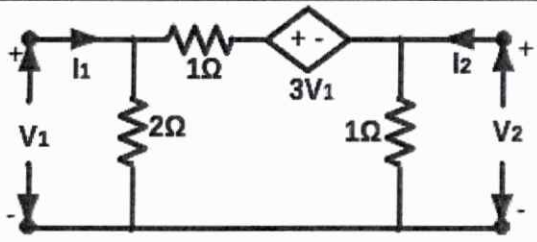
Time: 3 hours (ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Explain about linear, non-linear, unilateral and bilateral elements and sketch the V-I characteristics of Ideal and practical voltage sources.	[4M]
		ii) Determine the potential difference V_{AB} for the given network shown in below. 	[2M]
		iii) Obtain an equivalent resistance between A and B terminals of the network shown below using star-delta/delta-star transformation. 	[6M]
		OR	
	b	i) For the figure given below, determine the voltage V_2 such that $V_x = 0$. 	[6M]
		ii) Find the voltage across the 4 Ω resistor for the given network below using source transformation technique.	[6M]

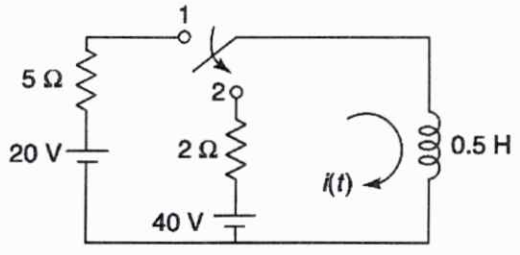
			
2		Unit-II	
	a	i) Define average value, rms value of an alternating quantity, also calculate the form factor and amplitude factor of the waveform shown below. 	[6M]
		ii) A circuit consists of three parallel branches. The branch currents are given as $i_1=10\sin(\omega t)$, $i_2=20\cos(\omega t-30^0)$ and $i_3=7.5\sin(\omega t-30^0)$. Find the resultant current and express it in the form $i=I_{max}\sin(\omega t+\Phi)$. If the supply frequency is 50 Hz, calculate the resultant current when (a) t = 0 (b) t = 0.001 s.	[6M]
		OR	
	b	i) What is the significance of DOT convention in coupled circuits and deduce the equivalent inductance of the network shown below. 	[6M]
		ii) Define self-inductance and mutual inductance of the magnetic coupled circuits.	[2M]
		iii) Two inductors are connected in parallel. Their equivalent inductance when the mutual inductance aids the self-inductance is 6 mH and it is 2 mH when the mutual inductance opposes the self-inductance. If the ratio of the self- inductances is 1:3 and the mutual inductance between the coils is 4 mH, find the self-inductances.	[4M]
3		Unit-III	
	a	i) An RLC series circuit has a current which lags the applied voltage by 45°. The voltage across the inductance has a maximum value equal to twice the maximum value of voltage across the capacitor. Voltage across the inductance is 300 sin (1000t) and R = 20 Ω. Find the value of inductance, capacitance, active and reactive power of the circuit.	[6M]
		ii) Two circuits A and B are connected in parallel to a 115 V, 50 Hz supply. The total current taken by the combination is 10 A at unity power factor. Circuit A consists of a 10 Ω resistor and 200 mF capacitor connected in series. Circuit B consists of a resistor and an inductor in series. Determine (a) current, (b) power factor, (c) impedance, (d) resistance, and (e) reactance of the circuit B. Also draw the admittance triangles of circuit A and circuit B.	[6M]
		OR	
	b	i) State maximum power transfer theorem and determine the amount of maximum power transferred in RL for the circuit shown in below.	[6M]

			
		ii) State superposition theorem and find current I in the circuit shown below using superposition principle. 	[6M]
4		Unit-IV	
	a	i) A voltage v(t) = 10 sin ωt is applied to a series RLC circuit. At the resonant frequency of the circuit, the voltage across the capacitor is found to be 500 V. The bandwidth of the circuit is known to be 400 rad/s and the impedance of the circuit at resonance is 100 Ω. Determine inductance and capacitance, resonant frequency, upper and lower cut-off frequencies.	[6M]
		ii) Derive the expression for resonant frequency for the parallel circuit shown in figure. Also calculate the impedance, current at resonance and draw its phasor diagram. 	[6M]
		OR	
	b	i) Solve the network to find the ABCD-parameters as shown below, also find its H-parameters using interrelations of the two-port networks. 	[8M]
		ii) Solve the given two-port network to find the Y parameters.	[4M]



