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II B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024

II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BCE3TH06 BUILDING MATERIALS AND BUILDING CONSTRUCTION

Time: 3 hours   (CE)   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 properties of building stones	[6M]
			ii) Write about dressing of stone.	[6M]
			OR	
	b		i) Classify different types of tiles discuss briefly	[6M]
			ii) Explain the characteristics of good tile	[6M]
			Unit-II	
2	a		Explain about seasoning of Timber and write the properties of Timber	[12M]
			OR	
	b		i) Define the following terms; Header, Stretcher, Quoin closer.	[4M]
			ii) Draw English and Flemish bond	[4M]
			iii) Explain the defects in Timber	[4M]
			Unit-III	
3	a		i) Explain various ingredients of lime	[6M]
			ii) What are the various types of cement and their properties	[6M]
			OR	
	b		i) Write on the following: (a) Vicat apparatus (b) Le-chatlier apparatus	[6M]
			ii) Write about hydration of cement	[6M]
			Unit-IV	
4	a		i) Explain different types of foundation with neat sketches	[6M]
			ii) Draw spread and strap footing with neat sketches	[6M]
			OR	
	b		i) Draw Lean to roof with neat sketch and label parts?	[6M]
			ii) Explain about Coupled Roof with sketch	[6M]
			Unit-V	
5	a		i) Write about DPC and water proofing materials	[6M]
			ii) Explain about white washing and distempering	[6M]
			OR	
	b		i) Write the difference between plastering and pointing	[6M]
			ii) Explain about form work and scaffolding	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEE3TH03   **ELECTRICAL CIRCUIT ANALYSIS - II**

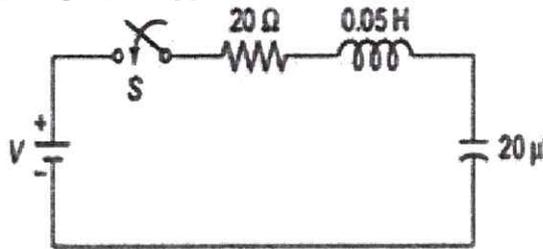Time: 3 hours   (EEE)   Max. Marks: 60

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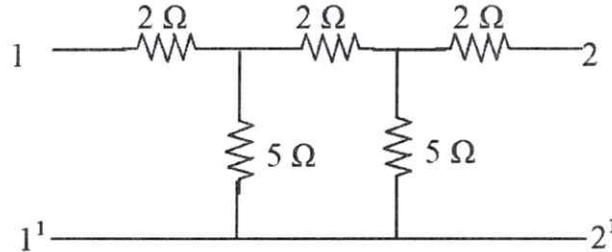
All Questions Carry Equal Marks   (5 X 12 = 60M)

Q.No		Questions	Marks
		Unit-I	
1	a	i) Derive the relation between line and phase voltages and currents in balanced delta connected systems.	[6M]
		ii) A balanced star connected load having an impedance $(15+j20)$ Ω per phase is connected to a three phase 440V, 50Hz supply. Find the line currents and the power absorbed by the load. Assume RYB phase sequence.	[6M]
		OR	
	b	i) Derive the expression for active power and reactive power in a balanced star connected systems.	[6M]
		ii) A 3 phase,3-wire balanced delta load yields 2 wattmeter readings as 1154W and 577W. Obtain the load impedance if V_L = 141.4 V.	[6M]
		Unit-II	
2	a	i) Briefly discuss the procedure for analyzing star connected three wire unbalanced loads and combinations of star and delta connected loads	[6M]
		ii) An unbalanced four wire, star connected load has a balanced voltage of 400 V, the loads are: Z_1= $(4+j16)$ Ω, Z_2= $(5+j20)$ Ω, Z_3= $(8+j4)$ Ω. Calculate the: (i) The line currents. (ii) Current in the neutral wire and (iii) The total power	[6M]
		OR	
	b	i) Show that 2 wattmeter are sufficient to measure 3 phase total power even when the load was unbalanced	[6M]
		ii) The two wattmeter method is used to measure power in a three phase load. The wattmeter readings are 400W and -35W. Calculate (i) Total active power (ii) Power factor (iii) Reactive Power.	[6M]
3		Unit-III	
	a	i) Find the response of RL network with sinusoidal excitation using differential equations	[6M]
		ii) The circuit shown in fig. consists of resistance, inductance and capacitance in series with a 200V constant source. When the switch is closed at t=0. Find the transient current using differential equation approach.	[6M]
		OR	
	b	i) Find the response of RC network with sinusoidal excitation using Laplace transform method.	[6M]
		ii) The circuit shown in figure consists of series RL elements. The sine wave is applied to the circuit when the switch is closed at t = 0. Determine the current i(t).	[6M]
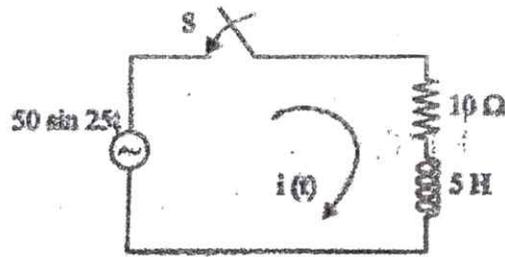
		Unit-IV	
4	a	i) Derive the condition of symmetry and reciprocity of Z and Y parameters	[6M]
		ii) Determine the Y- parameters of the network shown in figure 	[6M]
		OR	
	b	i) Express h-parameters in terms of ABCD parameters.	[6M]
		ii) Determine the ABCD parameters of the network shown in figure 	[6M]
		Unit-V	
5	a	i) What is a high pass filter? In what respects it is different from a low pass filter?	[4M]
		ii) Derive the equations to find the inductances and capacitances of a constant K high pass filter	[8M]
		OR	
	b	i)Derive the expression for Propagation Constant of π network.	[6M]
		ii) A low pass π section filter consists of an inductance of 25mHin the series arm and two capacitors of 0.2 μF in the shunt arm. Calculate the cutoff frequency, design impedance, characteristic impedance and phase shift at 2kHz.	[6M]
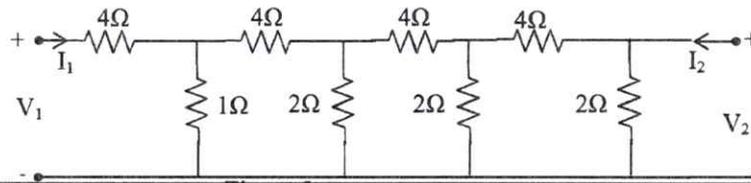
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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEE3TH05   **ELECTRO MAGNETIC FIELDS**

