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I B.TECH. II SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2022

I B.Tech II Semester Supple. Examinations, March-2022

Sub Code: 19BCC2TH01   COMMUNICATIVE ENGLISH-II

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

Note: Answer All **FIVE** Questions.

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

Q.No.		Questions	Marks
		Unit-I	
1	a	i) In what way did the Government of India acknowledge Rahul Bajaj's contribution?	[6M]
		ii) As the "Purchase Officer" of Tech Mahindra, Hyderabad, you want to buy a number of laptops for your organization. Write a letter to the "Sales Officer" Dell Corporation, requesting them to send you details of their products along with latest configuration, price, and time required for delivery of those products etc.	[6M]
		OR	
	b	i) Discuss the features of human communication.	[6M]
		ii) Write an e-mail as a flipkart representative in response to a purchase order placed for a new cell phone.	[6M]
		Unit-II	
2	a	Describe some of the acquisitions that were made by Ratan Tata in the light of achievements and his contribution to Indian industries.	[12M]
		OR	
	b	i) Discuss different types of communication.	[4M]
		ii) Bring out the difference in meaning of the following pairs of words by making sentences using them. A) ascent and assent B) capital and capitol C) cite and site D) principal and principle	[4M]
		iii) Fill in the blanks with the words formed by adding suitable prefix/suffix in the following sentences. A) Marks will not be awarded for _____ (correct) answers. B) The thieves are trying to _____ (lock) the safe. C) Women prefer to use _____ (stick) cookware. D) Some patients may die due to an _____ (dose) of medicines.	[4M]
		Unit-III	
3	a	i) Describe some of the ventures that Bhatia started after selling Hotmail.	[6M]
		ii) Write the synonyms of the following words. A) charisma B) irksome C) cheat	[3M]

		ii) Write the antonyms of the following words. A) heartfelt B) impartial C) common	[3M]
		OR	
	b	i) Discuss Knapp's relationship development model.	[6M]
		ii) Write an essay of 200 words on online classes during the lockdown.	[6M]
4		Unit-IV	
	a	i) Describe Jobs's interest in design. What did this arise from?	[6M]

		ii) Write one-word substitutes for the following phrases
		
		    A) A person appointed by two parties to solve a dispute
		    B) A man who is womanish in his habits
		    C) Someone who walks in sleep
		    D) The art or practice of garden cultivation and management
		    E) A person who speaks more than one language
		    F) One who is a centre of attraction
			[6M]

		OR	
	b	i) Draft your resume for the post of trainee sales executive at a top real estate firm in Narasaraopeta.	[6M]
		ii) Write the success story of Steve Jobs in your own words.	[6M]
5		Unit-V	
	a	i) Describe some of the work done by Sudha Murthy in the field of philanthropy and social work.	[6M]
		ii) As the Director, Softech Private Ltd., write a report to the vice-president of the company on the poor performance of the night-shift workers.	[6M]
		OR	
	b	i) Draft a report on your visit to a dam.	[6M]
		ii) You are in the middle of an important meeting when you receive a phone call form an important client. Keeping telephone etiquette in mind, explain what you will do in the situation.	[6M]

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NEC ~ RAJARA DELTA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple Examinations, March-2022

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
			Unit=I	
			i) Solve $xy(1+xy^2)\frac{dy}{dx}=1$.	[6M]
		a	ii) Show that the family of confocal conics $\frac{x^2}{a^2+\lambda}+\frac{y^2}{b^2+\lambda}=1,\lambda$ being a parameter, is self-orthogonal.	[6M]
			OR	
1			i) Solve $(y^4+2y)dx+(4y^3+2y^4-4x)dy=0$.	[6M]
		b	ii) When a switch is closed in a circuit containing a battery E, a resistance R and an inductance L, the current i builds up at a rate given by $L\frac{di}{dt}+Ri=E$. Find i as a function of t. How long will it be, before the current has reached one-half of its maximum value if $E = 6$ volts, $R = 100$ ohms and $L = 0.1$ henry?	[6M]
2			**Unit-II**	
			i) Solve $\frac{d^2y}{dx^2}-y=x\sin x+(1+x^2)e^x$.	[6M]
		a	ii) In an LCR 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 charge q be zero then show that, for small values of $\frac{R}{L}$, the current in the circuit at time t is $\frac{Et}{2L}\sin pt$.	[6M]
			OR	

		i) Solve $x^2\dfrac{d^2y}{dx^2}+4x\dfrac{dy}{dx}+2y=e^x$.	[6M]
	b	ii) Solve the simultaneous equations $t\dfrac{dx}{dt}+y=0, t\dfrac{dy}{dt}+x=0$ given that $x(1)=1, y(-1)=1$.	[6M]

Unit-III

	a	i) Find the differential equation of all spheres of radius 3 units having their centres in the xy-plane.	[6M]
3		ii) Solve $(y^3x-2x^4)\dfrac{\partial z}{\partial x}+(2y^4-x^3y)\dfrac{\partial z}{\partial y}=9z(x^3-y^3)$.	[6M]

OR

	b	i) Find the differential equation by eliminating the arbitrary functions from the relation $z=yf(x)+xg(y)$.	[6M]
		ii) Solve $(z^2-2yz-y^2)\dfrac{\partial z}{\partial x}+(xy+zx)\dfrac{\partial z}{\partial y}=xy-zx$.	[6M]

Unit-IV

	a	i) If $u=x^2+y^2+z^2$ and $\vec{V}=x\vec{i}+y\vec{j}+z\vec{k}$, then find $\operatorname{div}(u\vec{V})$.	[6M]
		ii) Find the constants a and b so that the surfaces $ax^2-byz=(a+2)x$ and $4x^2y+z^3=4$ may intersect orthogonally at the point $(1,-1, 2)$.	[6M]
4			

OR

	b	i) Find the constants a, b, c so that $\vec{F}=(x+2y+az)\vec{i}+(bx-3y-z)\vec{j}+(4x+cy+2z)\vec{k}$ is irrotational. Find the scalar potential φ such that $\vec{F}=\nabla\varphi$.	[6M]
		ii) If $\vec{A}=3xz^2\vec{i}-yz\vec{j}+(x+2z)\vec{k}$, find $\operatorname{curl}(\operatorname{curl}\vec{A})$.	[6M]

Unit-V

	a	Verify Green's theorem in the plane for $\oint_C (3x^2-8y^2)dx+(4y-6xy)dy$ Where C is the boundary of the region defined by the lines x-axis, y-axis and $x + y = 1$.	[12M]
5			

OR

	b	Verify Gauss divergence theorem for $\vec{F}=4x\vec{i}-2y^2\vec{j}+z^2\vec{k}$ taken over the region bounded by the cylinder $x^2+y^2=4$, $z=0, z=3$.	[12M]