Unit-V

a i) In the network shown below, the switch is moved from 1 to 2 at t = 0, determine i(t). [6M]



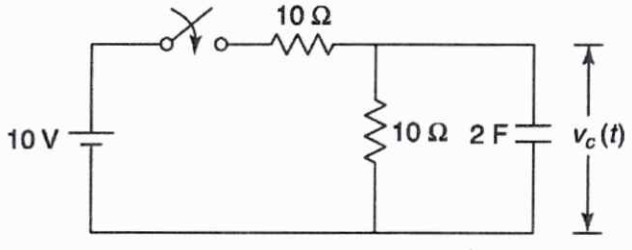
ii) For series R-C circuit, derive the expression for i(t)and voltage across capacitor Vc(t) with D.C excitation at t=0. [6M]

OR

5 b i) **Find the inverse Laplace transform of given function** [6M]

$$f(t)=\frac{s^2-15s-11}{(s+1)(s-2)^2}$$

b ii) Determine the voltage cross the capacitor using Laplace transform when the switch in the network shown below is closed at t = 0. [6M]



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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BCC2TH07 **ENGINEERING PHYSICS**

Time: 3 hours (Common to EEE, CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Differentiate Quarter and Half wave plate.	[6M]
		ii) Discuss the Principle of double diffraction using Nichol's Prism. Mention its applications.	[6M]
		OR	
	b	i) Differentiate Fraunhofer and Fresnel diffraction.	[6M]
		ii) Derive the condition for minimum and maximum intensity of diffraction pattern by considering the Fraunhofer diffraction due to single slit.	[6M]
2		Unit-II	
	a	Discuss the construction and working of He-Ne laser. Mention its drawbacks and advantages. Discus any four important characteristics of laser radiation.	[12M]
		OR	
	b	i) Derive the relation between numerical aperture and refractive indices of the core and cladding of the optical fiber.	[8M]
		ii) Discuss the importance of population inversion in laser systems.	[4M]
3		Unit-III	
	a	i) What is meant by atomic packing factor? Derive the atomic packing factor for BCC and FCC crystal systems.	[6M]
		ii) State and Explain the Bragg's condition for obtaining constructive interference in diffraction spectrum.	[6M]
		OR	
	b	i) Derive the relation between interplanar distance and Miller indices of the plane.	[6M]
		ii) Define Unit cell. Mention the characteristic parameters of the unit cell. Differentiate primitive and non-primitive unit cell.	[6M]
4		Unit-IV	
	a	i) Derive the differential forms of Maxwell's electromagnetic equations.	[8M]
		ii) Define magnetic permeability and susceptibility of a magnetic material with units. Mention its importance.	[4M]
		OR	
	b	i) Classify the different magnetic materials based on interaction of the materials with external magnetic field, temperature and intensity of magnetization.	[8M]
		ii) Differentiate soft and hard magnetic materials based on B-H curve.	[4M]
5		Unit-V	
	a	i) By assuming Schrodinger wave equation, when the particle is enclosed in a one dimensional potential well of infinite height, Derive the probability density function and energy of the particle for various excitation levels.	[8M]
		ii) Differentiate intrinsic and extrinsic semiconductors.	[4M]
		OR	
	b	i) Explain the dual nature of matter. Derive the wavelength of the particle using de Broglie concept of matter waves	[6M]
		ii) State and explain Hall effect. Derive the relation between Hall coefficient and Hall voltage.	[6M]

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BCI2TH08 **PROBABILITY AND STATISTICS**