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) Obtain the expression for electric field intensity and potential due to an electric dipole.	[6M]
			ii) Find the total charge Q with in the sphere of radius r=4 m if its volume charge density is $\rho_v = \dfrac{10}{r sin\theta}$ C/m³	[6M]
			OR	
	b		i) Three equal positive charges of 4×10-9 coulomb each are located at three corners of a square, side 20cm. determine the electric field intensity at the vacant corner point of the square.	[6M]
			ii) The capacitance of a parallel plate condenser is 0.2µF. Potential difference between the plates is 2V. Calculate the energy stored by the charged condenser.	[6M]
			Unit-II	
2	a		i) Derive Equation of continuity. What is its significance?	[6M]
			ii) State the boundary conditions in electrostatic fields and prove any one of them.	[6M]
			OR	
	b		i) Using Gauss law, derive the expression for electric field intensity due to an infinite length of line charge.	[6M]
			ii) A homogeneous dielectric (ε_r= 2.5) fills region 1(x<0) while region 2 (x>0) is free space. If $\vec{D}_1$=12 **a**x-10 **a**y+4 **a**z C/m², find $\vec{D}_2$	[6M]
			Unit-III	
3	a		i) Derive the magnetic field intensity due to an infinite length current carrying conductor by using Biot Savart's law.	[6M]
			ii) Find the magnetic field intensity at the centre O of a square loop of sides equal to 5M and carrying 10A of current.	[6M]
			OR	
	b		i) If magnetic vector potential is $\vec{A}$= 2.5 r²⁵**a**z Wb/m in free space, find Magnetic field intensity $\vec{H}$	[6M]
			ii) Find **H** at the centre of an equilateral triangle loop of side 4m carrying 5 A of current lying in x=0 plane and the centroid lies along z axis.	[6M]
4			Unit-IV	
	a		i) Derive an expression for the torque on a current loop placed in a uniform magnetic field and hence define magnetic dipole-moment from this derivation.	[6M]
			ii) A small current loop L1with magnetic moment 5 **az** A/m2 is located at the origin while another small loop of current L2 with magnetic moment 3 ay A/m2 is located at (4,-3,10). Determine the torque on L2.	[6M]
			OR	
	b		i) Explain the concept self and mutual inductances.	[6M]
			ii) Two parallel current carrying conductors separated by a distance of 4m carries current of 10 A and 15 A in opposite directions. Find the force on each conductor. Find the field intensity at mid-point between the two conductors.	[6M]

		Unit-V	
		i) State and explain Faraday's laws of electromagnetic induction with some examples.	[6M]
	a	ii) A 30 cm × 40 cm loop rotates at 130 rad/s in a magnetic field 0.06 Wb/m2 normal to the axis of rotation. If the loop has 50 turns, determine the induced voltage in the loop.	[6M]
5		OR	
	b	i) Write Maxwell's equation for static fields. Explain how they are modified for time varying electric and magnetic fields.	[8M]
		ii) State and explain Poynting theorem	[4M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEE3TH04   **ELECTRICAL MACHINES-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) Derive and analyze the energy conversion through magnetic field with circuit diagram?	[6M]
		ii) A compound generator delivers a load current of 37A at 487V. The armature resistance is 0.07 ohms, series field resistance is 0.06 ohms and shunt field resistance being 222 ohms. Calculate the induced e.m.f if contact drop is 0.8V per brush. Neglect the armature reaction. Assume the long shunt and short shunt connections?	[6M]
		OR	
	b	i) Define and compare field energy and co-energy with i-λ characteristics?	[6M]
		ii) Derive the excitation characteristics of DC shunt generator with relevant expressions?	[6M]
		Unit-II	
2	a	Describe in detail about the armature reaction in the DC machines with field effect diagrams?	[12M]
		OR	
	b	i) Justify the significance of back e.m.f in the operation of DC shunt motor?	[6M]
		ii) A 214V DC shunt motor takes 32A at full load. The resistances of armature and shunt field windings are 0.3 ohms and 216 ohms respectively. Find the back e.m.f on full load. What will be the generated voltage at 48A to load at terminal voltage of 214V?	[6M]
		Unit-III	
3	a	i) Explain the need of starter in the DC motors and draw the four point starter diagram?	[6M]
		ii) A permanent magnet DC motor has armature resistance of 0.9 ohms. When fed from 40V DC supply, it runs at a speed of 2300 r.p.m while taking 0.7A. Find i) The no-load rotational losses of the motor? ii) The motor output when running at a speed of 1556 r.p.m with supply voltage of 66V DC? iii) Its stall torque when the source voltage is 18V DC?	[6M]
		OR	
	b	i) Draw the circuit diagram and explain the procedure of separation of losses test on a DC motor?	[6M]
		ii) A 4 pole DC series motor has 924 wave connected armature conductors. At a particular load the flux per pole is 0.05wb and the total torque developed is 216N-m. Find the line current taken by the motor and the speed at which it will run when the applied voltage is 444V. The total resistance of the motor is 3.7 ohms?	[6M]

