NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, May-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	Marks
1		Unit-I	
	a	i) Solve the differential equation $(xy^3+y)dx+2(x^2y^2+x+y^4)dy=0$	[6M]
		ii) If the temperature of the air is 40°C and the substance cools from 80°C to 60°C in 20 minutes, what will be the temperature of the substance after 40 minutes?	[6M]
		OR	
	b	i) Solve $\frac{dy}{dx}+\frac{y\cos x+\sin y+y}{\sin x+x\cos y+x}=0$	[6M]
		ii) Find the orthogonal trajectories of the family of the curves $r^n \sin n = a^n$.	[6M]
2		Unit-II	
	a	i) Solve $(x^2D^2 - xD + 2)y = 6$, $y(1) = 1$, $y'(1) = 2$.	[6M]
		ii) Solve $(D^2 + 1)y = \text{cosec } x$.	[6M]
		OR	
	b	i) Solve $(D^2 + 3D + 2)y = \sin 2x$.	[6M]
		ii) Determine q and i in the RLC circuit with L = 0.5 H, R = 6 , C = 0.02 F, e = 24 sin 10t and initial conditions q = i = 0 at t = 0.	[6M]
3		Unit-III	
	a	i) Form the partial differential equation by eliminating the arbitrary constants *a* and *b* from the following $\log(az-1)=x+ay+b$.	[6M]
		ii) Solve the equation $p(1 - q^2) = q(1 - z)$.	[6M]
		OR	
	b	i) Form the partial differential equation by eliminating the arbitrary function 'f' from . $xy+yz+zx=f\left(\frac{z}{x+y}\right)$	[6M]
		ii) Solve the equation $z = px + qy + p^2 + pq + q^2$.	[6M]
4		Unit-IV	
	a	i) Find the direction in which the directional derivative of $\phi=\frac{x^3-y^3}{xy}$ at (1, 1) is zero.	[6M]
		ii) Prove that $\nabla.(\bar{A}\times\bar{B})=\bar{B}.(\nabla\times\bar{A})-\bar{A}.(\nabla\times\bar{B})$.	[6M]
		OR	

	b	i) Determine the constants a and b such that curl of $(2xy+3yz)\bar{i}+(x^3+axz-4z^3)\bar{j}+(3xy+2byz)\bar{k}$ is zero.	[6M]
		ii) If $\bar{r}=x\bar{i}+y\bar{j}+z\bar{k}$, show that $div(r^n\bar{r})=(n+3)r^n$.	[6M]
5		Unit-V	
	a	i) Find work done in moving a particle along the straight line segments joining the points (0, 0, 0) to (1, 0, 0), then to (1, 1, 0) and finally to (1, 1, 1) under the force field $\bar{F}=(3x^2+6y)\bar{i}-14yz\bar{j}+20xz^2\bar{k}$.	[6M]
		ii) Verify Green's theorem for , $\int_C (xy+y^2)dx+x^2dy$ where C is the boundary of the region bounded by the parabola $y = x^2$ and the line $y = x$.	[6M]
		OR	
	b	i) Evaluate $\iint_S (xy\,dy\,dz+xz\,dz\,dx+xy\,dx\,dy)$, over the surface of the sphere $x^2 + y^2 + z^2 = 1$ in the positive octant.	[6M]
		ii) Find the area of the loop of the folium of descrates $x^3 + y^3 = 3axy$	[6M]

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NAKASARAOPETA
NEC ENGINEERING COLLEGE
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I B.Tech II Semester Supple. Examinations, May-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) Discuss zeolite process for softening hard water.	[6M]
		ii) Discuss desalination of water by reverse osmosis method.	[6M]
		OR	
	b	i) Explain break point chlorination of water	[6M]
		ii) Explain how alkalinity can be determined.	[6M]
2		Unit-II	
	a	Explain (i) Injection moulding (ii) moving bed cracking method	[12M]
		OR	
	b	i) Discuss coordination polymerization.	[4M]
		ii) Explain octane and cetane number.	[4M]
		iii) A coal has the composition by weight: C = 75%, N = 16%, O = 4%, S = 3% and ash= 2 %. Calculate high and lower calorific value of coal.	[4M]
3		Unit-III	
	a	i) Discuss applications of composite materials.	[6M]
		ii) Explain characterization of CNTs by TEM method.	[6M]
		OR	
	b	i) Discuss preparation and properties of fullerenes.	[6M]
		ii) Explain chemical vapour method for preparation of CNTs.	[6M]
4		Unit-IV	
	a	i) Discuss construction of Daniel cell.	[6M]
		ii) Explain dry corrosion theory.	[6M]
		OR	
	b	i) Explain working of hydrogen- oxygen fuel cell.	[6M]
		ii) Discuss electroplating method.	[6M]
5		Unit-V	
	a	i) Explain fluid film mechanism of lubrication.	[6M]
		ii) Discuss the effect of carbon dioxide and chlorides for failure of cement concrete.	[6M]
		OR	
	b	i) Classify refractories with examples.	[6M]
		ii) Explain (i) aniline point (ii) cloud and pour point	[6M]