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I B.Tech II Semester Supple Examinations, March-2022p

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
			Unit-I	
			i) Explain the following term: Alkalinity of water, Break point chlorination	[3M]
	a		ii) Explain the method of determination of dissolved oxygen of water and mention the chemical reactions involved in it.	[6M]
			iii) State the differences between biological oxygen demand and chemical oxygen demand.	[3M]
1			**OR**	
			i) Define hardness of water. Distinguish between temporary hardness and permanent hardness of water.	[3M]
	b		ii) A water sample contains 408 mg of $CaSO_4$ per litre. Calculate the hardness in terms of $CaCO_3$ equivalents. Given atomic weight of elements: Ca = 40, S = 32, O = 16, C = 12.	[3M]
			iii) Describe Ion-exchange process for softening of hard water with a neat diagram.	[6M]
			Unit-II	
			i) State the difference between octane number and cetane number of a fuel.	[4M]
			ii) Calculate the gross and net calorific value of a coal sample having the following composition: C = 80%, H = 7%, O = 3%, S= 3.5%, N = 2.1% and ash = 4.4%.	[4M]
	a		iii) Exactly 1.5 gm of coal was taken in a silica crucible. After heating at 100 °C for one hour, the residue weighed 1.415 gm. The crucible was then covered with a vented lid and strongly heated for 10 minutes at 950 °C, so that the residue weighed 0.528 gm. Calculate percentage of moisture and volatile matter using Proximate analysis.	[4M]
2			**OR**	
			i) State the differences between addition polymerization and condensation polymerization.	[4M]
	b		ii) Explain the mechanism for free radical chain polymerization reaction.	[4M]
			iii) Explain how thermoplastics differ from thermosetting plastics.	[4M]
			Unit-III	
	a		i) Explain sol-gel method for the synthesis of nanoparticle.	[6M]
			ii) Write the applications of CNT and fullerenes.	[6M]
3			**OR**	
			i) Distinguish between thermotropic and lyotropic liquid crystals with suitable examples.	[6M]
	b		ii) Define composite material with example.	[2M]
			iii) Write a short note on various applications of composite materials.	[4M]
4			**Unit-IV**	
			i) Construct the cell for the reaction Co (s) + Ni^{2+} (1M) = Co^{2+} (0.1M) + Ni (s) and calculate its EMF at 298 K. Given, E° (Co^{2+}/Co) = -0.282 V and E° (Ni^{2+}/Ni) = -0.236 V	[4M]
	a		ii) Write a short note on calomel electrode.	[3M]
			iii) Explain working principle of Dry cell with suitable diagram and chemical reactions.	[5M]

			OR	
			i) Differentiate between chemical corrosion and electrochemical corrosion.	[4M]
		b	ii) Explain anodic metallic coating and cathodic metallic coating with suitable examples.	[4M]
			iii) Explain electroplating process for control of corrosion.	[4M]
5			Unit-V	
		a	i) What is Boundary lubrication? Name two lubricants which can be used in boundary lubrication. State the characteristics for lubricant molecules to show boundary lubrication.	[6M]
			ii) Describe aniline point, cloud and pour pint of a lubricating oil.	[6M]
			OR	
			i) State the characteristics of a good refractory material.	[3M]
			ii) Explain refractoriness of refractory materials.	[3M]
		b	iii) Draw a flow-diagram for the manufacture of Portland cement from raw materials and write the chemical reactions involved in it.	[6M]

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I B.Tech II Semester Supple. Examinations, March-2022

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
		Unit-I	
1	a	i) Explain the conditions for producing the interference pattern.	[3M]
		ii) How rings are formed in Newton's ring experiment. Draw and explain the experimental setup and determine the wavelength of the light source using this experiment.	[9M]
		OR	
	b	i) Differentiate quarter and half wave plate with a neat sketch.	[6M]
		ii) Explain the double refraction principle using Nicol's prism.	[6M]
		Unit-II	
2	a	Differentiate spontaneous and stimulated emission of radiation. Explain the He-Ne laser using an experimental setup and draw the energy level diagram. Mention its advantages and drawbacks.	[12M]
		OR	
	b	i) Discuss the construction and working of optical fibre.	[4M]
		ii) Explain the importance of population inversion in laser systems.	[4M]
		iii) Discuss the importance of Numerical aperture in optical fibres and derive the relation between numerical aperture and fractional index change.	[4M]
		Unit-III	
3	a	i) What is atomic packing factor (APF)? Prove that $APF_{FCC} > APF_{SC}$	[6M]
		ii) State and explain Bragg's law.	[6M]
		OR	
	b	i) Explain the cubic, tetragonal and orthogonal crystal systems based on unit cell parameters.	[6M]
		ii) Derive the expression for interplanar spacing of crystalline planes.	[6M]
		Unit-IV	
4	a	i) Derive the differential form of Maxwell's electromagnetic equations.	[6M]
		ii) Based on Hysteresis behavior of Ferromagnetic materials, differentiate soft and hard magnetic materials.	[6M]
		OR	
	b	i) Classify paramagnetic and ferromagnetic materials based on susceptibility, temperature and response to magnetic field.	[6M]
		ii) Explain the Stoke's theory and discuss its applicability in Maxwell's electromagnetic equations.	[6M]
		Unit-V	
5	a	i) Mention the properties of Intrinsic semiconductors.	[3M]
		ii) Explain the applicability of Schrodinger's wave equation in solving	[9M]

		particle in a potential well of infinite height and determine the probability of finding a particle and its energy for ground, first and second excited states.	
		OR	
	b	i) State and explain the Hall effect. Drive the expression for Hall coefficient in terms of Hall voltage.	[6M]
		ii) Explain the dual nature of matter. Based on quantum mechanics principles, Derive the de Broglie wavelength for matter waves.	[6M]

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I B.Tech II Semester Supple Examinations, March-2022

Sub Code: 19BCC2TH11   **ENGINEERING MECHANICS**

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
			Unit-I	
1	a		Two smooth spheres each of radius 100 mm and weight 100 N, rest in a horizontal channel having vertical walls, the distance between which is 360 mm. Find the reactions at the points of contacts A,B,C and D shown in Figure-1 below. Figure-1	[12M]
			OR	
	·b		i) State and prove the varignon's theorem	[6M]
			ii) Two forces of magnitude 50 N and 30 N are acting at a point. If the angle between the two forces is 60°, determine the magnitude and direction of the resultant force.	[6M]
			Unit-II	
2	a		Determine the forces in the truss shown in Figure 2 below which carries a horizontal load of 16KN and a vertical load of 24KN. Figure 2	[12M]
			OR	
	b		i) State the coloumb's law of friction	[4M]

ii) What is the value of P in the system shown in Figure-3 below to cause the motion to impend? Assume the pulley is smooth and coefficient of friction between the   other contact surfaces is 0.02
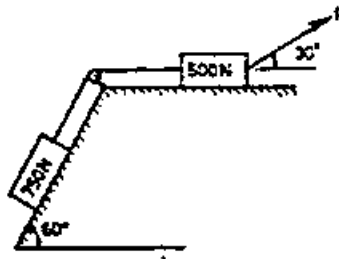
Figure-3