Time: 3 hours (Common to CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		**Unit-I**	
	a	i) A pair of dice is tossed twice. Find the probability of scoring 7 points (i) One (ii) at least once (iii) twice.	[6M]
		ii) If X and Y are independent Poisson variables such that P(X = 1) = P(X = 2) and P(Y = 2) = P(Y = 3), find the variance of (X – 2Y)	[6M]
		OR	
	b	i) Consider the experiment of tossing two coins together. With the events defined as follows: A: The first coin shows Head; B: The second coin shows Tail Show that the probability of A won't be affected by the occurrence of an event B.	[6M]
		ii) A random variable X has the following probability function X: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 P(X): 0 | K | 2K | 2K | 3K | K^2 | $2K^2$ | $7K^2+1$ i) Determine K (ii) Evaluate $P(0<X\le 5)$ and $P(X\ge 6)$.(iii) if $P(X\le K)>\frac{1}{2}$,find the minimum value of K.	[6M]
2		**Unit-II**	
	a	i) A continuous random variable has the probability density function $f(x)=K.x.e^{-\lambda x}$,for $x\ge 0,\lambda>0$and $f(x)=0$,otherwise. (i) Determine K (ii) Mean (iii) Variance.	[6M]
		ii) If X is a normal variate with mean 30 and standard deviation 5, find the probabilities that i) $26\le X\le 40$(ii) $X\ge 45$(iii) $\lvert X-30\rvert>5$.	[6M]
		OR	
	b	i) If the pdf of a random variable is given by f(x) = x/2, 0 < x < 2. Find P(X > 3/2) and P[(X > 3/2)/(X > 1)]	[6M]
		ii) The time (in hours) required to repair a watch is exponentially distributed with parameter λ = ½. (a) What is the probability that the repair time exceeds 2 hours?; (b) What is the probability that the repair takes atleast 11 hours given that its duration exceeds 8 hours?	[6M]

Unit-III

3 a The mean score of students on an aptitude test is 72 points with a standard deviation of 8 points and another test with mean 86 and standard deviation of 11. What is the probability that two groups of students consisting of 28 and 36 students respectively, will differ in their mean scores by [12M]

(i) 3 or more points

(ii) 6 or more points

(iii) between 2 and 5 points.

OR

b A random sample size of 64 is taken from a normal population with $\mu=51.4$ and $\sigma=68$. What is the probability that the mean of the sample will [12M]

(i) exceed 52.9 (ii) falls between 50.5 and 52.3 (iii) be less than 50.6.

Unit-IV

4 a i) Explain the procedure generally followed in testing of hypothesis. [6M]

ii) A sample of 400 items is taken from a population whose S.D is 10 and the mean of sample is 40. Test whether the sample has come from a population with means 38.Also calculate 95% confidence interval for the population. [6M]

OR

b In a certain sample of 2,000 families, 1,400 people are consumers of tea. Out of 1,800 Hindu families, 1,236 families are consumers of tea. State whether there is any significant difference between consumption of tea among Hindu and non-Hindu families. [12M]

Unit-V

5 a 15 tape-recorders were examined for quality control test. The number of defects in each tape-recorder is recorded below. Draw the appropriate control chart and comment on the state of control [12M]

Unit no. (i)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of defects (c)	2	4	3	1	1	2	5	3	6	7	3	1	4	2	1

OR

b The following data show the values of the sample mean (x) and range (R) for 10 samples for size 6 each. Calculate the value for central line and the central limits for Mean-chart and Range-chart. Draw the control chart and comment on the state of control. [12M]

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean(x)	43	49	37	44	45	37	57	46	43	47
Range(R)	5	6	5	7	7	4	8	6	4	6