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NEC NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech II Semester Supple. Examinations, May-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	Mark
		Unit-I	
1	a	i) Discuss the Fraunhofer diffraction due to single slit. Obtain the expression for width of a central bright fringe	[8M]
		ii) Differentiate quarter-wave plate and half-wave plate.	[4M]
		OR	
	b	i) Explain the principle and working of diffraction grating. Derive the condition for maximum intensity in the interference pattern of a diffraction grating?	[8M]
		ii) What are the characteristics of circularly and elliptically polarized light.	[4M]
		Unit-II	
2	a	i) Discuss the construction and working of Ruby lasers mention its advantageous and drawbacks.	[8M]
		ii) What is population inversion? Explain its importance in laser systems.	[4M]
		OR	
	b	i) Differentiate spontaneous and stimulated emission of radiation using energy level diagrams.	[6M]
		ii) Derive the expression for numerical aperture of an optical fiber. Discuss its importance.	[6M]
		Unit-III	
3	a	i) What is atomic packing factor (APF)? Derive the APF for SC, BCC and FCC systems. Prove that FCC systems are more densely packed than BCC and SC systems.	[8M]
		ii) What is unit cell? Differentiate primitive and non-primitive unit cells with examples.	[4M]
		OR	
	b	i) State and explain Bragg's law. Mention its importance in identifying the crystal structure.	[6M]
		ii) Derive the relation between miller indices and interplanar spacing. Compute the lattice spacing for the (211) reflection of a crystal with a = 4.830 Å b= 10.896 Å and c=6.288 Å	[6M]
		Unit-IV	
4	a	i) Derive the Maxwell's Electromagnetic equations in differential form.	[6M]
		ii) Differentiate soft and hard magnetic materials based on hysteresis response with examples.	[6M]
		OR	
	b	i) discuss various types of magnetic materials based on intensity of magnetization, temperature and susceptibility.	[8M]
		ii) Discuss the Gauss law of electromagnetism.	[4M]
		Unit-V	
5	a	i) Derive the Schrodinger time independent wave equation for a free particle.	[6M]
		ii) Explain the dual nature of matter. Derive the de Broglie wavelength of a particle with a velocity '*v*' and having mass '*m*'.	[6M]
		OR	
	b	i) State and Explain Hall effect. Derive the relation between Hall coefficient and Hall Voltage using a neat experimental setup.	[8M]
		ii) Differentiate intrinsic and extrinsic (n-type and p-type) semiconductors using energy band diagrams.	[4M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech II Semester Supple. Examinations, May-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) Draw the equivalent circuit and explain the characteristics of an ideal voltage source?	[6M]
		ii) Obtain the voltage distribution of a series circuit having three un equal resistances?	[6M]
		OR	
	b	i) State and prove the Kirchhoff's laws by using relevant expressions?	[6M]
		ii) A lamp rated 560W, 145V is to be operated from 200V supply. Determine the value of the resistor to be connected in series the lamp and power loss in the resistance?	[6M]
2		Unit-II	
	a	i) Explain the construction of D.C machines with the position of brush and commutator?	[6M]
		ii) A 8 pole lap wound armature rotated at 380 r.p.m is required to generate 250V. The useful flux per pole is about 0.06wb. If the armature has 120 slots, find the number of conductors per slot and hence determine the actual value of flux required to generate the same voltage for wave wound?	[6M]
		OR	
	b	i) Draw the circuit diagram and explain the procedure of direct loading test on a D.C shunt motor?	[6M]
		ii) A 4 pole D.C motor takes an armature current of 58A. The armature has 480 lap connected conductors. The flux per pole is 24mwb. Find the gross torque developed by the motor?	[6M]
3		Unit-III	
	a	i) By using the diagram explain the distribution of flux in primary and secondary windings of a transformer?	[6M]
		ii) Memorize and discuss in detail about the starting methods of 3 phase induction motor with circuit diagrams?	[6M]

	OR		
	b	i) Describe the role of slip in the operation of three phase induction motor?	[6M]
		ii) A single phase transformer has 560 primary and 1220 secondary turns. Net cross sectional area of the core is 80.8cm^2. If the primary winding is connected to 50Hz supply at 560V. Find the value of maximum flux density on core and the e.m.f induced in the secondary?	[6M]
4	Unit-IV		
	a	i) Elaborate the energy band description of N-type semi conductor?	[6M]
		ii) Explain the operation of zener diode working as voltage regulator?	[6M]
	OR		
	b	i) Elaborate the energy band description of P-type semi conductor?	[6M]
		ii) Derive the output voltage and efficiency of a half wave rectifier with circuit diagram?	[6M]
5	Unit-V		
	a	i) Draw the circuit diagram and explain the operating characteristics of common base PNP transistor amplifier?	[6M]
		ii) Find the value of emitter current and collector current of a transistor having α= 0.88 and collector to base leakage current I_{CBO} is 4.2 micro amperes. The base current is 55 micro amperes?	[6M]
	OR		
	b	i) Derive the base current amplification factor of common emitter configuration?	[6M]
		ii) Analyze the common collector configuration circuit and obtain the total emitter current?	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech II Semester Supple. Examinations, May-2023