		Unit-IV		
4	a	i) Derive and analyze the equivalent circuit of a transformer referred to the secondary side?	[6M]	
		ii) A 4400/220V, single phase 556kVA transformer has 1100 primary turns. Calculate the transformation ratio, secondary turns, voltage per turn and the secondary current when it supplies a load of 412kW at 0.7 power factor lagging?	[6M]	
		OR		
	b	i) Derive and explain the equivalent circuit of an auto transformer?	[6M]	
		ii) A 45kVA 4800/200V transformer has R_1=3.33 ohms, R_2=0.008 ohms, X_1= 6.9 ohms and X_2=0.018 ohms. Find the equivalent resistance referred to primary, the equivalent reactance referred to primary, the equivalent impedance referred to primary, equivalent resistance, reactance and impedance referred to secondary?	[6M]	
5		Unit-V		
	a	i) Draw the connection diagram and discuss the advantages of delta-delta connected transformer?	[6M]	
		ii) Describe the operation of ON load tap changer with neat diagram?	[6M]	
		OR		
	b	i) Draw the connection diagram and discuss the advantages of delta-star connected transformer?	[6M]	
		ii) Write the causes and analyze the third harmonics in the phase voltages of a three phase transformer?	[6M]	

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BME3TH04   **THERMODYNAMICS**
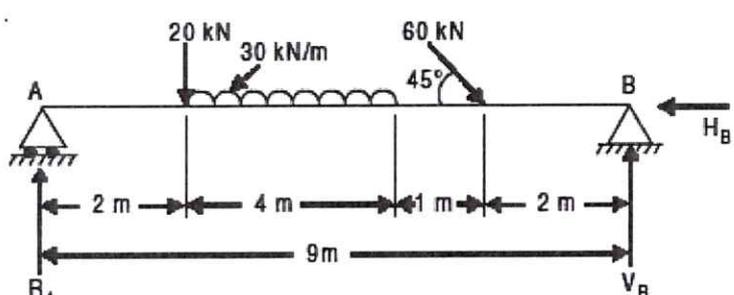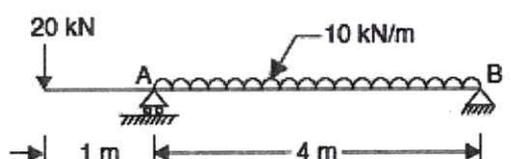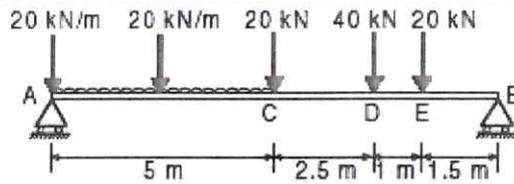
Time: 3 hours   (ME)   Max. Marks: 60

Note: Answer All **FIVE** Questions.

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

Q.No		Questions	Marks
		Unit-I	
1	a	i) Explain the difference between an open and a closed thermodynamic system. Give examples of each.	[6M]
		ii) Explain the concept of thermodynamic equilibrium and quasi-static processes. Give examples of each.	[6M]
		OR	
	b	i) Discuss the work done in various non-flow processes, including isobaric, isochoric, and adiabatic processes.	[6M]
		ii) Define thermodynamic path, cycle, work, and heat. How are these concepts related to each other?	[6M]
		Unit-II	
2	a	Describe the different forms of stored energy and give examples of each. And Discuss the limitations of the first law of thermodynamics for flow systems.	[12M]
		OR	
	b	i) Define a closed system and explain the first law analysis of a closed system. What are the different forms of stored energy in a thermodynamic system?	[4M]
		ii) Define thermodynamic processes. Explain the differences between isothermal and adiabatic processes. Give an example of each process.	[4M]
		iii) State and explain the first law of thermodynamics. What is its significance in thermodynamics?	[4M]
		Unit-III	
3	a	i) Discuss the differences between reversible and irreversible processes and give examples of each.	[6M]
		ii) Explain the Carnot cycle and its significance in thermodynamics.	[6M]
		OR	
	b	i) Define the second law efficiency and explain its significance in thermodynamics.	[6M]
		ii) Explain the second law of thermodynamics, including Kelvin-Planck and Clausius statements.	[6M]
		Unit-IV	
4	a	i) Define specific volume and specific internal energy of a pure substance. How are they related to each other?	[6M]
		ii) A gas is compressed from an initial volume of 0.5 m3 to a final volume of 0.1 m3 at a constant temperature of 300 K. Determine the change in internal energy and enthalpy of the gas during the process. Also, calculate the work done by the gas and the heat transferred to the gas.	[6M]
		OR	
	b	i) Discuss Dalton's law of partial pressure and Avogadro's laws of additive for mixtures of perfect gases.	[6M]
		ii) A piston-cylinder device contains a gas at a pressure of 500 kPa and a volume of 0.1 m3. The gas is compressed to a pressure of 1 MPa and a volume of 0.05 m3. Determine the work done by the gas during the process assuming it to be reversible. Also, calculate the change in internal energy and enthalpy of the gas.	[6M]

		Unit-V	
5	a	i) Define the coefficient of performance of a refrigeration cycle and explain its significance in thermodynamics.	[6M]
		ii) Describe the Carnot, Otto, Diesel, and Dual cycles, including their representation on P-V and TS diagrams.	[6M]
		OR	
	b	i) A diesel engine has a compression ratio of 18 and operates on an air standard diesel cycle. The air enters the compressor at 1 bar and 27°C and is compressed to 40 bar. The fuel is injected at a constant pressure of 160 bar and the combustion process is assumed to occur at constant volume. Determine the maximum temperature and the thermal efficiency of the cycle.	[6M]
		ii) Explain thermal efficiency and mean effective pressure on an air standard basis. Compare the different cycles.	[6M]

Subject Code: 19BME3TH05

II B.Tech. - I Semester Supple Examinations, April-2024
MECHANICS OF SOLIDS
(ME)