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BCI2TH10 NUMERICAL METHODS AND VECTOR CALCULUS

Time: 3 hours (Common to CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Find the positive root of the equation $x^3 - 2x - 5 = 0$ using bisection Method.	[6M]
	a	ii) Find the real root of the equation 3x = cos x + 1 by Newton-Raphson method, correct upto four decimal places.	[6M]
		OR	
	b	i) Solve by the method of false position the equation x tanx = -1, starting with $x_0 = 2.5$ and $x_1 = 3$, correct up to three decimal places.	[12M]
2		Unit-II	
	a	i) If y_x is a polynomial for which fifth difference is constant and $y_1 + y_7 = -784$, $y_2 + y_6 = 686$, $y_3 + y_5 = 1088$, find y_4.	[6M]
		ii) If y = (3x+1)(3x+4). . . . (3x+22) prove that $\Delta^4 y = 136080(3x+13)(3x+16)(3x+19)(3x+22)$.	[6M]
		OR	
	b	i) Use Lagrange's interpolation formula to find the value of y when x = 10, if the following values of x and y are given x: 5 6 9 11 y: 12 13 14 16	[6M]
	b	ii) Find the value of sin 52° using Newton's forward interpolation formula from the following table θ° 45° 50° 55° 60° Sin θ° 0.7071 0.7660 0.8192 0.8660	[6M]
3		Unit-III	
	a	i) Find by Taylor's series method, the values of y at x = 0.1 and x = 0.2 to five places of decimals from $dy/dx = x^2y - 1$, y(0) = 1.	[6M]
	a	ii) Solve numerically by applying Euler's method $y^1 = y^2 + x$, y(0) = 1. Find y(0.1) and y(0.2)	[6M]
		OR	
	b	i) Apply Runge-Kutta fourth order method to find an approximate value of y when x = 0.2 given that dy/dx = x + y and y = 1 when x = 0.	[6M]
	b	ii) Compute the value of $\int (\sin x - \log x + e^x)\,dx$ using Simpson's 3/8th rule.	[6M]

		Unit-IV	
4	a	i) Find the directional derivative of $\varphi = xyz$ along the direction of normal to the surface $x^2z + y^2x + yz^2 = 3$at point (1,1,1).	[6M]
		ii) A particle moves along the curve $x = 3t^2$, $y = t^2 - 2t$ and $z = t^3$. Find its velocity and acceleration at t = 1 in the direction of $\mathbf{i} + \mathbf{j} - \mathbf{k}$.	[6M]
		OR	
	b	i) Show that div $(\bar{a} \times \bar{b}) = \bar{b} \cdot \text{curl}\, \bar{a} - \bar{a} \cdot \text{curl}\, \bar{b}$	[6M]
		ii) Show that $f = \frac{x\hat{i} + y\hat{j}}{x^2 + y^2}$, is both solenoidal and irrational.	[6M]
5		Unit-V	
	a	i) If $\bar{F}(u) = 3u\hat{i} + u^2\hat{j} + (u+2)\hat{k}$ and $\bar{v}(u) = 2u\hat{i} - 3u\hat{j} + (u-2)\hat{k}$. Evaluate $\int_0^2 (\bar{F}(u) \times \bar{v}(u))du$.	[6M]
		ii) Find the work done in moving a particle in the force field $\mathbf{f} = 3x^2\mathbf{i} + (2xz - y)\mathbf{j} + z\mathbf{k}$ along the straight line from (0, 0, 0) to (2, 1, 3).	[6M]
		OR	
	b	Verify Stoke's theorem for the vector field $\mathbf{f} = (x^2 - y^2)\mathbf{i} + 2xy\,\mathbf{j}$, integrated around the rectangle z = 0, and bounded by the lines x = 0, y = 0, x = a and y = b.	[12M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

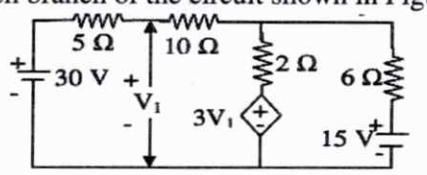
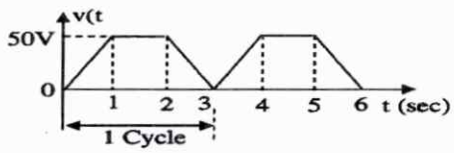
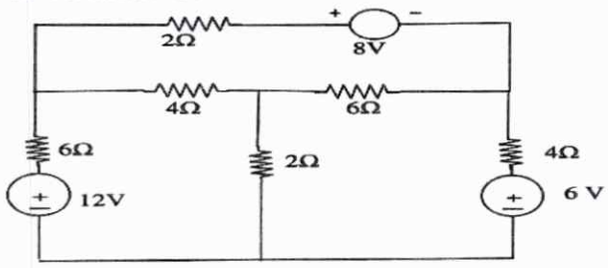
I B.Tech II Semester Supple. Examinations, September-2023

