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II B.TECH. I SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2022

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

Sub Code: 19BCC3TH01 BUSINESS MANAGEMENT CONCEPTS FOR ENGINEERS

Time: 3 hours (Common to CE, 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) List determinants of demand. What are different cost concepts?	[6M]
			ii) EYZ Company sells several products. Information of average revenue and costs are as follows: Selling price per unit $20.00 , Variable costs per unit: Direct materials $4.00 Direct manufacturing labor $1.60 Manufacturing overhead $0.40 Selling costs $2.00 Annual fixed costs $96,000 1. Calculate the contribution margin per unit. 2. Calculate the number of units XYZ company must sell each year to break even. 3. Calculate the number of units XYZ Company must sell to yield a profit of $144,000.	[6M]
			OR	
	b		i) Describe the scope and interdisciplinary nature of managerial economics.	[6M]
			ii) Explain how Cost-Volume Profit (CVP) analysis is related to planning for a profitable business	[6M]
2			**Unit-II**	
	a		What are different market structures? Write the salient features of oligopoly market. How is output-price determined in oligopoly market competition.	[12M]
			OR	
	b		Record the following transactions in the Journal and post them into ledger and prepare a Trail Balance Oct 1st : Neel started business with a capital of 80,000 3rd : Bought goods from Karl on credit 20,000 4th : Sold goods to Tarl 25,000 5th : Cash purchases 25,000 7th : Cash sales 15,000 9th : Goods retuned to Karl 2,000	[12M]

		10th : Bought furniture for 15,000	६
		11th : Cash paid to Karl 12,000	
		12th : Goods returned by Tarl 3,000	
		14th : Goods taken by Neel for personal use 3,000	
		15th : Cash received from Tarl 12,000	
		16th : Took loan from Parl 30,000	
		17th : Salary paid 5,000	
		18th : Bought stationery for 1,000	
		19th : Amount paid to Parl on loan account 18,000	
		20th : Interest received 4,000	

Unit-III

| 3 | a | i) Define management. Briefly explain different functions of management. | [6M] |
| | | ii) State the principles of scientific management. What is the importance of scientific management? | [6M] |

OR

| | b | i) Describe the changing trends of management in today's globalised economic era. | [6M] |
| | | ii) Briefly explain theory X and theory Y. Write down its implications. | [6M] |

Unit-IV

| 4 | a | i) List the objectives and functions of production management. | [6M] |
| | | ii) What are the goals of finance management? How financial management contributes to the success of the business? | [6M] |

OR

| | b | i) What is role, scope and functions of marketing management? | [6M] |
| | | ii) List the duties and responsibilities of HR manager. | [6M] |

Unit-V

i) For the given activities determine:
1. Critical path using PERT.
2. Calculate variance and standard deviation for each activity.
3. Calculate the probability of completing the project in 26 days.

Activity	t_o	t_m	t_p
1-2	6	9	12
1-3	3	4	11
2-4	2	5	14
3-4	4	6	8
3-5	1	1.5	5
2-6	5	6	7
4-6	7	8	15
5-6	1	2	3

[6M]

ii) Why is a network diagram important in project management? What are the advantages of network techniques? [6M]

OR

b | i) Differentiate between PERT and CPM. [6M]

ii) The following details are available regarding a project:

Activity	Predecessor Activity	Duration (Weeks)
A	-	3
B	A	5
C	A	7
D	B	10
E	C	5
F	D,E	4

Determine the critical path, the critical activities and the project completion time.

[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

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

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	
	a	i) Find a real root of the equation $x^2 + x = \cos x$, using Bisection method correct to three decimal places.	[6M]
		ii) Using Newton-Raphson method, derive formula for finding kth root of positive number N and hence compute the value of $\{25\}^{1/4}$ correct to four decimal places.	[6M]
1		**OR**	
	b	i) Find f(0.29) using appropriate interpolation formula from the following table	[6M]
		ii) Find y(2) from the following data using Lagrange's formula	[6M]

x	0.20	0.22	0.24	0.26	0.28	0.30
f(x)	1.6596	1.6698	1.6804	1.6912	1.7024	1.7139

x	0	1	3	4	5
y(x)	0	1	81	256	625

Q.No		Questions	Marks
		Unit-II	
	a	Write an algorithm to implement Runge-Kutta fourth order formula for solving an initial problem. Using this find y(0.1), y(0.2) and y(0.3) given that $\frac{dy}{dx} = \frac{2xy}{1+x^2}, y(0) = 0$.	[12M]
2		**OR**	
	b	i) Estimate the value of the integral $\int_1^3 \frac{1}{x} dx$ by Simpson' 1/3 rule with 4 and 8 strips respectively. Determine the error in each case.	[8M]
		ii) Estimate the value of the integral $\int_0^1 \frac{1}{1+x} dx$ by Simpson's 3/8 rule with 6 strips. Also determine the error.	[4M]
		Unit-III	
3	a	i) Find the Laplace transform of the saw-toothed wave of period T, given $f(t) = \frac{t}{T}$ for $0 < t < T$.	[6M]
		ii) Find Laplace transform of te⁻ᵗSint	[6M]