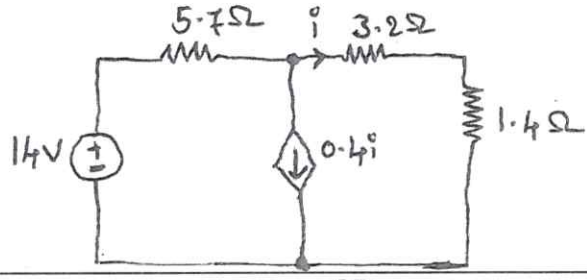
Sub Code: 19BEE2TH13 **ELECTRICAL CIRCUIT ANALYSIS-I**

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) Compare the independent and dependent voltage sources with circuit diagrams and equations?	[6M]
		ii) Two 115W, 200V bulbs are required to be connected across a 415V supply. Find the value of the resistance to be inserted in the line so that the voltage across the bulbs does not exceed 200V?	[6M]
		OR	
	b	i) State and prove the source transformation techniques with necessary equations?	[6M]
		ii) A 12 micro farads capacitor is charged full by a 130V D.C source. It is then connected across a un charged capacitor of 55 micro farads capacity. Find the energy distribution and compare the energy stored in the initial as well as final state?	[6M]
2		Unit-II	
	a	i) Determine the form factor of a sinusoidal waveform?	[6M]
		ii) The voltage and current through a circuit element is v=110 sin (314t+45°) volts and i= 12 sin (314t-45°) amps. Identify the circuit element and find its value?	[6M]
		OR	
	b	i) Draw the power triangle and analyze the significance of power factor?	[6M]
		ii) Derive expressions and analyze the steady state analysis of inductive circuit with sinusoidal excitation?	[6M]
3		Unit-III	
	a	i) Obtain and explain the properties of Basic cut set matrix with an example?	[6M]
		ii) Analyze the principle of duality of an *RLC* series circuit excited with a voltage source?	[6M]
		OR	
	b	i) Obtain and explain the properties of Basic tie set matrix with an example?	[6M]
		ii) Memorize the applications and process of construction of dual network with an example?	[6M]
4		Unit-IV	
	a	i) Deduce the expression for the Q factor of a series resonant circuit?	[6M]
		ii) Determine the resonance frequency of a series RLC circuit where R=12 ohms, L=28mH and C=140 micro farad? Find the quality factor also?	[6M]
		OR	
	b	i) Describe the parallel resonance of RLC circuit with AC excitation?	[6M]
		ii) A series *RLC* circuit has R=1.7 ohms, X_C=5.8 ohms and the inductance is impure having its resistance of 3.5 ohms and inductive reactance of 0.8 ohms. Find the input impedance and the circuit current. Find the frequency of resonance. The supply is 108V, 50Hz?	[6M]

		Unit-V	
5	a	i) Elaborate different methods of finding the Thevinin's equivalent resistance of a network?	[6M]
		ii) Find the current through 1.4 ohms resistor in the following figure by using Norton's theorem?  	[6M]
		OR	
	b	i) State and prove the Norton's theorem with circuit diagram?	[6M]
		ii) Discuss in detail about the steps for the solution of a network by using maximum power transfer theorem?	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech II Semester Supple. Examinations, May-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) Calculate the average power in kW that can be generated in a hydro-electric project from the following data: Catchment area = 5×109 m2; Mean head, H = 40 m Annual rainfall, F = 1.35 m; Yield factor, K = 80 % Overall efficiency = 75%. If the load factor is 50%, what is the rating of generators installed?	[6M]
		ii) With neat sketch explain Pelton wheel turbine.	[6M]
		OR	
	b	i) What is hydro power station? With neat sketch explain the operation of hydel power station.	[6M]
		ii) With a neat sketch explain Kaplan turbine.	[6M]
2		Unit-II	
	a	Draw and explain the block diagram of thermal power station.	[12M]
		OR	
	b	i) Draw a neat schematic diagram of feed water/steam flow circuit of a modern large thermal power plant. Explain the working.	[6M]
		ii) What is the function of a condenser in a steam power plant? Describe with a neat sketch any one type of condenser commonly used in power plants.	[6M]
3		Unit-III	
	a	Discuss essential components of a nuclear reactor.	[12M]
		OR	
	b	i)Explain the importance of boiled water reactor in nuclear Power station.	[6M]
		ii) Explain the Safety measures for nuclear power station	[6M]
4		Unit-IV	
	a	i) What do you understand by Solar radiation data? What is the need of Solar radiation data?	[6M]
		ii) Write short notes on solar thermal power plant.	[6M]
		OR	
	b	i) What are the advantages and disadvantages of geothermal energy?	[6M]
		ii) Explain the basic components of Tidal Power Plants and give their significance.	[6M]
5		Unit-V	
	a	i) Define and explain the significance of the following terms with illustrations. (a) Demand factor, (b) Load factor, (c) Diversity factor and (d) Plant factor	[12M]