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

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

QNo			Questions	K L	CO	Marks
			Unit-I			
1	a		A steel flat of thickness 10 mm tapers uniformly from 60 mm at one end to 40 mm at other end in a length of 600 mm. If the bar is subjected to a load of 80 kN, find its extension. Take E = 2 × 105 MPa. What is the percentage error if average area is used for calculating extension?	K3	1	6M
			A bar of 25 mm diameter is tested in tension. It is observed that when a load of 60kN is applied, the extension measured over a guage length of 200 mm is 0.12 mm and contraction in diameter is 0.0045 mm. Find Poisson's ratio and elastic constants E, G, K.	K3	1	6M
			OR			
	b		The temperature of a steel ring is raised through 150°C in order to fit it on a wooden wheel of 1.2 m diameter. Find the original diameter of the steel ring and also the stresses developed in the ring when it cools back to normal temperature. Assume Es = 2 × 105 N/mm^2 and αs = 12 × 10^{-6}/°C.	K3	1	6M
			Discuss the significance of following terms: (i) Modulus of Rigidity (ii) Proof Resilience (iii) Factor of safety.	K3	1	6M
2			**Unit-II**			
	a		Find the reactions at supports A and B of the loaded beam shown in Fig.	K4	2	6M
			An overhanging beam is on rollers at A and is hinged at B and is loaded as shown in Fig. Determine the reactions at A and B.	K4	2	6M
			OR			
	b		Draw the SF and BM diagrams for the beam shown in Fig. and find out the position and the magnitude of maximum moment.	K4	2	12M

20 kN/m   20 kN/m   20 kN   40 kN   20 kN

A, C, D, E, B — 5 m, 2.5 m, 1 m, 1.5 m

Unit-III

3	a	A circular steel pipe of external diameter 60 mm and thickness 8 mm is used as a simply supported beam over an effective span of 2 m. If permissible stress in steel is 150 N/mm², determine the maximum concentrated load that can be carried by it at mid span.	K3	3	6M
		A circular bar of simply supported span 1 m has to carry a central concentrated load of 800 N. Find the diameter of the bar required, if permissible stress is 150 N/mm².	K3	3	6M

OR

	b	Draw the shear stress variation diagram for the I-section shown in Fig. if it is subjected to a shear force of 100 kN. 180 mm, 10 mm, 400 mm, 10 mm, 10 mm, 80 mm	K4	3	12M

Unit-IV

4	a	Find the maximum deflection and slope at the supports of a simply supported beam of span 6 m and carrying a UDL of 2 kN/m over the left half of the span. Assume $EI = 4 \times 10^{12}$ Nmm².	K4	4	12M

OR

	b	A cantilever beam is 2 m long and has a flexural rigidity of 25MN-m². It carries a point load of 3 kN at mid length and a uniformly distributing load of 2 kN/m along its entire length. Calculate the deflection and slope at the free end by Macaulay's method.	K4	4	12M

Unit-V

5	a	A thin cylinder of internal diameter 2 m contains a fluid at an internal pressure of 3 N/mm². Determine the maximum thickness of the cylinder if i) the longitudinal stress is not to exceed 30 N/mm² and ii) the hoop stress is not to exceed 40 N/mm².	K3	5	6M
		A solid shaft of 200 mm diameter has the same cross sectional area as that of a hollow shaft of the same material with inside diameter of 150 mm. Find the ratio of the power transmitted by the two shafts at the same speed.	K3	5	6M

OR

			KL	CO	M
		Illustrate the various stresses acting at a point in a thick cylinder with closed ends subjected to internal pressure. Write down the Lame's equations detailing various terms.	K3	5	6M
	b	A hollow shaft is to transmit 300 kW power at 80 rpm. If the shear stress is not to exceed 60N/mm^2 and the diameter ratio is 0.6, find the external and internal diameters assuming the maximum torque is 1.4 times the mean.	K3	5	6M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M:Marks

II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEC3TH01 NUMERICAL METHODS AND COMPLEX VARIABLES

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) Find the real root of the equation $2x - \log_{10} x = 7$ correct to four decimal places, using the fixed point iteration method with initial guess $x_0 = 3.8$.	[6M]
		ii) Using the Newton-Raphson method, derive a formula for finding the kth root of a positive number N and hence compute the value of $(25)^{\frac{1}{4}}$ correct to four decimal places.	[6M]
		OR	
	b	i) Use the Newton-Raphson method to obtain a real root of $x^{\sin 2} = 4$, correct to four decimal places.	[6M]
		ii) Find the real root of the equation $x e^x = 3$ which lies between 1 and 2, correct to four decimal places, using the method of false position.	[6M]
2		**Unit-II**	
	a	i) Apply Lagrange's formula to find $f(x)$ from the following data: 	x	0	1	4	5	 	f(x)	4	3	24	39		[6M]
		ii) Prove that $hD = \log(1+\Delta) = -\log(1-\nabla) = \sinh^{-1}(\mu\delta)$.	[6M]
		OR	
	b	i) The following are the data from the steam table: 	Temperature $^\circ C$	140	150	160	170	180	 	Pressure kgf/cm^2	3.685	4.854	6.302	8.076	10.225	 Using Newton's formula, find the pressure of steam for a temperature of $142\,^\circ C$.	[6M]
		ii) Use Newton's divided difference formula to find $f(x)$ from the following data: 	x	0	1	2	4	5	6	 	F(x)	1	14	15	5	6	19		[6M]
3		**Unit-III**	
	a	i) Using the Runge-Kutta method of order four, compute $y(0.2)$ correct to four decimal places in steps of $h = 0.1$, given that $\frac{dy}{dx} = x + y^2$, $y(0) = 1$.	[6M]
		ii) Given $\frac{dy}{dx} = 1 + xy$, $y(0) = 1$, obtain Taylor's series for $y(x)$. Compute $y(0.1)$ correctly to five decimal places.	[6M]
		OR	
	b	i) Find an approximate value of $y(0.5)$ correct to four decimal places by modifying Euler's method, given that $\frac{dy}{dx} = x + y^2$, $y(0) = 1$.	[6M]
		ii) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using (i) Simpson's 1/3 rd rule taking $h = 1/4$ (ii) Simpson's 3/8 th rule taking $h = 1/6$.	[6M]