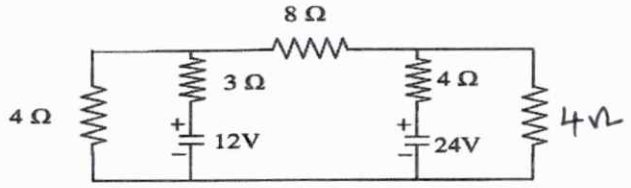
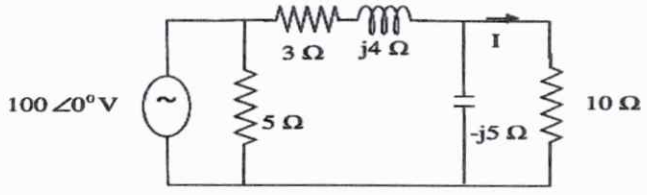
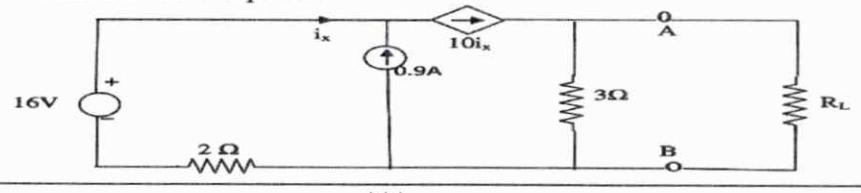
Sub Code: 19BEE2TH13 **ELECTRICAL CIRCUIT ANALYSIS-I**

Time: 3 hours (EEE) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Distinguish between independent and dependent sources.	[6M]
		ii) Two groups of resistances, one consisting of 4 ohms, 6 ohms and 12 ohms in parallel and other consisting of 3 ohms and 6 ohms in parallel are connected in series with a source of 10 V having an internal resistance of 1 ohm. Calculate the resistance of entire circuit, the potential drop across each group and current in each resistance.	[6M]
		OR	
	b	i) Explain the star – delta and delta – star transformation by deriving relevant expressions.	[6M]
		ii) Find the current through each branch of the circuit shown in Figure 1, using mesh analysis.  Figure 1	[6M]
2		Unit-II	
	a	i) Two coils of impedance $25.23 \angle 37^0$ and $18.65 \angle 68^0$ ohms are connected in series across a 230V, 50Hz supply. Find the total impedance, current, power factor and active power.	[6M]
		ii) Find the rms and average value of the trapezoidal waveform shown in Figure. 	[6M]
		OR	
	b	i) A coil having a resistance of 10 ohms and an inductance of 0.2 H is connected in series with a 100 μF capacitor are fed with 230 V, 50 Hz AC supply. Calculate (i) active and reactive components of current (ii) voltage across the coil. Draw the phasor diagram	[6M]
		ii) A coil of power factor 0.9 is in series with a 120 μF capacitor. When the circuit is connected to a 50 Hz supply, the potential difference across the coil is equal to the potential difference across the capacitor. Find the resistance and inductance of the coil.	[6M]
3		Unit-III	
	a	i) Find out currents through and voltages across all branches of the network shown in figure, with the help of tie-set schedule. 	[12M]

		OR	
	b	i) What is duality? Explain the procedure to obtain the dual of the given planar network.	[6M]
		ii) For a network shown in figure, derive the cut set matrix and find various branch voltages and currents. 	[6M]
4		Unit-IV	
	a	i) Explain the dot convention in coupled circuits.	[6M]
		ii) Two coils having 750 and 1200 turns, respectively, are wound on a common nonmagnetic core. The leakage flux and mutual flux, due to a current of 7.5A in coil 1, is 0.25 mWb, and 0.75 mWb, respectively. Calculate: i) Self Inductance, ii) Mutual Inductance, iii) coefficient of coupling.	[6M]
		OR	
	b	i) A coil of 20 ohm resistance and an inductance of 0.2 H are connected in parallel with a capacitor of 100 μF. Determine the resonant frequency and the input impedance at resonance.	[6M]
		ii) A series RLC circuit is connected to a constant voltage variable frequency source of 200 V (rms). The values of R, L and C are 5 Ω. 0.1 H and 100 μF. What would be the voltage across C at resonance?	[6M]
5		Unit-V	
	a	i) State and explain reciprocity theorem. Is this theorem valid for network with two sources? Substantiate your answer	[6M]
		ii) Verify the reciprocity theorem using the network given in figure 	[6M]
		OR	
	b	i) State and explain Superposition theorem. Is this theorem valid for power calculations? Substantiate your answer.	[6M]
		ii) Find the value of RL to be connected between terminals AB in figure , for maximum transfer of power and maximum value of power. 	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