		OR	
	b	i)The load on a power plant on a typical day is as under Time: 12-5 AM | 5-9 AM | 9-6 PM | 6-10 PM | 10-12 Load(MW): 20 | 40 | 80 | 100 | 20 Plot the chronological load curve and load duration curve. Find the load factor of the plant and energy supplied by the plant in 24 hours.	[6M]
		ii) A consumer has the following connected loads: 15 lamps of 40W each and two heaters of 1,000W each. His maximum demand is 15000W. On the average he uses 10 lamps 5 hours a day and each heater for 3 hours a day. Find his average load, monthly energy consumption and load factor.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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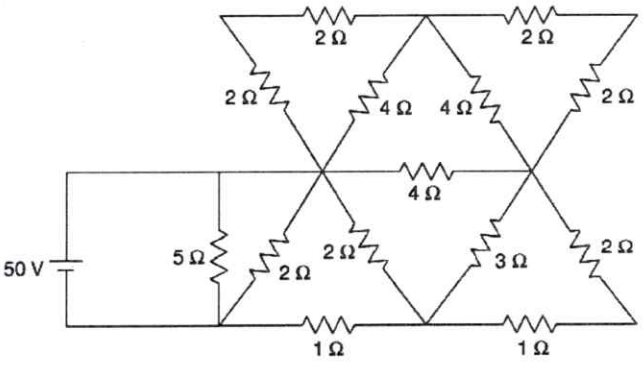
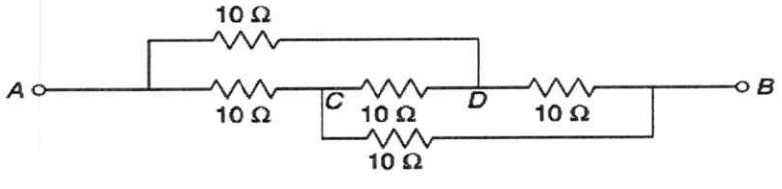
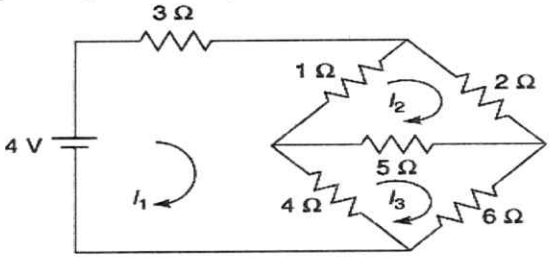
I B.Tech II Semester Supple. Examinations, May-2023

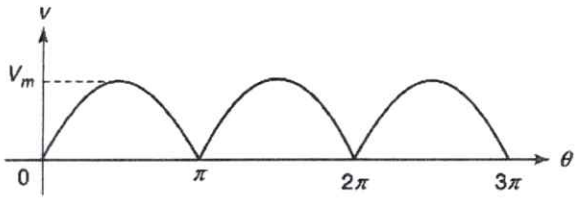
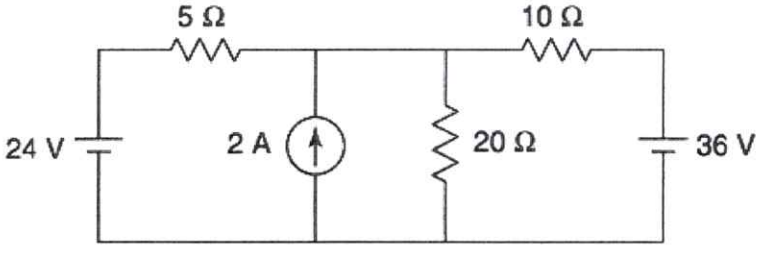
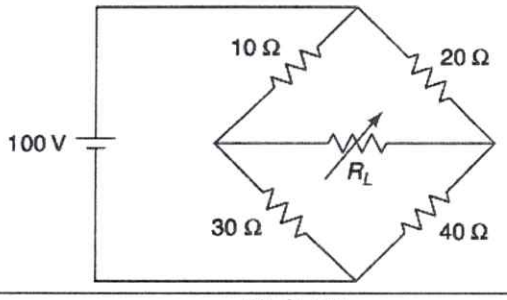
Sub Code: 19BEC2TH04 **NETWORK ANALYSIS**