[8M]

Unit-III

Locate the centroid of the hatched area shown in figure-4 below

20 cm

20 cm   20 cm
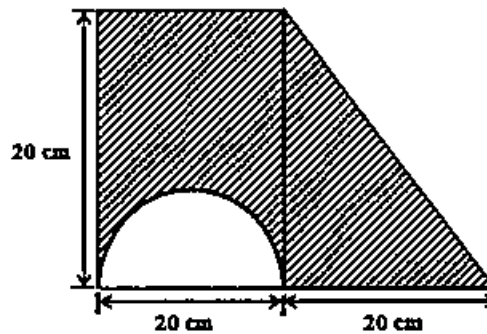
Figure-4

a   [12M]

OR

Determine the position of the center of gravity of the shaded area OBD as shown in the Figure-5.The curve OD is parabolic.

b

$x^2 = ky$

Figure-5

[12M]

3

4	Unit-IV

2
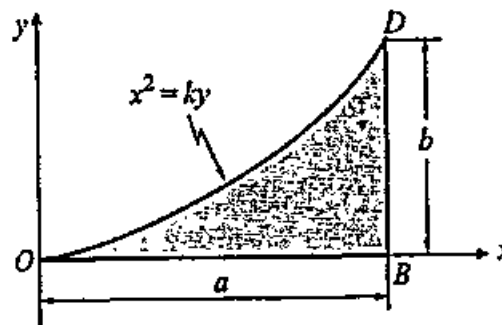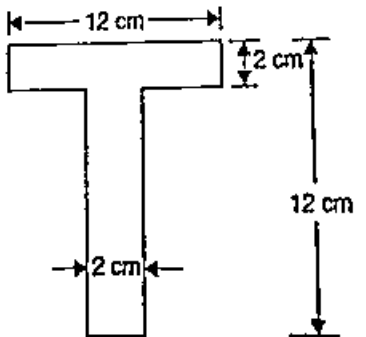
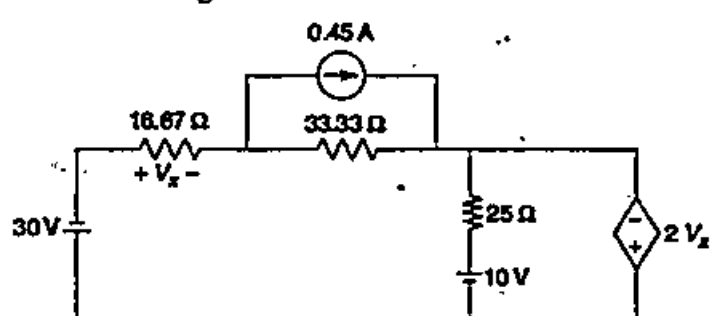|		For the T-section shown in figure-6, determine the moment of inertia of the section about the horizontal and vertical axes, passing through the centre of gravity of the section.	
	a	 figure-6	[12M]
		OR	
	b	Determine the mass moment of inertia of a right circular cone.	[12M]
		Unit-V	
	a	i) State and prove the D'Alembert's principle.	[6M]
		ii) Derive the work energy equation for translation.	[6M]
		OR	
5	b	A block and pulley system is shown in the figure.7. The pulley is friction less. Find the tension in the cable and the velocity of 50kg block after it has moved a distance of 1.5m when the system starts from rest. Neglect the mass of the pulley. Take the coefficient of kinetic friction between the blocks and plane as 0.25. Use the principle of work and energy. figure.7	[12M]

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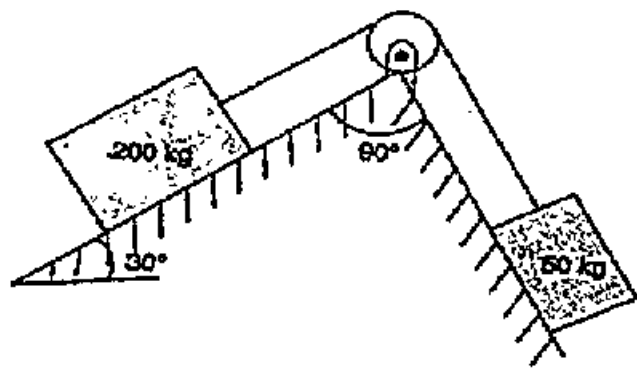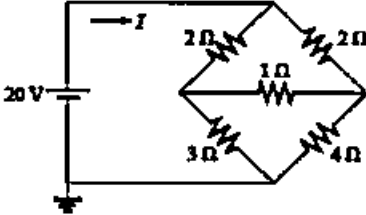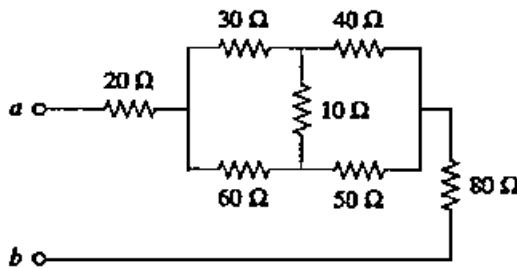
I B.Tech II Semester Supple. Examinations, March-2022

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
		Unit-I	
1	a	i) State and explain Kirchoff's laws with suitable examples.	[6M]
		ii) Using Δ-Y or Y-Δ conversion, find the current I in the circuit shown in figure.	[6M]
		OR	
	b	?. i) Find the equivalent resistance R_{ab} in the circuit shown in figure	[8M]
		ii) What are Ideal and Practical sources?	[4M]
		Unit-II	
2	a	Explain the constructional details of a D.C. Generator with neat sketches.	[12M]
		OR	
	b	i) List the applications of different types of DC machines.	[4M]
		ii) Derive the emf equation of a dc Generator	[4M]
		iii) Explain different types of losses in DC Motor.	[4M]
3		**Unit-III**	
	a	i) A single – phase, 50 Hz transformer has 40 primary turns and 520 secondary turns. The cross- sectional area of the core is 270 cm2 . When the primary winding is connected to a 300 volts supply, determine (i) the maximum value of flux density in the core, and (ii) the voltage induced in the secondary winding.	[6M]
		ii) Explain about various losses of Single phase transformer? How to minimize them?	[6M]
		OR	
	b	i) Explain the operating principle of Three phase Induction motor.	[6M]
		ii) The stator of a 3-phase, 4-pole induction motor is connected to a 50 Hz	[6M]

		supply. The rotor runs at 1455 rev/min at full load. Determine (i) the synchronous speed and (ii) the slip at full load.	
4		Unit-IV	
	a	i) Draw the Energy band diagram of PN junction diode and explain.	[6M]
		ii) A single phase half wave rectifier operates from 230V, 50 Hz supply. The load resistance is 5Ω. Find out the output voltage and current.	[6M]
		OR	
	b	i) What are the P-Type and N-Type semi conductors? Draw and explain the V-I Characteristics of P-N Junction diode	[6M]
		ii) List the specification parameters of a Diode	[6M]
5		Unit-V	
	a	i) Compare CE, CB and CC characteristics of a BJT.	[6M]
		ii) Draw the characteristics of Zener diode and explain.	[6M]
		OR	
	b	i) Briefly explain about PNP and NPN transistors.	[6M]
		ii) Compare the characteristics of transistor amplifiers in the three configurations	[6M]