		Unit-IV	
4	a	i) Consider the function $f:C \to C$ defined by $$f(z) = \begin{cases} \dfrac{z^5}{|z|^4}, z \neq 0 \\ 0, z=0 \end{cases}$$ Prove that $f(z)$ satisfies Cauchy-Riemann equations at $z=0$, but $f(z)$ is not differentiable at $z=0$.	[6M]
		ii) Show that $u(x,y)$ is harmonic in some domain and find the harmonic conjugate $v(x,y)$ when $u(x,y) = \dfrac{x}{x^2 + y^2}$.	[6M]
		OR	
	b	i) If $f(z)$ is an analytic function with constant absolute value in a domain D then prove that $f(z)$ is constant in D.	[6M]
		ii) Show $f(z) = \dfrac{1}{z^4}, (z \neq 0)$ is differentiable for all values of z except at $z=0$ and hence find $f'(z)$.	[6M]
		Unit-V	
5	a	i) Evaluate $\int_C f(z)\,dz$, where $f(z)$ is defined by means of the equations $f(z) = \begin{cases} 1, \text{when } y<0 \\ 4y, \text{when } y>0 \end{cases}$ and C is the arc from $z=-1-i$ to $z=1+i$ along the curve $y=x^3$.	[6M]
		ii) Evaluate $\int_0^{2\pi} \dfrac{1+\sin\theta}{3+\cos\theta}\,d\theta$ using integration around the unit circle.	[6M]
		OR	
	b	i) Show that $\int_C (z-z_0)^{n-1}\,dz = \begin{cases} 0, n=\pm 1, \pm 2, \cdots \\ 2\pi i, n=0 \end{cases}$ where $C:|z-z_0|=R$.	[6M]
		ii) Evaluate $\int_{-\infty}^{\infty} \dfrac{x^2+1}{x^4+1}\,dx$ using residue theorem.	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEC3TH02   **ELECTRONIC DEVICES AND CIRCUITS**

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) Explain diode V-I characteristics in detail.	[6M]
		ii) Explain diode Static Resistance, Dynamic Resistance, and Reverse Resistance.	[6M]
		OR	
	b	i) Explain insulators, semiconductors, and metal classification using energy gap.	[6M]
		ii) Explain diode transition and diffusion capacitance.	[6M]
		Unit-II	
2	a	Explain Zener, Varactor and Tunnel diode characteristics.	[12M]
		OR	
	b	i) Explain full wave rectifier and bridge rectifier.	[6M]
		ii) Explain characteristics and applications of LED and LCD.	[6M]
		Unit-III	
3	a	i) Explain transistor common base characteristics.	[6M]
		ii) Provide in detail the comparison of BJT CB, CE and CC configurations.	[6M]
		OR	
	b	i) Explain transistor common emitter characteristics.	[6M]
		ii) Explain transistor as a switch.	[6M]
		Unit-IV	
4	a	i) Explain thermal runway and thermal stability in detail.	[6M]
		ii) Explain collector-to-base bias.	[6M]
		OR	
	b	i) Explain diode compensation for variation in I_{CO}	[6M]
		ii) Explain fixed and self-bias of transistor.	[6M]
		Unit-V	
5	a	i) Explain N-Channel JFET construction and characteristics.	[6M]
		ii) Explain P-channel depletion and enhancement MOSFET construction.	[6M]
		OR	
	b	i) Explain P-Channel enhancement MOSFET construction and characteristics.	[6M]
		ii) Comparison between JFET and MOSFET in detail.	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEC3TH03 **SIGNALS AND SYSTEMS**
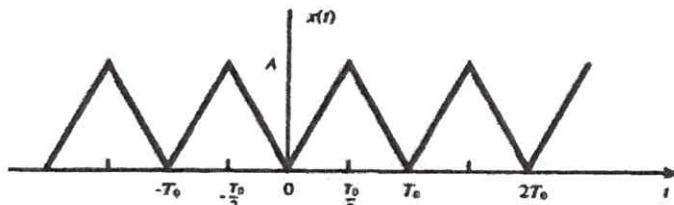
Time: 3 hours (ECE) Max. Marks: 60

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

Q.No			Questions	Marks
			Unit-I	
	a		Classify the signals based on their important characteristics. Find the fundamental period T of the following signal if they are periodic. $x_1(t)=\sin 10\pi u(t)$ $x_2(t)=2\cos(10t+1)-\sin(4t-1)$	[6M]
			ii) Show that if two signals $f_1(t)$ and $f_2(t)$ are orthogonal over an interval $<t_1, t_2>$, then the energy of the signal $[f_1(t)+f_2(t)]$ is equal to the sum of energies of $f_1(t)$ and $f_2(t)$.	[6M]
1			OR	
	b	i)	Sketch the following signals, where u(t) is a unit step signal and r(t) is a unit ramp signal. $X_1(t)= u(t)-u(t-2)$ $X_2(t)= r(t)u(2-t)$ $X_3(t)=r(t)-2r(t-1)+r(t-2)$	[6M]
		ii)	The function f(t) is defined as $$f(t)=\begin{cases} 1 & for\ 0\le t\le\pi \\ -1 & for\ \pi\le t\le 2\pi \end{cases}$$ Show that the above function is orthogonal to function $x_n(t)=\cos nt$, for all non-zero integer values of n over the interval 0 to 2π	[6M]
			Unit-II	
	a	i)	Find the trigonometric fourier series of the periodic waveform that is formed by eliminating the negative halfs of the sine wave (**half wave rectified sine wave**) by direct evaluation of the coefficients and sketch the frequency spectrum.	[8M]
		ii)	Discuss whether it is possible represent any periodic function by a Fourier series or not? What are the conditions that must be satisfied for the existence of convergent fourier series?	[4M]
2			OR	
			i) Explain various types of Fourier series representation and compare them.	[4M]
				[8M]
			ii) Find the exponential Fourier series and plot the magnitude and phase spectra of the triangular wave form shown above.	
3			Unit-III	
	a		i) Find the Fourier Transform of the signals $f_1(t)= sgn(t)$ and $f_2(t) = u(t)$	[8M]
			ii) Find the fourier transform of the following time function $x(t)=e^{-3t}[u(t+2)-u(t-3)]$	[4M]