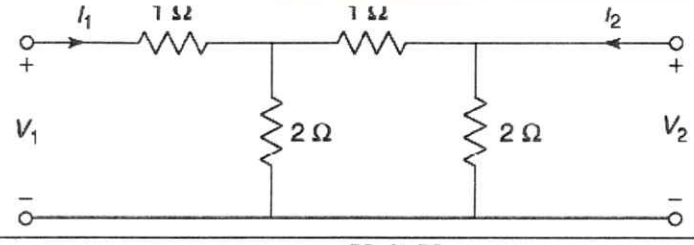
Time: 3 hours (ECE) Max. Marks: 60

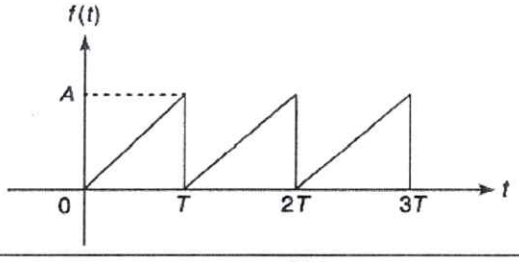
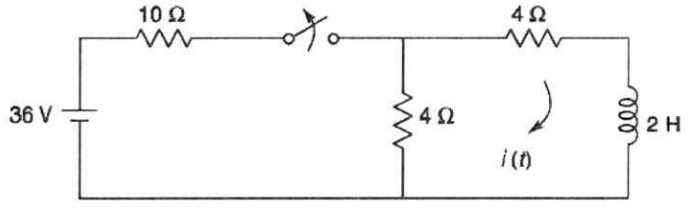
Note: Answer All **FIVE** Questions.

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

Q.No		Questions	Marks
1		Unit-I	
	a	i) Find the current delivered by the source in the network shown below. 	[6M]
		ii) Explain about Ideal, practical voltage and current sources along with their V-I characteristics, also explain dependent sources with neat diagrams.	[6M]
		OR	
	b	i) Find an equivalent resistance between A and B in the network of shown below using star/delta transformation. 	[6M]
		ii) Find the current supplied by the battery of the network shown below. 	[6M]
2		Unit-II	
	a	i) Find the effective value of the resultant current which carries simultaneously a direct current of 10 A and a sinusoidally alternating current with a peak value of 10 A.	[6M]
		ii) Two coils with a coefficient of coupling of 0.6 between them are connected in series so as to magnetize in (a) same direction, and (b) opposite direction. The total inductance in the same direction is 1.5 H and in the opposite direction is 0.5 H. Find the self-inductance of the coils.	[6M]
		OR	
	b	i) Deduce the Average value, RMS value, Form factor, and Peak factor for the wave	[6M]

		shown below.  	
		ii) Explain self-inductance, mutual inductance, self-induced emf and mutual induced emf of magnetically coupled circuits with relative formulas.	[6M]
3		Unit-III	
	a	i) A circuit consists of a pure resistor, a pure inductor, and a capacitor connected in series. When the circuit is supplied with 100 V, 50 Hz supply, the voltages across inductor and resistor are 240 V and 90 V respectively. If the circuit takes a 10 A leading current, calculate the value of inductance, resistance and capacitance, power factor of the circuit, and voltage across the capacitor.	[6M]
		ii) Find the current flowing through the 5 Ω resistor in the circuit shown below using superposition theorem.  	[6M]
		OR	
	b	i) Two circuits, the impedances of which are given by Z_1=(6+j8) Ω and Z_2=(8-j6) Ω and are connected in parallel. A supply voltage of 100 V is applied to the combination then find the current and pf of each branch, overall current and pf of the combination, and power consumed by each impedance.	[6M]
		ii) Calculate the value of resistance R_L in the circuit shown for maximum power transfer and calculate the maximum power.  	[6M]
4		Unit-IV	
	a	i) A resistor and a capacitor are connected in series with a variable inductor. When the circuit is connected to a 230 V, 50 Hz supply, the maximum current obtained by varying the inductance is 2 A. The voltage across the capacitor is 500 V. Calculate the resistance, inductance and capacitance of the circuit.	[6M]
		ii) Determine H- parameters in terms of Z and Y parameters.	[6M]
		OR	
	b	i) Compare series and parallel resonant circuits in any four aspects with suitable sketches.	[6M]
		ii) Find Z-parameters for the network shown in below.	[6M]



5		Unit-V	
	a	i) Derive the expression for i(t)and voltage across inductor $V_l(t)$ for series R-L circuit with D.C voltage applied to it at t=0 and draw its current and voltage responses.	[6M]
		ii) Find the Laplace transform of the waveform shown below.  	[6M]
		OR	
	b	i) The network shown in figure below has acquired steady-state with the switch closed for t<0. At t=0, the switch is opened. Obtain i(t) for t>0.  	[6M]
		ii) Derive the expression for i(t)and voltage across capacitor Vc(t) for series R-C circuit with D.C voltage applied to it at t=0. Also sketch the current and voltage responses.	[6M]

NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech II Semester Supple. Examinations, May-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) Write an algorithm to find the biggest among three numbers.	[6M]
		ii) Draw a flowchart for displaying the sum of even numbers in the range of 1 to n. accept 'n' from user.	[6M]
		OR	
	b	i) Explain Structure of C Program?	[6M]
		ii) Explain different Operators avail in C Programming ?	[6M]
2		Unit-II	
	a	Explain Loop controlled statements and write a Program to display sum of individual digits of a given integer number?	[12M]
		OR	
	b	i) Differentiate Call by value and Call by reference?	[4M]
		ii) Discus about the goto statement with example.	[4M]
		iii)Explain break and continue in C programming.	[4M]
3		Unit-III	
	a	i) Briefly explain about arrays in C programming.	[6M]
		ii) Write a C Program to Matrix multiplication Program?	[6M]
		OR	
	b	i) Discus the various string functions that can be performed on strings.	[6M]
		ii) Write a C Program to find Max value in a given array?	[6M]
4		Unit-IV	
	a	i) Write a Program to Add two numbers using pointers?	[6M]
		ii) Define a Pointer and explain pointer arithmetic?	[6M]
		OR	
	b	i) Differentiate Unions and structures?	[6M]
		ii) Write a C program using a pointer to structure illustrating the initialization of the members in the structure	[6M]
5		Unit-V	
	a	i) Discuss different file accessing functions available in C Programming?	[6M]
		ii) Discuss about Command line arguments, and write a program to copy content of one file to another using command line arguments?	[6M]
		OR	
	b	i) Write a C Program to Merging content of two files into one file?	[6M]
		ii) Write a C program that opens a file and deletes the blank spaces.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