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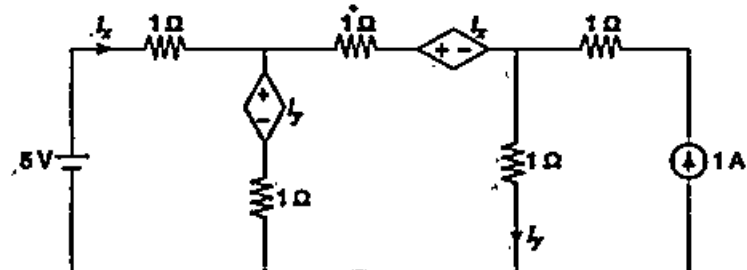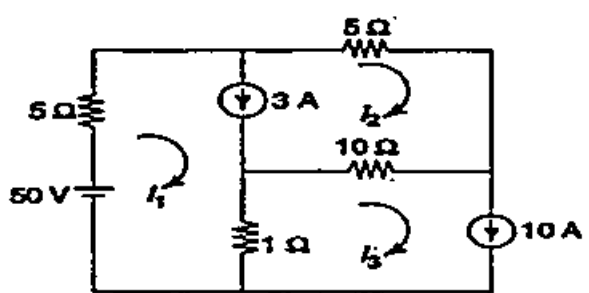
I B.Tech II Semester Supple. Examinations, March-2022

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
			Unit-I	
1	a	i)	Explain the Ideal and practical voltage sources and differentiate independent and dependent sources. Also explain different types of dependent sources	[6M]
		ii)	Calculate the voltage Vx in the network shown 	[6M]
			OR	
	b	i)	Find the currents in the three meshes of the network shown below. 	[6M]
		ii)	Determine the power delivered by the voltage source and the current in the 10 Ω resistor of the network shown below. 	[6M]
			Unit-II	
2	a		A periodic voltage waveform has been shown in the below figure. Determine the following. (i) Frequency of the waveform (ii) Wave equation for 0< t	[12M]

(iii) R.M.S. value, (iv) Average value, (v) Form Factor and Peak Factor
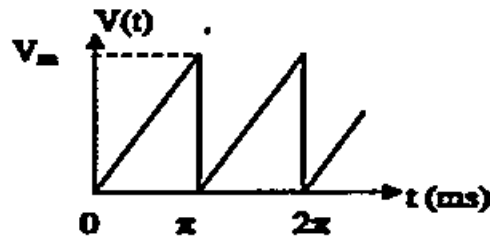
OR

		i) A series combination of R and C is in parallel with a 25 Ω resistor. A 50 Hz source results in a total current of 6.5 A, a current of 5 A through 25 Ω resistance and a current of 2.3 A in the RC branch. (i) Draw the phasor diagram of the circuit and find the values of R and C.	[4M]
	b	ii) Explain the steady state analysis of series and parallel RLC circuits with an AC excitation and draw the suitable phasor diagrams.	[4M]
		iii) A Resistor of 100 Ω in series with a capacitance of 50 μF is connected to a supply of 200 V, 50 Hz. Find (i) impedance (ii) current (iii) phase angle (iv) voltage across the resistor & capacitor.	[4M]

Unit-III

3	a	i) Determine the basic cutest matrix for the oriented graph given in Figure where the elements 1, 2, 3 are free branches.	[6M]
		ii) For the Network shown in Figure formulate its dual network.	[6M]
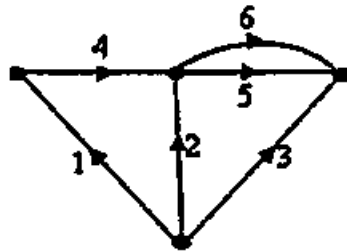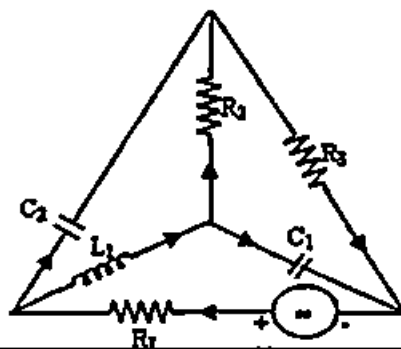
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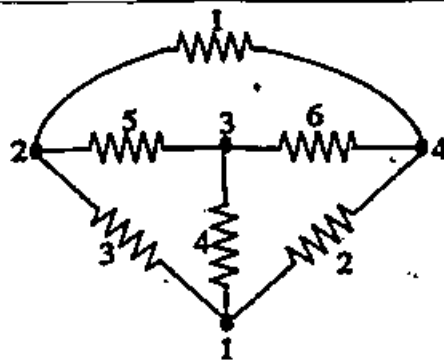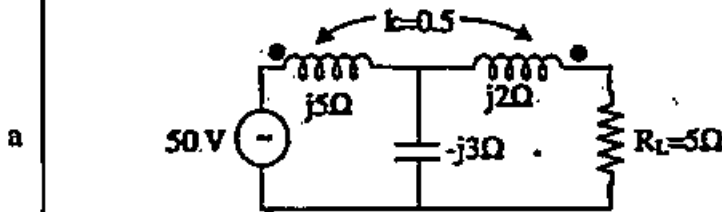|			
	b	i) For the given network shown in Figure, draw the graph and chose a possible tree. Construct the basic tie set schedule. Write the equation for the branch currents and in terms of the link currents and write separately the independent equations.	[12M]

i) For the network shown in below figure, find the voltage across load resistance RL.