		OR	
	b	i) State and prove any three properties of Fourier transform.	[8M]
		ii) Find the fourier transform of a double sided exponential signal $x(t) = e^{-b|t|}$	[4M]
		Unit-IV	
4	a	i) Find the inverse Laplace transform of $$X(s) = \frac{2s+1}{(s+1)(s^2+2s+2)} \wedge W(s) = \frac{3s^2+8s+6}{(s+2)(s^2+2s+1)}$$	[6M]
		ii) State and prove any THREE properties of Z-transform	[6M]
		OR	
	b	i) Use convolution theorem of Laplace transform to find $y(t) = x_1(t) * x_2(t)$ where $x_1(t) = \cos(4t)u(t) \wedge x_2(t) = \sin(2t)u(t)$	[6M]
		ii) Write the properties of Region of Convergence in Z-plane. Find the z-transform and ROC of the sequence $x(n) = [\cos\omega_0 n]u(n)$.	[6M]
5		Unit-V	
	a	i) Prove that "A bandlimited signal can be fully reconstructed from its samples, provided that the sampling rate exceeds twice the bandwidth of the signal".	[6M]
		ii) What do you under stand by the terms 'Signal bandwidth' and 'system bandwidth'? Obtain the condition for distortionless transmission through an LTI System.	[6M]
		OR	
	b	i) Draw the ideal characteristics of Band pass and Band reject filters. If x(t) is the input to a LTI system and if the required output is 4x(t-2), what should be the transfer function of the system.	[6M]
		ii) What are the different types of Sampling? Explain briefly about Impulse sampling.	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEC3TH04   **INTERNET OF THINGS**

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) Define IOT? Explain various characteristics of IOT?	[6M]
			ii) Explain the Physical Design of IOT?	[6M]
			OR	
	b		i) What are the advantages of Functional blocks? Explain Various Communication Models?	[6M]
			ii) Explain how Cloud computing and Big data analytics enabled in IOT?	[6M]
			Unit-II	
2	a		Illustrate various applications of IOT home automation system?	[12M]
			OR	
	b		i) Explain how IOT Useful for good environment management?	[4M]
			ii) Explain the process of Smart irrigation using IOT?	[4M]
			iii) List out various health care applications of IOT?	[4M]
			Unit-III	
3	a		i) Differentiate between M2M and IOT	[6M]
			ii) Explain how SDN and NFV useful in the development of IOT systems?	[6M]
			OR	
	b		i) Explain Software defined networking in IOT?	[6M]
			ii) Explain Network function Virtualization?	[6M]
			Unit-IV	
4	a		i) Explain Simple Network Management Protocol and it's advantages?	[6M]
			ii) Explain IOT System Management with NETCONF-YANG	[6M]
			OR	
	b		i) List out various network operator requirements?	[6M]
			ii) Explain YANG System Management with NETCONF-YANG	[6M]
			Unit-V	
5	a		i) What is IOT Physical device? Explain Exemplary device?	[6M]
			ii) Explain Five Linux Coding commands on Raspberry pi?	[6M]
			OR	
	b		i) Explain how we can design a restful web API Using Python web application framework?	[6M]
			ii) Explain the various interfaces in the development of IOT Systems?	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BEC3TH05 **DATA STRUCTURES**

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) Explain the classification of data structures. Explain its applications	[12M]
		OR	
	b	ii) Discuss the efficiency of recursive Fibonacci number generation compared to iterative methods. What are the advantages and disadvantages of each approach?	[12M]
		Unit-II	
2	a	i) Explain the conversion procedure of of infix expression into a prefix expression with example	[12M]
		OR	
	b	i) Discuss the structure of Stack ADT. Explain the operations and applications	[12M]
		Unit-III	
3	a	i) Trace the steps of mergesort for sorting the list- 12, 19, 33, 26, 29, 35, 22, 37. Find the total number of comparisons made.	[6M]
		ii) Differentiate between internal sorting and external sorting.	[6M]
		OR	
	b	i) Explain the insertion sort with example.	[6M]
		ii)Explain the binary search algorithm. How does it differ from linear search, and what are its advantages?	[6M]
		Unit-IV	
4	a	i) What is a circular linked list, and how does it differ from a singly linked list? Discuss the advantages and use cases of circular linked lists	[6M]
		ii) Discuss about implementation of stacks using linked list	[6M]
		OR	
	b	i) Explain the concept of a singly linked list. How are nodes connected in a singly linked list, and what are its advantages and disadvantages compared to other data structures?	[12M]
		Unit-V	
5	a	i) Explain the DFS with example	[6M]
		ii) Construct a Binary Tree from the following Inorder and Preorder listings: Inorder: I D E B A H F G C, Preorder: A B D I E C F H G	[6M]
		OR	
	b	i) Construct a BST from the following list of numbers and show the sequence of steps clearly: 10, 20, 12, 3, 18, 9, 17, 1	[12M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BCC3TH02 NUMERICAL METHODS AND TRANSFORMATIONS

Time: 3 hours   (Common to CE, EEE, 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) Perform three iterations of the bisection method to obtain the root of the equation $2\sin x - x = 0$, correct upto three decimal places.	[6M]
		ii) Evaluate f(9) using the following table by Newton's divided difference formula 	X	5	7	11	13	17	 F(x)	150	392	1452	2366	5202		[6M]
		OR	
	b	i) Find a root of $x^4 - x - 10 = 0$, correct up to three decimal places by using Newton-Raphson method.	[6M]
		ii) Fit the polynomial which fits the data in the following table using Gauss's forward interpolation formula 	X	3	5	7	9	11	 Y	6	24	58	108	174		[6M]
2		**Unit-II**	
	a	i) Use the Taylor's series method to solve $\frac{dy}{dx} = x^2 y - 1$, $y(0)=1$. Also find y(0.03)	[6M]
		ii) A rocket is launched from the ground. Its acceleration is registered during the first 80 seconds and is given as follows:	[6M]
		OR	
	b	i) Apply the Runge-Kutta method of fourth order to find an approximate value of y at x = 0.2 if $\frac{dy}{dx} = x + y^2$, given that y = 1 when x = 0 in steps of h = 0.1.	[8M]
		ii) Considering the following tabular values:	[4M]

(rocket table)

t(s)	0	10	20	30	40	50	60	70	80
a(m/s²)	30	31.63	33.34	35.47	37.75	40.33	43.25	46.69	50.67

By Simpson's 1/3 rule, find the velocity at t = 80 s.