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

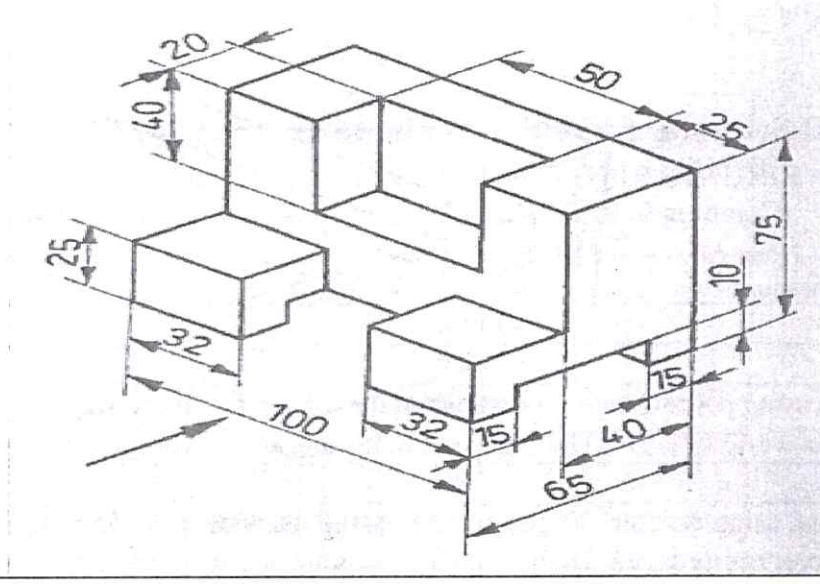
Sub Code: 19BCC2TH09 **ENGINEERING GRAPHICS**

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	Construct an Ellipse, using eccentricity method, when the distance of focus from directrix is 50mm. Eccentricity is 2/3. Draw tangent & normal at any point on the curve.	[12M]
		OR	
	b	Construct a Hyperbola, using eccentricity method, when the distance of focus from directrix is 65mm. Eccentricity is 3/2. Draw tangent & normal at any point on the curve.	[12M]
2		Unit-II	
	a	The top view of a 75 mm long line AB measures 65 mm, while the length of its front view is 50 mm. Its one end A is in the H.P. and 12 mm in front of the V.P. Draw the projections of AB and determine its inclinations with the H.P. and the V.P.	[12M]
		OR	
	b	i) A point P is in the first quadrant. Its shortest distance from the intersection point of H.P.,V.P. and Auxiliary vertical plane, perpendicular to the H.P. and V.P. is 70 mm and it is equidistant from principal planes (H.P. and V.P.).Draw the projections of the point and determine its distance from the H.P. and V.P.	[6M]
		ii) A point P is 50 mm from both the reference planes. Draw its projections in all possible positions.	[6M]
3		Unit-III	
	a	Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60° to the V.P.,and its surface making an angle of 45° with the H.P.	[12M]
		OR	
	b	A thin rectangular plate of sides 60 mm x 30 mm has its shorter side in the V.P. and inclined at 30° to the H.P. Project its top view if its front view is a square of 30 mm long sides.	[12M]
4		Unit-IV	
	a	i) Draw the projections of a hexagonal pyramid, base 30 mm side and axis 60 mm long, having its base on the H.P. and one of the edges of the base inclined at 45° to the V.P.	[6M]
		ii) A triangular prism base 40 mm side and height 65 mm is resting on the H.P. on one of its rectangular faces with the axis parallel to the V.P. Draw its projections.	[6M]
		OR	
	b	Draw the projections of a cylinder 75 mm diameter and 100 mm long, lying on the ground with its axis inclined at 30" to the V.P. and parallel to the ground.	[12M]
5		Unit-V	
	a	A cylindrical block of base, 60 mm diameter and height 80 mm, standing on the H.P. with its axis perpendicular to the H.P. Draw its isometric view.	[12M]
		OR	
	b	Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure.	[12M]