[6M]

a

ii) Two coupled coils with L1 = 0.01 H and L2 = 0.04 H and k = 0.6 can be connected in four different ways such as series aiding, series opposing, parallel aiding and parallel opposing. Find the equivalent inductance in each case.
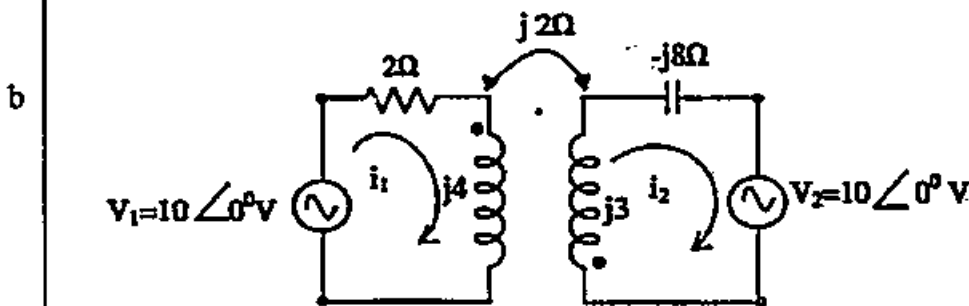
[6M]

OR

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i) Derive the expression for coefficient of coupling between pair of magnetically coupled coils.

[5M]

ii) For the circuit shown in figure below, determine the currents i1 and i2 using loop method of analysis.
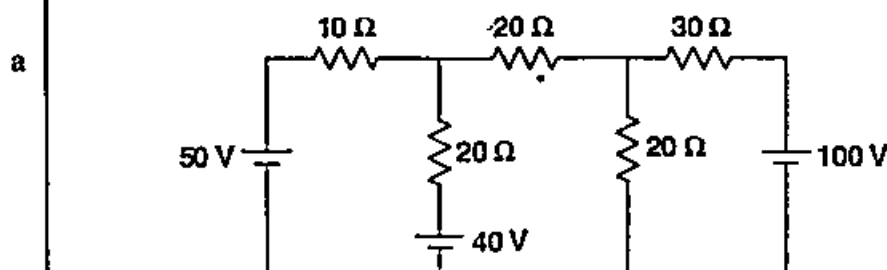
b

[7M]

i) State and explain the Superposition theorem and also list its limitations.

[5M]

iii) Find the current flowing through the 10 Ω resistor shown in figure below using superposition principle.

5

a

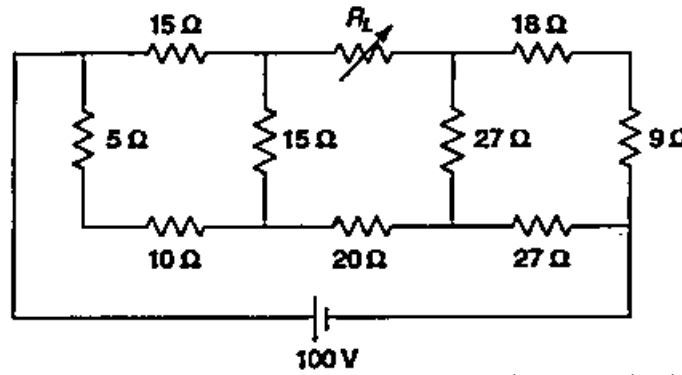[7M]

3 .

	b	i) State and explain the Maximum power transfer theorem and derive the maximum power condition.	[6M]
		ii) Deduce the value of resistance R_L in figure below for maximum power transfer and obtain its maximum power.	[6M]

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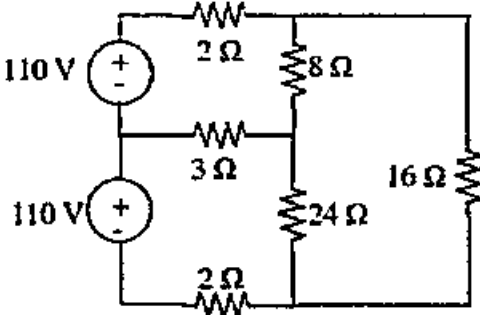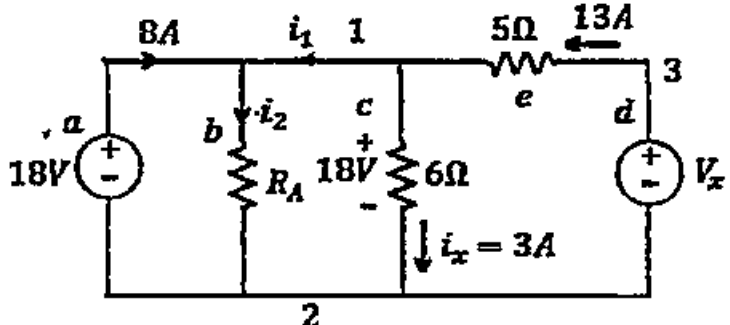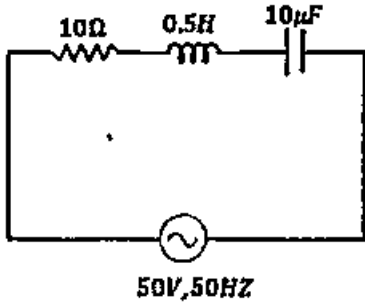I B.Tech II Semester Supple Examinations, March-2022

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)

			Unit-I	
1.	a	i)	What do you mean by an electric network and an electric circuit?	[4M]
		ii)	Using nodal analysis find all branch currents for the following circuit.	[8M]
			OR	
	b	i)	Explain the concept of source transformation with example?	[4M]
		ii)	Count the number of branches and nodes in the circuit. If $i_x = 3A$ and the 18V source delivers 8A of current. What is the value of R_A?	[8M]
			Unit-II	
2.	a	i)	What is time constant? What are the time constants of series RL and RC circuits?	[5M]
		ii)	In the circuit shown below, Determine the total impedance, current I, phase angle and the voltage across each element.	[7M]

			OR	
	b	i)	Define and explain self and mutual inductance.	[6M]
		ii)	Derive the expression of coefficient of coupling for a coupled circuit	[6M]
			Unit-III	
3.	a	i)	A series R-L-C circuit, excited by a 100V variable frequency source, has a resistance of 10Ω and an inductive reactance of 50Ω at 100Hz. If the resonance frequency is 500Hz, what is the voltage across the capacitor at resonance?	[6M]
		ii)	Prove that the power transfer to the load becomes maximum when the load impedance is equal to the complex conjugate of the Thevenin's impedance.	[6M]
			OR	
	b	i)	A series combination of R and C is in parallel with a 25ohms resistor. A 50Hz source results in a total current of 6.5A, a current of 5A through 25ohms resistance and a current of 2.3A in the R-C branch. (i) Draw the phasor diagram of the circuit and find values of R and C (ii) Find apparent, active, reactive power and power factor of the circuit.	[6M]
		ii)	State and explain Norton's theorem?	[6M]
			Unit-IV	
4.	a	i)	Obtain the expression for resonant frequency for parallel RL-RC circuit.	[6M]
		ii)	Determine all the two port network parameters of an ideal transformer'	[6M]
			OR	
	b	i)	Write the comparison between series resonance and parallel resonance?	[6M]
		ii)	The Z-parameters of a two-port network are $Z_{11} = 15\Omega$, $Z_{22} = 24\Omega$, $Z_{12} = Z_{21} = 6$ Ω. Determine ABCD and h-parameters.	[6M]
			Unit-V	
5.	a		For an RC series circuit, a sinusoidal voltage $v(t) = V_m \sin\omega t$ is applied at $t = 0$. Find the expression for transient current using both differential equation approach and Laplace transform approach.	[12M]
			OR	
	b	i)	Distinguish between Homogeneous and Non-Homogeneous with example?	[6M]
		ii)	In a series RLC circuit, R = 6ohms, L = 1H, C = 1F. A DC voltage of 40V is applied at $t = 0$. Obtain the expression for i(t) using differential equation approach.	[6M]