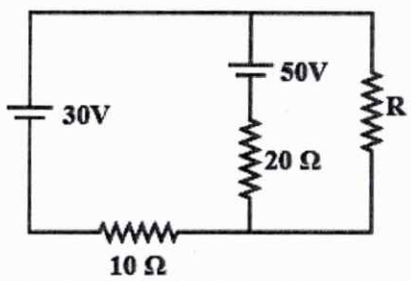
Sub Code: 19BCC2TH14

ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Time: 3 hours (Common to CE, ME) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) The Resistors R1 and R2 are connected in series then equivalent resistance is 9 ohms. The same resistors R1 and R2 are connected in parallel then the equivalent resistance is 2 ohms. Find the value of resistance R1 and R2.	[6M]
		ii) For the given circuit shown in figure 1 find the value of resistance R? Figure:1  	[6M]
		OR	
	b	i) State and Explain Kirchhoff's Laws	[6M]
		ii) Explain star to delta and delta to star transformation with a neat sketch.	[6M]
2		Unit-II	
	a	With a neat sketch explain the working of a 3-point starter.	[6M]
	b	With a neat sketch explain the speed control of dc shunt motor.	[6M]
		OR	
	b	i) Derive an emf equation of a DC generator.	[4M]
		ii) Write short notes about shunt field and series field winding.	[4M]
		iii) Derive the efficiency formula for dc motor and generator.	[4M]
3		Unit-III	
	a	Describe how open-circuit and short circuit tests are performed on a single -phase transformer.	[12M]
		OR	
	b	i) With a neat sketch compare 3-phase induction motors.	[6M]
		ii) Explain Construction and working principle 1-Phase Induction motor.	[6M]
4		Unit-IV	
	a	i) With a neat sketch explain the operation of full wave bridge rectifier.	[6M]
		ii) What is Zener Diode? Explain its use as voltage regulator.	[6M]

		OR	
	b	i) Explain the formation of P type and N type semiconducting materials and mention their majority and minority carriers.	[6M]
		ii) Explain the VI characteristics of a PN junction diode.	[6M]
5		Unit-V	
	a	i) Explain the operation of PNP transistors in CE configuration.	[6M]
		ii) Compare CE, CB and CC configurations of a transistor.	[6M]
		OR	
	b	i) With a neat sketch explain operation of transistor work as an amplifier.	[6M]
		ii) With a neat sketch explain operation of transistor work as an switch.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BEC2TH06 **C PROGRAMMING**

Time: 3 hours (ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Draw a flowchart to count positive and negative numbers in a given list	[6M]
		ii) Explain the key features of algorithm	[6M]
		OR	
	b	i) What are the relational operators? Explain with examples	[6M]
		ii) What is a conditional expression operator? Use conditional expression operator to determine the number of days in February	[6M]
2		Unit-II	
	a	Explain the storage classes with example	[12M]
		OR	
	b	i) State the difference between entry controlled and exit controlled loops with an example.	[6M]
		ii) Explain break, continue and goto statements with example	[6M]
3		Unit-III	
	a	i) Illustrate the declaration and initialization of two dimensional array.	[6M]
		ii) Write a 'C' program to remove duplicate elements from a given array	[6M]
		OR	
	b	i) Explain the following string handling functions with example: a. strcpy() b. strcmp() c. strcat() d.strlen() e. strncat()	[6M]
		ii) Write a program to find whether the given string is present in the main string or not and also find the no of blanks in the main string.	[6M]
4		Unit-IV	
	a	i) What is a pointer? What are the advantages of pointers?	[6M]
		ii) How are increment and decrement operations implemented with pointers?	[6M]
		OR	
	b	i) Differentiate between structure and union?	[6M]
		ii) What is an enumerated data type? Explain with example.	[6M]
5		Unit-V	
	a	i) What are different types of files? Explain.	[6M]
		ii) What are the functions used for accessing files randomly? Explain with examples	[6M]
		OR	
	b	i) Write a 'C' program to copy the contents of one file to another file using command line arguments	[12M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BCI2TH12 **PYTHON PROGRAMMING**