20
40
50
25
75
10
25
32
100
32
15
15
40
65

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, May-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** and **B** play 12 games of chess of which 6 are won by **A**, 4 are won by **B**, and 2 end in a draw. They agree to play a tournament consisting of 3 games. Find the probability that **a) A** wins all the three games, b) Two games end in a draw **c) A** and **B** win alternately	[6M]
		ii)A manufacturing firm employs three analytical plans for the design and development of a particular product. For cost reasons, all three are used at varying times. In fact, plans 1, 2, and 3 are used for 30%, 20% and 50% of the products, respectively. The defect rate is different for the three procedures as follows: $P(D/P_1)=0.01$, $P(D/P_2)=0.03$, $P(D/P_3)=0.02$, Where $P(D/P_j)$ is the probability of a defective product, given plan j. If a random product was observed and found to be defective, which plan was most likely used and thus responsible?	[6M]
		OR	
	b	i) A player tosses 3 fair coins. He wins Rs. 500 if 3 heads occur, Rs. 300 if 2 heads occur, Rs. 100 if one head occurs. On the other hand, he loses Rs. 1500 if 3 tails occur. Find the expected value of the game to the player. Is it favorable?	[6M]
		ii) Fit a binomial distribution to the following data X: 0 | 1 | 2 | 3 | 4 f: 30 | 62 | 46 | 10 | 2	[6M]
2		Unit-II	
	a	Obtain the equation of the normal curve that may be fitted to the following data *Class*: 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-100 *Frequency*: 3 | 21 | 150 | 335 | 326 | 135 | 26 | 4 Also obtain the expected normal frequencies.	[12M]
		OR	
	b	i) If X is uniformly distributed with mean 1 and variance 4/3, find $P(X<0)$.	[4M]
		ii) Define exponential distribution. Find the mean and variance of exponential distribution.	[4M]
		iii)Let X be normally distributed with mean 8 and standard deviation 4. Find $P(5\le X\le 10)$ and $P(10\le X\le 15)$.	[4M]
3		Unit-III	
	a	i) Explain the sampling distribution of a statistic?	[6M]
		ii) Determine 99% confidence interval for the mean of contents of soft drink bottles if contents of 7 such soft drink bottles are 10.2,10.4,9.8,10.0,9.8,10.2,9.6 ml.	[6M]
		OR	
	b	i) Explain about point estimation and interval estimation?	[6M]
		ii) The pulse rate of 50 yoga practitioners decreased on the average by 20.2 beats/minute with standard deviation of 3.5. If $\acute{x}=20.2$ is used as a point estimate of the true average decrease in the pulse rate, what can we assert with 95% confidence about the maximum error E. Construct 99% confidence intervals for the true average decrease in pulse rate.	[6M]
4		Unit-IV	
	a	i) Write the procedure for testing of Hypothesis?	[6M]
		ii) Mice with an average lifespan of 32 months will live upto 40 months when fed by a	[6M]

		certain nutruious food. If 64 mice fed on this diet have an average lifespan of 38 months and standard deviation of 5.8 months, is there any reason to believe that average lifespan is less than 40 months.	
		OR	
	b	I) In a mathematics examination 9 students of class A and 6 students of class B obtained the following marks. Test at 0.01 level of significance whether the performance in mathematics is same or not for the two classes A and B. Assume that the samples are drawn from normal populations having the same variance.	[6M]

A	44	71	63	59	68	46	69	54	48
B	52	70	41	62	36	50			

b — ii)To determine the effectiveness of drugs against "aids", three types of medicines, allopathic, homeopathic and ayurvedic were tested on 50 persons with the following results. [6M]

Effectiveness	Drug			
	Allopathy	Homeopathy	Ayurved	Total
No relief	11	13	9	33
Some relief	32	28	27	87
Total relief	7	9	14	30
Total	50	50	50	150

		Unit-V	
	a	i) What are statistical quality control techniques ? Discuss the objectives and advantages of statistical quality control.	[6M]
		ii) A drilling machine bores holes with a mean diameter of 0.5230cm and a standard deviation of 0.0032cm. Calculate the 2-sigma and 3-sigma upper and lower control limits for means of sample of 4.	[6M]
		OR	
5	b	Sample of size 50 are taken every hour from a process producing a certain type of item that is considered either defective or not defective. Twenty samples are taken. Construct a control chart for control of proportion defective. Does the process appear to be in control? Explain.	[12M]

Sample	Number of Defective items
1	4
2	3
3	5
4	3
5	2
6	2
7	2
8	1
9	4
10	3
11	2
12	4
13	1
14	2
15	3
16	1
17	1
18	2
19	3
20	1