(tabular values for 2.b.ii)

X	25.0	25.1	25.2	25.3	25.4	25.5	25.6
F(x)	3.205	3.217	3.232	3.245	3.256	3.268	3.280

Determine the area bounded by the given curve and the x-axis between x = 25 and x = 25.6 by the trapezoidal rule.

		Unit-III	
3	a	i) Find Laplace transform of the function $\int_0^t t\,e^{-4t}\sin 3t\,dt$.	[6M]
		ii) Find the inverse Laplace transform of the function $\log\sqrt{\dfrac{s^2+1}{s(s+1)}}$	[6M]
		OR	
	b	i) Find the Laplace transform of the function $\dfrac{\cos at - \cos bt}{t}$	[6M]
		ii) Find the inverse Laplace transform of the function $\dfrac{s^2-15s-11}{(s+1)(s-2)^2}.$	[6M]
		Unit-IV	
4	a	i) Find the Fourier series of $f(x)=\begin{cases}-1, & 0<x<\pi\\ 2, & \pi<x<2\pi\end{cases}.$	[6M]
		ii) Find the half-range cosine series $f(x) = \sin x$ in the interval $(0, \pi)$.	[6M]
		OR	
	b	i) Find the Fourier series of $f(x) = 2x - x^2$ in the interval $(0, 3)$.	[6M]
		ii) Find the half-range sine series of $f(x)=\begin{cases}x, & 0<x<1\\ 2-x, & 1<x<2\end{cases}$	[6M]
		Unit-V	
5	a	i) Find the Fourier integral representation of the function $f(x)=\begin{cases}e^{ax}, & x\le 0\\ e^{-ax}, & x\ge 0\end{cases}$ for a > 0.	[6M]
		ii) Find the Fourier transform of $f(x)=\begin{cases}1, & |x|<a\\ 0, & |x|>a\end{cases}$. Hence find the value of $\int_0^\infty \dfrac{\sin x}{x}dx$.	[6M]
		OR	
	b	Find the Fourier cosine transform of $e^{-a^2x^2}$ for any a > 0 and hence prove that $e^{\frac{-x^2}{2}}$ is self-reciprocal under Fourier cosine transform.	[12M]

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Subject Code: 19BCI3TH02

II B.Tech. - I Semester Supple Examinations, April-2024
FRONT END WEB TECHNOLOGIES
(CSE&IT)

Time: 3 hours

Max. Marks: 60

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

QNo		Questions	K L	CO	Marks
		Unit-I			
1	a	Explain table tag and attributes with example.	K2	CO1	6M
		Explain the following: i) Links ii) URLs iii) Images in HTML	K2	CO1	6M
		OR			
	b	Write HTML5 code which **Creates** circles, rectangles using Canvas.	K2	CO1	6M
		Create a student registration form by using all Form elements?	K2	CO1	6M
		Unit-II			
2	a	Explain list styles with example.	K3	CO2	6M
		With the neat block diagram explain the CSS Box Model.	K3	CO2	6M
		OR			
	b	Write CSS code that defines five classes of paragraph with different background, color, margins, padding and border style.	K3	CO2	12M
		Unit-IIIK3			
3	a	Explain about object, methods and events in Java Scripts.	K3	CO3	12M
		OR			
	b	Explain Pattern Matching using Regular Expressions in Java script with example scripts?	K3	CO3	6M
		How to declare and use variables in JavaScript?	K3	CO3	6M
		Unit-IV			
4	a	Explain the usage of MouseEvent in JQuery with example.	K3	CO4	6M
		What is JQuery? Explain about i) Filter( ) ii) Slice( ) iii) add( )	K3	CO4	6M
		OR			
	b	With example explain event wrapper methods.	K3	CO4	6M
		Explain Attaching Persistent Event Handlers with Example	K3	CO4	6M
		Unit-V			
5	a	What is dynamic interaction? Explain building blocks of dynamic interaction.	K3	CO5	6M
		Make use of Draggable, Droppable in jQuery UI.	K3	CO5	6M
		OR			
	b	Write jQuery code to demonstrate the usage of important options disabled, delay, distance and clone in the drag function of jQuery UI	K3	CO6	6M
		Construct sample code to implement Date picker in jQuery?	K3	CO6	6M

II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BCI3TH03 **OOPS THROUGH JAVA**

Time: 3 hours   (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) List and explain various features of Objected oriented programming?	[6M]
			ii) Write a java program to showcase the difference between type casting and type conversion?	[6M]
			OR	
	b		i) List and explain Java Buzzwords?	[6M]
			ii) Define constructor? Explain different types of constructors supported by Java with their syntax?	[6M]
2			**Unit-II**	
	a		i) Differentiate between Method Overloading and Method Overriding with a Java Program?	[6M]
			ii) Create an Abstract Class "Bank" with an abstract method "display". Assume that Rs.100, Rs.200 & Rs.300 are deposited in Bank A, Bank B and Bank C respectively. Bank A, Bank B and Bank C are subclasses of Class Bank. Write a Java Program that displays the amount deposited in Bank A, Bank B and Bank C?	[6M]
			OR	
	b		i) Write a java program that describes the concept of dynamic method dispatch?	[6M]
			ii) Define package? Summarize its significance? Explain how to create and import packages in Java?	[6M]
3			**Unit-III**	
	a		i) Discuss various string manipulation functions in java?	[6M]
			ii) Illustrate Possible states of thread with suitable diagram?	[6M]
			OR	
	b		i) Define Exception? Explain blocks of exception handling by writing a java program?	[6M]
			ii) Define Thread? Explain various ways to create thread with an example program?	[6M]
4			**Unit-IV**	
	a		i) Explain the significance of Collection Framework and Collection Hierarchy in Java?	[6M]
			ii) Explain the difference between byte stream and character stream? How byte stream and character stream classes are used while copying content of one file to another file in java?	[6M]
			OR	
	b		i) Explain the difference between ArrayList and LinkedList with an example program?	[6M]
			ii) Write a java program that demonstrates the usage of FileReader and FileWriter?	[6M]
5			**Unit-V**	
	a		i) Define Applet? Why it is required? Draw and explain Applet Architecture?	[6M]
			ii) Illustrate Delegation Event Model with diagram?	[6M]
			OR	
	b		i) Illustrate the process of parameter passing to an applet with a java program?	[6M]
			ii) Define Layout Manager? List and explain various types of Layout Managers in Java?	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