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I B.Tech II Semester Supple. Examinations, March-2022

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
			Unit-I	
1	a		i) What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart	[6M]
			ii) Differentiate between if statement and if-else statement with suitable examples and proper syntax	[6M]
			OR	
	b		i) Explain datatypes available in C	[6M]
			ii) Write about various types of operator in C programming	[6M]
			Unit-II	
2	a		What is an user defined and pre-defined function? When these functions are useful? How a function is declared and what are the rules followed to call a function.	[12M]
			OR	
	b		i) Write an algorithm to find the biggest among three numbers	[4M]
			ii) Discuss about call by reference and call by value with an example	[4M]
			iii) Write a C program to add two matrices (2-dimensional 3^x 3 matrices)	[4M]
			Unit-III	
3	a		i) What is meant by type conversion? Why is necessary? Explain about implicit and explicit type conversion with examples	[6M]
			ii) What is a loop? Explain different statements in C with example	[6M]
			OR	
	b		i) Define a pointer. How to initialize and declare pointer variables? Explain the same with examples	[6M]
			ii) Discuss the various parameter passing mechanisms with examples	[6M]
			Unit-IV	
4	a		i) Define a structure. Describe how to declare and initialize structure and its members with an example	[6M]
			ii) Write a program to find second highest and smallest number in the given array.	[6M]
			OR	
	b		i) What is Union? How it differ from Structure. Explain it with example	[6M]
			ii) What is an array? How to initialize, accessing, and print the array elements?	[6M]
5			**Unit-V**	
	a		i) Write a C program that reads contents of a file and displays then in capital letters if they are alphabets	[6M]
			ii) Write a program to open a file and read the file and print the file contents in reverse order	[6M]
			OR	
	b		i) Create two text files and write a program to add the contents of one file at the end of another	[6M]
			ii) Explain any three functions used for input/output in file handling	[6M]

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I B.Tech II Semester Supple Examinations, March-2022

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
		Unit-I	
1	a	i) In a certain assembly plant, three machines B_1, B_2 and B_3 make 30%, 45% and 25% respectively, of the products. It is known from past experience that 2%,3% and 2% of the products made by each machine, respectively, are defective. Suppose that a finished product is randomly selected. What is the probability that it is defective?	[6M]
		ii) A and B throw alternately with a single die, A having the first throw. The person who first throws ace is to win. What are their respective chances of winning .	[6M]
		OR	
	b	i) Find the mean and variance of Poisson distribution. Fit a Poisson distribution to the following data and calculate the expected frequencies. No. of the deaths: 0 1 2 3 4 Frequency: 109 65 22 3 1	[6M]
		ii) Find the mean and variance of Binomial distribution. Fit a Binomial distribution to the following data and calculate the expected frequencies.	[6M]

$x:$	0	1	2	3	4	5	6	7
$f:$	7	6	19	35	30	23	7	1

Q.No		Questions	Marks
		Unit-II	
2	a	i) A continuous r.v X has a probability density function (p.d.f.) given by $f(x) = \begin{cases} kx\,e^{-\lambda x}; & x \geq 0, \lambda > 0 \\ 0; & elsewhere \end{cases}$ Determine the constant k, obtain the mean and variance of X.	[6M]
		ii) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.	[6M]
		OR	

		i) Using Principle of Least Squares, derive the normal equations of a parabola $y=ax^2+bx+c$ and fit the parabola to the following data.	[6M]
	b	<table><tr><td>x:</td><td>10</td><td>12</td><td>15</td><td>23</td><td>20</td></tr><tr><td>y:</td><td>14</td><td>17</td><td>23</td><td>25</td><td>21</td></tr></table>	
		ii) Find the mean and variance of the uniform distribution.	[6M]

Unit-III

		i) A random sample of 400 computer chips is taken from a large lot of chips and 50 of them are found to be defective. Find a 95% confidence interval for p the proportion of defective chips contained in the lot.	[6M]
3	a	ii) A manufacturing engineer decided to check the efficiency of a new technician hired by the company. She records the time taken by the technician to complete 100 randomly selected jobs and found that in this sample of 100, the average time taken per job was 10 hours with a standard deviation of two hours. Find a 95% confidence interval for μ, the average time taken by a technician to complete one job.	[6M]

OR

	b	Suppose that X is a random variable with mean and variance. Let $X_1, X_2, X_3, ..., X_n$ be a random sample of size n from the population represented by X. Show that the sample mean $\bar{x}$ and sample variance S^2 are unbiased estimators of μ and σ^2 respectively. Also find the standard error of the sample mean.	[12M]

Unit-IV

		i) Write the procedure for testing of Hypothesis.	[6M]
	a	ii) The mean weight obtained from a random sample of size 100 is 64 gms. The S.D of the weight distribution of the population is 3 gms. Test the statement that the mean weight of the population is 67 gms at 5% level of significance. Also set up 99% confidence limits of the mean weight of the population.	[6M]

OR

4	b	i) The height of 6 randomly chosen sailors are in inches are 63, 65, 68, 69, 71 and 72. Those of 9 randomly chosen soldiers are 61, 62, 65, 66, 69, 70, 71, 72 and 73. Test whether the sailors are on the average taller than soldiers.	[6M]
		ii) Two random samples of sizes 9 and 6 gave the following values of the variable.	[6M]

Sample 1	15	22	28	26	18	17	29	21	24
Sample 2	8	12	9	16	15	10			

Test the difference of the estimates of the population variances at 5% level of significance.