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, May-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 a positive real root of $x-\cos(x)=0$ by bisection method, correct upto 4 decimal places between 0 and 1.	[6M]
		ii) Find the non-zero negative real root of the equation $x^2+4\sin(x)=0$ using Newton-Raphson method, correct to three decimal places.	[6M]
		OR	
	b	i) Find the positive real root of the equation $x^2-\log_e x-12=0$ using Regula falsi method, correct to three decimal places.	[6M]
		ii) Obtain the root of the equation $x^x=100$ correct to three decimal places, using Newton-Raphson method. Given the root lies between 3 and 4.	[6M]
2		Unit-II	
	a	i) For the data x: -4, -2, 0, 2, 4, 6 $f(x)$: -139, -21, 1, 23, 141, 451 Construct the forward and backward difference tables. Using the corresponding interpolation, show that the interpolating polynomial is same.	[6M]
		ii) Find the number of men getting wages between Rs. 10 and Rs. 15 from the following table *Wages in Rs.*: 0-10, 10-20, 20-30, 30-40 *Frequency*: 9, 30, 35, 42	[6M]
		OR	
	b	i) Prove that $\Delta+\nabla=\frac{\Delta}{\nabla}-\frac{\nabla}{\Delta}$ where Δ and ∇ are forward and backward difference operators, respectively.	[2M]
		ii) Using Newtwon's divided difference formula, find the value of $f(8)$ x: 4, 5, 7, 10, 11, 13 $f(x)$: 48, 100, 294, 900, 1210, 2028	[5M]
		iii) Find the unique polynomial $P(x)$ of degree 2 such that $P(1)=1$, $P(3)=27$, $P(4)=64$ Use Lagrange's method of interpolation.	[5M]
3		Unit-III	
	a	i) The table below gives the result of an observation. θ is the observed temperature in degrees centigrade of a vessel of cooling water, t is the time in minutes from the beginning of observations t: 1, 3, 5, 7, 9 θ: 85.3, 74.5, 67.0, 60.5, 54.3 Find the approximate rate of cooling at $t=3$ and $t=3.5$.	[6M]

		ii) The speeds of an electric train at various times after leaving one station until it stops at the next station are given in the following table. Find the distance between the two stations.	[6M]

Speed	0	13	33	$39\frac{1}{2}$	40	40	36	15	0
Time	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$

		OR	
	b	i) Obtain the Picard's second approximation for the initial value problem $\frac{dy}{dx}=\frac{x^2}{y^2+1}$, $y(0)=0$ Find $y(1)$.	[6M]
		ii) Apply Runge-Kutta fourth order method to find approximate value of y for $x=2.4$, in steps of 0.2, if $\frac{dy}{dx}=x(y-x)$, given that $y=3$ when $x=2$.	[6M]
4		Unit-IV	
	a	i) Prove that $curl(curl\,\vec{v})=grad(curl\,\vec{v})-\nabla^2\vec{v}$.	[6M]
		ii) Find constants a,b,and $c$so that $V=(-4x-3y+az)\vec{i}+(bx+3y+5z)\vec{j}+(4x+cy+3z)\vec{k}$ is irrotational. Show that V can be expressed as the gradient of a scalar function.	[6M]
		OR	
	b	i) Find the values of the constants a, b, and $c$so that the directional derivative of $\phi=axy^2+byz+cz^2x^3$ at (1,2,-1) has a maximum of magnitude 64 in a direction parallel to the z axis.	[6M]
		ii) Find the acute angle between the surfaces $xy^2z=3x+z^2$ and $3x^2-y^2+2z=1$ at the point (1,-2,1).	[6M]
5		Unit-V	
	a	i) Show that $\vec{F}=(2xy+z^3)\vec{i}+x^2\vec{j}+3xz^2\vec{k}$ is a conservative force field. Find the scalar potential. Find the work done in moving an object in this field from (1,-2,1) to (3,1,4).	[6M]
		ii) Evaluate $\iint_S \vec{F}\cdot\vec{n}\,dS$ where $\vec{F}=4xz\vec{i}-y^2\vec{j}+yz\vec{k}$ and S is the surface of the cube bounded by $x=0,x=1,y=0,y=1,z=0,z=1$.	[6M]
		OR	
	b	Verify the divergence theorem for $\vec{F}=2x^2y\vec{i}-y^2\vec{j}+4xz^2k$ taken over the region in the first octant bounded by $y^2+z^2=9$, and $x=2$.	[12M]

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple. Examinations, May-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) Explain the precedence of operators in Python.	[6M]
		ii) Write a Python program that calculates number of seconds in a day.	[6M]
		OR	
	b	i) Explain about string formatting operator with example.	[6M]
		ii) Write a Python program to find the given year is leap year or not.	[6M]
2		Unit-II	
	a	Explain about Dictionaries and traversing dictionaries. Briefly describe about built-in functions and methods of dictionaries.	[12M]
		OR	
	b	i) Discuss the basic Tuple operations with examples.	[4M]
		ii) What is Sequence in Python?	[4M]
		iii) Explain the Python Dictionary Comprehension	[4M]
3		Unit-III	
	a	i) Write a short note on Python sets?	[6M]
		ii) Write a Python script to find the square root of a number without using built-in functions?	[6M]
		OR	
	b	i) List some of useful math methods/functions?	[6M]
		ii) Write a Python program to draw a bar chart using turtle	[6M]
4		Unit-IV	
	a	i) What is an exception? Elaborate exception handling in python?	[6M]
		ii) Give an overview of OOP terminology.	[6M]
		OR	
	b	i) Write a script illustrating multiple inheritance?	[6M]
		ii) How data hiding is achieved in Python?	[6M]
5		Unit-V	
	a	i) Explain the steps of Regular expression matching in python.	[6M]
		ii) Write a python program that returns a list of strings containing all matches of a string "World".	[6M]
		OR	
	b	i) Describe about Pattern matching in Python with Regex	[6M]
		ii) Explain about RE methods in Python.	[6M]