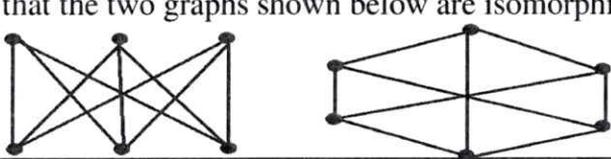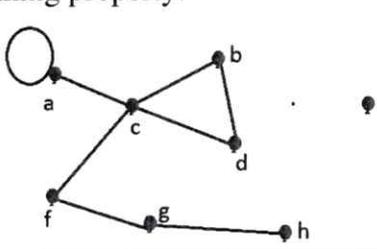Sub Code: 19BCI3TH04MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Time: 3 hours   **(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) Prove that, for any propositions p,q,r the conditional $[(p \to q) \wedge (q \to r)] \to (p \to r)$.	[6M]
		ii) Prove that, for any three propositions p,q,r ((pvq) ∧ r) ->((pvr)	[6M]
		OR	
	b	(i)Prove the following logical equivalences: I)$(p \longrightarrow q) \wedge [\neg q \wedge (r \vee \neg q)] \Longleftrightarrow \neg(q \vee p)$.	[6M]
		ii) Obtain the principal conjunctive normal forms of the following: I)$(\neg p \to q) \wedge (q \longleftrightarrow p)$. II)$(p \wedge q) \vee (\neg p \wedge q)$.	[6M]
		Unit-II	
2	a	i)Negate and simplify each of the following: I)$\exists x,[p(x) \vee q(x)]$. II)$\forall x,[p(x) \wedge \neg q(x)]$. III) $\forall x,[p(x) \longrightarrow q(x)]$. IV) $\exists x,[[p(x) \vee q(x)] \to r(x)]$.	[6M]
		ii) Find whether the following argument is valid: No graduate student of commerce or literature studies physics. *Anil is a graduate student who studies physics* ∴ *Anil is not a graduate student of literature .*	[6M]
		OR	
	b	i) Explain rules of Inference with suitable examples.	[6M]
		ii) Show that $2^{2n} - 1$ is divisible by 3 using principle of mathematical induction.	[6M]
		Unit-III	
3	a	i) Show that the two graphs shown below are isomorphic:	[6M]
		ii) For the graph shown below, indicate the degree of each vertex and verify the handshaking property.	[6M]
		OR	
	b	i) Using Kruskal's algorithm, find a minimal spanning tree for the weighted graph shown below:	[6M]
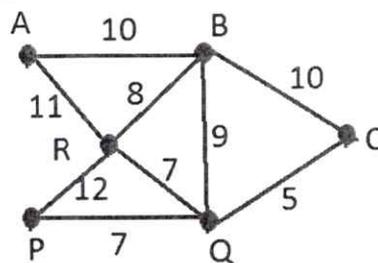
		ii) I) Prove that the complete graph $K_n, n \geq 3$, is a Hamilton graph. II) Show that every simple k-regular graph with $2k-1$ vertices is Hamiltonian.	[6M]
		Unit-IV	
4	a	(i)Find the recurrence relation and the initial condition for the sequence $0, 2, 6, 12, 20, 30, 42, \cdots$ Hence find the general term of the sequence.	[6M]
		ii) Solve the recurrence relation $F_{n+2} = F_{n+1} + F_n$ for $n \geq 0$, given $F_0 = 0, F_1 = 1$	[6M]
		OR	
	b	i) Solve the recurrence relation $a_{n+2}^2 - 5a_{n+1}^2 + 6a_n^2 = 7n$ for $n \geq 0$, given $a_0 = a_1 = 1$	[6M]
		ii) Find a generating function for the recurrence relation $a_{n+1} - a_n = 3^n, n \geq 0$, and $a_0 = 1$. Hence solve the relation.	[6M]
5		**Unit-V**	
	a	i) Prove that in any set of 29 persons at least five persons must have been born on the same day of the week.	[6M]
		ii) Find the number of permutations of the letters of the word SUCCESS.	[6M]
		OR	
	b	i) Out of five mathematicians and seven engineers, a committee consisting of two mathematicians and three engineers is to be formed. In how many ways can this be done if I) Any mathematician and any engineer can be included? II) One particular engineer must be on the committee? III) Two particular mathematicians cannot be on the committee?	[6M]
		ii) Explain disjunctive and conjunctive normal forms with suitable examples in Boolean algebra.	[6M]

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II B.Tech I Semester Supple Examinations, April-2024

Sub Code: 19BCI3TH06 **COMPUTER ORGANIZATION**

Time: 3 hours (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) Write and explain different types of computers based on the functions they perform.	[6M]
		ii) Discuss about the arithmetic logic shift unit with examples.	[6M]
		OR	
	b	i) Explain the tri state buffer in detail	[6M]
		ii) What is Micro operation? Briefly explain the arithemetic micro operations?	[6M]
		Unit-II	
2	a	Describe the memory reference instructions with an example	[12M]
		OR	
	b	i) What is register transfer language? Explain the basic symbols used in register transfer.	[6M]
		ii) Discuss about stored program organization	[6M]
		Unit-III	
3	a	i) Explain about the different types of addressing modes	[12M]
		OR	
	b	i) Explain the basic computer instruction formats	[6M]
		ii) Compare and Contrast CISC and RISC	[6M]
		Unit-IV	
4	a	i) Explain different types of mapping functions in cache memory	[12M]
		OR	
	b	i) Explain the booth multiplication with example	[12M]
		Unit-V	
5	a	i) Explain the following with respect to asynchronous data transfer. a) Strobe control b)Handshaking c) Asynchronous serial transfer d) Asynchronous communication Interface.	[12M]
		OR	
	b	i) Explain the method of DMA transfer. How does a DMA controller improve the performance of a computer	[6M]
		ii) Discuss about Priority Encoder in detail	[6M]

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