			Unit-V	

5	a	A steel manufacturer extrudes scrap for manufacturing blades. Specifications require that the thickness of this scrap has $\mu=0.020\,mm$ and $\sigma=0.005\,mm$. (A) Use the specifications to calculate a central line and three-sigma control limits for an x chart with $n=10$. (B) Use the specifications to calculate a central line and three-sigma control limits for an R chart with $n=10$. (C) Plot the following means and ranges, obtained in 20 successive random samples of size 10 on charts based on the control-chart constants obtained in parts (A) and (B) and discuss the process.	[12M]

Sample No.	1	2	3	4	5	6	7
Mean(x)	0.022	0.021	0.029	0.018	0.019	0.027	0.021
Range(R)	0.004	0.002	0.007	0.006	0.003	0.004	0.005

Sample No.	8	9	10	11	12	13	14
Mean(x)	0.022	0.019	0.018	0.017	0.016	0.022	0.023
Range(R)	0.002	0.007	0.002	0.003	0.008	0.006	0.004

Sample No.	15	16	17	18	19	20
Mean(x)	0.019	0.020	0.021	0.022	0.018	0.010
Range(R)	0.002	0.005	0.003	0.002	0.008	0.006

		OR	

	b	i) In a study designed to determine the number of turns required for an artillery-shell fuse to arm, 80 fuses, rotated on a turntable, average 45.6 turns with a standard deviation of 5.5 turns. Establish tolerance limits for which one can assert with 95% confidence that at least 99% of the fuses will arm within these limits.
		ii) To check the strength of carbon steel for use in chain links, the yield stress of a random sample of 25 pieces was measured, yielding a mean and a standard deviation of 52,800 psi and 4,600 psi, respectively. Establish tolerance limits with $\alpha=0.05$ and $P=0.99$, and express in words what these tolerance limits mean.

i) ... [6M]

ii) ... [6M]

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I B.Tech II Semester Supple Examinations, March-2022

Sub Code: 19BCC2TH09
Time: 3 hours

ENGINEERING GRAPHICS
(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
		Unit-I	
1	a	i) Draw an involute of a hexagon of side 25 mm and draw a normal and tangent at a point 80 mm from the pole.	[6M]
		ii) Construct an ellipse of major axis 100 mm and minor axis 60 mm using arcs of circles method. Draw a tangent and normal at a point 20 mm from any focus.	[6M]
		OR	
	b	Construct an ellipse by using of arc of circle method major axis length is 120mm and minor axis length is 80mm and also draw the tangent at a distance of 40mm from the major axis	[12M]
		Unit-II	
2	a	The front view of a 75 mm long line AB measures 65 mm, while the length of its top view is 50 mm. Its one end A is in the HP and 12 mm in front of VP. Draw the projections and determine the inclinations with the HP and the VP.	[12M]
		OR	
	b	A line AB of 65 mm long has its end A 20 mm above the HP and 25 mm in front of the VP. The end B is 40 mm above the HP and 65 mm in front of the VP. Draw the projections of AB and find its inclinations with the HP and VP.	[12M]
		Unit-III	
3	a	A regular pentagon of 30 mm sides is resting on HP on one of it's sides while it's opposite vertex (corner) is 30 mm above HP. Draw projections when side in HP is 30° inclined to VP.	[12M]
		OR	
	b	Draw the projections of a regular hexagon of 25mm 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 H.P.	[12M]
		Unit-IV	
4	a	A Square prism, having a base with a 35mm side and an 60mm long axis, rests on one of its base edges in the HP such that the axis is inclined at 45° to the HP and 45° to the VP. Draw its projections, if the resting edge makes an angle of 300 with VP.	[12M]
		OR	
	b	A circular cone, 40 mm base diameter and 60 mm long axis is resting on HP, on one point of base circle such that it's axis makes 45° inclination with HP and 40° inclination with VP. Draw it's projections.	[12M]

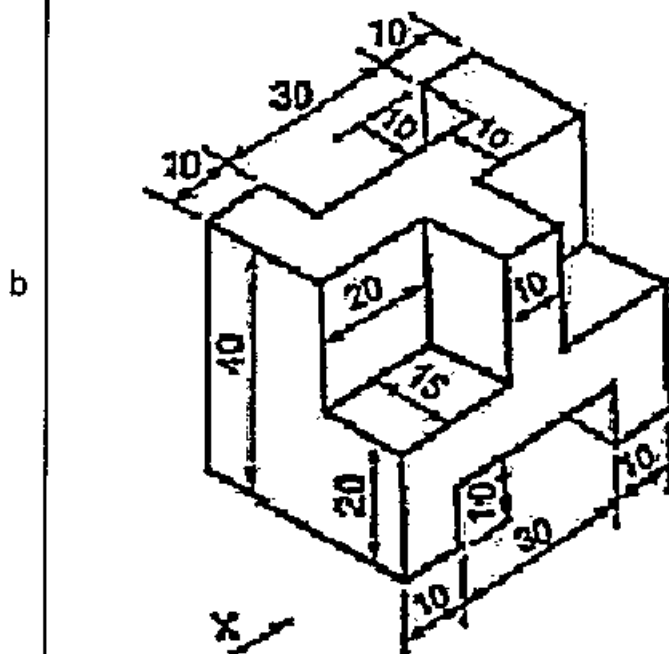|	Unit-V	
	Draw isometric view for the given orthographic projections.	
a		[12M]
	OR	
5		
b	Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure. 	[12M]
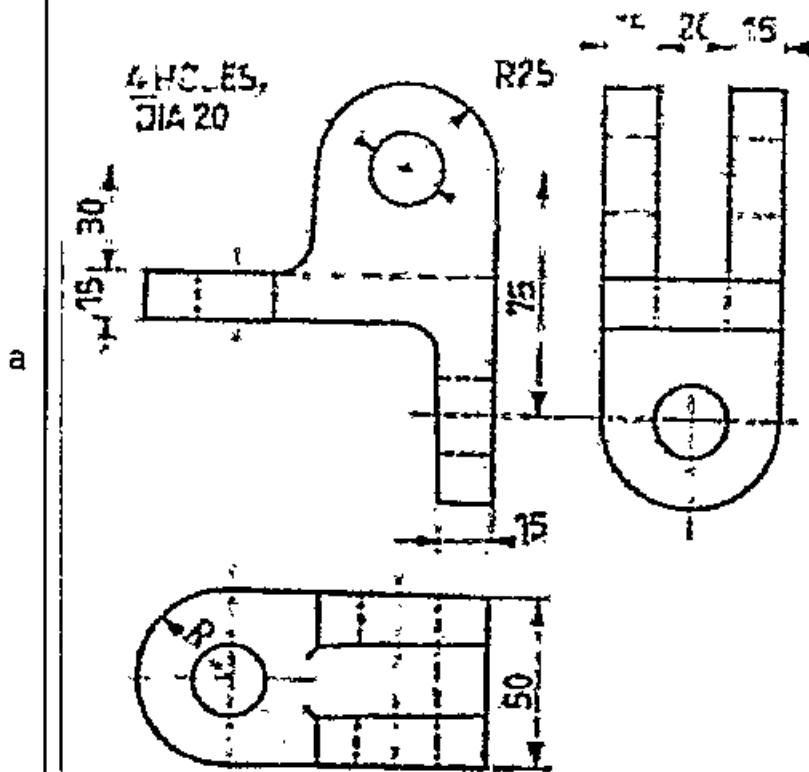
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I B.Tech II Semester Supple. Examinations, March-2022