Time: 3 hours (Common to CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Write a python program to retrieve strings starting with 'm' and having 5 characters.	[6M]
		ii) Explain built-in datatypes of python.	[6M]
		OR	
	b	i) Explain while loop & for loop with syntax and example in detail.	[6M]
		ii) Define math module? List and Explain functions of math module?	[6M]
2		Unit-II	
	a	Explain Lists along with methods associated with lists and explain mutability with respect to Lists.	[12M]
		OR	
	b	i) Differentiate List and Tuple in Python.	[4M]
		ii) What is negative index and how they are used in Python?	[4M]
		iii) "List is mutable." - Justify with suitable example.	[4M]
3		Unit-III	
	a	i) What is lambda function in python? Explain with any (one) example.	[6M]
		ii) Explain about features of turtle graphics in python.	[6M]
		OR	
	b	i) Describe about default arguments with suitable program.	[6M]
		ii) Write a python script to check whether the given string is palindrome or not using recursion.	[6M]
4		Unit-IV	
	a	i) Write a Python program which will throw exception if the value entered by user is less than zero.	[6M]
		ii) Explain exception handling in python with example.	[6M]
		OR	
	b	i) How to implement method overriding in Python? Explain	[6M]
		ii) Write a Python program to implement the concept of inheritance.	[6M]
5		Unit-V	
	a	i) Explain any four methods for regular expression with proper example.	[6M]
		ii) Describe match and search methods with example.	[6M]
		OR	
	b	i) Explain about pattern search using regular expression with example	[6M]
		ii) Write a Python program to replace all occurrences of space, comma, or dot with a colon.	[6M]

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NAKASAKAUPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, September-2023

Sub Code: 19BEE2TH15 POWER GENERATION AND ECONOMIC ASPECTS

Time: 3 hours (EEE) Max. Marks: 60

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		**Unit-I**	
	a	i) Explain the working of Hydro electric power plants with a neat diagram.	[12M]
		OR	
	b	i) Explain the classification of pumped storage power plants.	[6M]
		ii) Write the points to be considered for selection of site for hydro electric power plants.	[6M]
2		**Unit-II**	
	a	Draw the general layout of the thermal power station and discuss each component in detail.	[12M]
		OR	
	b	i) Describe the functions of economizer and super heater in a thermal power plant.	[6M]
		ii) What are the limitations of a thermal power plant?	[6M]
3		**Unit-III**	
	a	i) Explain essential components of a nuclear reactor.	[6M]
		ii) Explain the radiation hazards and shielding in nuclear power plants	[6M]
		OR	
	b	i) Describe working of PWR (pressurized water reactor). What are its advantages and disadvantages?	[6M]
		ii) Explain the functions of moderator and control roads in nuclear power plants	[6M]
4		**Unit-IV**	
	a	i) Explain the solar power generation with schematic diagram	[12M]
		OR	
	b	i) Explain the working of wind energy conversation system with neat block diagram.	[6M]
		ii) Discuss conventional and non-conventional energy in generation. Give example for each method.	[6M]
5		**Unit-V**	
	a	i) Define the terms: Load factor, plant use factor, demand factor and diversity factor	[6M]
		ii) A generating station supplies the following loads: 150MW, 120MW, 85MW, 60MW and 5MW. The station has a max-demand of 220 MW. The annual load factor of the station is 48%. Calculate i) the number of units supplied annually ii) diversity factor and iii) demand factor	[6M]
		OR	
	b	i) Define the load curve and illustrate it with different demands	[6M]
		ii) A consumer has the following connected loads: 10 lamps of 60W each and two heaters of 1,000W each. His maximum demand is 1,500W. On the average he uses 8 lamps 5 hours a day and each heater for 3 hours a day. Find his average load, monthly energy consumption and load factor.	[6M]