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
		Unit-I	
1	a	i) Find a real root of the equation $x^3 - 4x - 9 = 0$ by using false position method.	[6M]
		ii) By using the bisection method, find an approximate root of the equation $\sin x = 1/x$, that lies between $x=1$ and $x=1.5$ (measured in radians). Carry out computations up to the 7th stage.	[6M]
		OR	
	b	i) Use the method of iteration to find a root of the equation $x^3 + x^2 - 1 = 0$ assuming the initial approximation as $x_0 = 0.8$.	[6M]
		ii) Find a positive root of the equation $xe^x - \cos x = 0$ by using Newton-Raphson method.	[6M]
2		**Unit-II**	
	a	i) Evaluate $\Delta^{10}\left[(1-x)(1-2x^2)(1-3x^3)(1-4x^4)\right]$, if the interval of differencing is 2 .	[6M]
		ii) Prove that $$u_1 x + u_2 x^2 + u_3 x^3 + \dots = \frac{x}{1-x}u_1 + \left(\frac{x}{1-x}\right)^2 \Delta u_1 + \left(\frac{x}{1-x}\right)^3 \Delta^2 u_1 + \dots$$	[6M]
		OR	
	b	i) From the following table, estimate the number of students who obtained marks between 40 and 45 by using Newton's forward formula:	[6M]
		ii) Find the polynomial $f(x)$ by using Lagrange's formula and hence find $f(3)$ for	[6M]
3	a	**Unit-III**	
		i) Find by Taylor's series method the value of y at $x=0.1$ and $x=0.2$ to	[6M]

Table for Q2.b.i):

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

Table for Q2.b.ii):

x:	0	1	2	5
f(x):	2	3	12	147

		five places of decimals from $\frac{dy}{dx}=x^2y-1,\ y(0)=1$.	
		ii) Apply Runge-Kutta method to find $y(0.2)$, given $\frac{dy}{dx}=x+y,\ y=1$ when $x=0$.	[6M]
		OR	
	b	i) Solve the following by Euler's modified method $\frac{dy}{dx}=\log(x+y),\ y(0)=2$ at $x=0.2$ and 0.4 with $h=0.2$.	[6M]
		ii) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Simpson's $3/8$ rule.	[6M]
4		**Unit-IV**	
	a	i) Find the directional derivative of $\phi=4xz^3-3x^2y^2z$ at $(2,-1,2)$ in the direction of the vector $2\overline{\imath}-3\overline{\jmath}+6\overline{k}$.	[6M]
		ii) Find $div\,\overline{F}$ and $curl\,\overline{F}$ if $\overline{F}=grad(x^3+y^3+z^3-3xyz)$.	[6M]
		OR	
	b	i) Show that $\overline{F}=(3x^2y^2+yz^4)\overline{\imath}+(2x^3y+xz^4)\overline{\jmath}+(4xyz^3)\overline{k}$ is irrotational and find its scalar potential function.	[6M]
		ii) Show that $\nabla\times(\nabla\times\overline{a})=\nabla(\nabla.\overline{a})-\nabla^2\overline{a}$.	[6M]
5		**Unit-V**	
	a	i) Find the work done in moving a particle in the force field $\overline{F}=3x^2\overline{\imath}+(2xz-y)\overline{\jmath}+z\overline{k}$ along the straight line from $(0,0,0)$ to $(2,1,3)$.	[6M]
		ii) Apply Green's theorem to evaluate $\int_C (2x^2-y^2)\,dx+(x^2+y^2)\,dy$, where C is the boundary of the area enclosed by the x-axis and the upper-half of the circle $x^2+y^2=a^2$.	[6M]
		OR	
	b	Verify Gauss divergence theorem for $\overline{F}=(x^2-yz)\overline{\imath}+(y^2-zx)\overline{\jmath}+(z^2-xy)\overline{k}$ taken over the rectangular parallelopiped $0\le x\le a,\ 0\le y\le b,\ 0\le z\le c$.	[12M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech II Semester Supple Examinations, March-2022

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
			Unit-I	
1	a	i)	What is data type? Define different type of data types with example. Why we use different data types in the Python programing language?	[6M]
		ii)	Write a python program to print all the numbers from 1 to 1000 that are not divisible by 2, 3, 5, 7, 11, 13, 17 and 19.	[6M]
			OR	
	b	i)	What are operators in Python? Describe specifically about identity and membership operator?	[6M]
		ii)	Write a Python program that prompts user to enter numbers. The process will repeat until user enters 0. Finally, the program prints sum of the numbers entered by the user.	[6M]
			Unit-II	
2	a	i)	Make list of first 20 letters of alphabets then using list operations do the following operations (a) Print first 5 letters from created list. (b) Print last 5 letters from created list. (c) Print alternate letters from the created list.	[6M]
		ii)	What is a file? What are file operations? What are the advantages of file handling?	[6M]
			OR	
	b	i)	Write a program to create a list of numbers in the range 1 to 20. Then delete all the numbers from the list that are divisible by 2.	[6M]
		ii)	Write a Python program to generate and print a dictionary that contains a number (between 1 and n) in the form (x, x*x). Sample Dictionary input: n = 5 Expected Output: {1: 1, 2: 4, 3: 9, 4: 16, 5: 25}	[6M]
			Unit-III	
3	a	i)	Define math module? List and Explain functions of math module with example?	[6M]
		ii)	Define a function to find sum of all odd numbers between 1 to n.	[6M]
			OR	
	b	i)	What are differences between user defined functions and build in functions in the python programing. Explain with suitable examples	[6M]
		ii)	Explain various plots which can be created using python matplotlib with an example	[6M]
4			**Unit-IV**	
	a	i)	Explain different types of Inheritance with an example.	[6M]
		ii)	Write a python program to create students class (ID, NAME, MARKS). Create N (N>20) student objects. Sort student objects in descending order based on MARKS.	[6M]
			OR	
	b	i)	Explain how exceptions can be handled in Python. What is the exception handling mechanism behind the process?	[6M]

		ii) Write a program that has a class Point with attributes as the x and y coordinates. Make two objects of class and find the midpoint of the both the points.	[6M]
5		Unit-V	
	a	i) What is regular expression? Why we use regular expression in the Python Programming? How to use regular expression in the Python programming? Explain with an example.	[6M]
		ii) Write a Python program to replace whitespaces with @ character?	[6M]
		OR	
	b	i) Write a Python program that matches a word containing 'a', not at the start or end of the word.	[6M]
		ii) Explain different Special Sequences of regular expression in python with suitable example.	[6M]

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