		OR	
	b	i) Find inverse Laplace transform of $s\log\left(\dfrac{s-1}{s+1}\right)$.	[6M]
		ii) Solve $y''+2y'+y=\sin t,\, y(0)=1$ by the method of Laplace transforms.	[6M]
4		Unit-IV	
	a	i) Find the Fourier series to represent the function $f(x)=\cos x \quad,-\pi<x<\pi$.	[6M]
		ii) Find the half range Fourier sine series for the function $f(t)=t-t^2, 0<t<1$.	[6M]
		OR	
	b	i) Find the Fourier series expansion of $f(x)=2x-x^2$ in the interval (0, 3).	[6M]
		ii) Find the Fourier series for $f(x)=\begin{cases} x,0<x<1 \\ 1-x,1<x<2 \end{cases}$	[6M]
5		Unit-V	
	a	i) Express the function $f(x)=\begin{cases} 1, & \|x\|\leq1 \\ 0,\|x\|>1 \end{cases}$ as a Fourier integral. Hence evaluate $\displaystyle\int_0^\infty \frac{\sin s\cos sx}{s}ds$.	[6M]
		ii) Find the Fourier cosine transform of e^{-x^2} and hence evaluate Fourier sine transform of xe^{-x^2}.	[6M]
		OR	
	b	i) Find the Fourier transform of $f(x)=\begin{cases} a^2-x^2, & \|x\|\leq a \\ 0,\|x\|>a \end{cases}$ Hence deduce that $\displaystyle\int_0^\infty \frac{\sin t-t\cos t}{t^3}dt=\frac{\pi}{4}$.	[6M]
		ii) Find the Fourier sine transform of $\dfrac{e^{-ax}}{x}, a>0$.	[6M]

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

Sub Code: 19BCE3TH03   ENGINEERING GEOLOGY

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) Give a brief account of the importance of geology in civil engineering. Explain your answer by giving suitable example.	[8M]
		ii) Discuss how geological studies can be utilized in civil engineering projects.	[4M]
		OR	
	b	i) Define weathering. Explain types of weathering and add a note on its importance.	[8M]
		ii) Define river and river system. Give a detail geological work of rivers.	[4M]
		Unit-II	
2	a	Discuss the physical properties of minerals with suitable example.	[12M]
		OR	
	b	i) What is the igneous rock? Give their characteristics.	[4M]
		ii) Explain the textures of igneous rocks with sketches.	[4M]
		iii)Draw the structure of igneous rocks.	[4M]
		Unit-III	
3	a	i) Classify and describe the different types of faults in rocks and explain how they are recognized in the field?	[8M]
		ii) Define the terms strike and dip.	[4M]
		OR	
	b	What are the reasons for folding? Discuss how a recumbent fold differs from a monocline fold and illustrate your answers with the help of neat sketches.	[12M]
		Unit-IV	
4	a	i) What are landslides? What are their causes? How landslides can be prevented?	[6M]
		ii) Explain the construction of building in earthquake prone areas.	[6M]
		OR	
	b	Discuss in details about resistivity survey method and applications of electrical resistivity method for ground water exploration.	[12M]
		Unit-V	
5	a	i) What is tunnel? Explain its types, what are their advantages.	[6M]
		ii) Write short note on purpose of tunnel and over break in tunnels.	[6M]
		OR	
	b	i) What are the geological conditions necessary for the stability of a dam and life of a reservoir?	[8M]
		ii) Mention the different types of dams.	[4M]

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II B.Tech I Semester Supple Examinations, March-2022
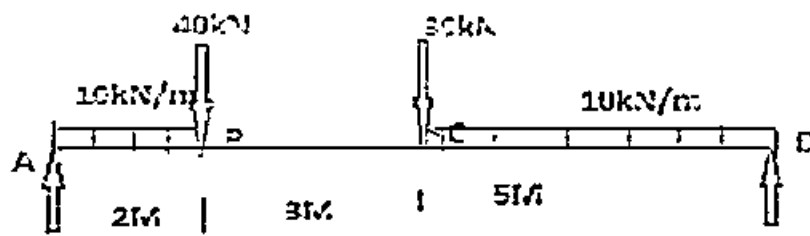
Sub Code: 19BCE3TH04   MECHANICS OF SOLIDS

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) Two vertical rods one of steel and the other of copper are each rigidly fixed at the top and 50cm apart. Diameters and lengths of each rod are 2cm and 4cm respectively. A cross bar fixed to the rods at the lower ends Carries a load of 5000N such that the cross bar remains horizontal even after loading. Find the stress in each rod and position of the load on the bar. Take Es= 2.x 105N/mm2 ,Ec= 1x 105N/mm2.	[6M]
			ii) Draw stress-strain curve for Ductile and brittle materials.	[6M]
			OR	
	·b		i) A weight of 10 KN falls by 30 mm on a collar rigidly attached to a vertical bar 4 m long and 1000 mm2 in section. Find the instantaneous expansion of bar. Take E= 210 Gpa.	[6M]
			ii) Derive equation for the relation between three elastic moduli.	[6M]
			Unit-II	
2	a		An elemental cube is subjected to tensile stresses of 30 N/mm2 and 10 30 N/mm2 acting on two mutually perpendicular planes and a shear stress of 10 30 N/mm2 on these planes. Draw the Mohr's circle of stresses and hence or otherwise determine the magnitudes and directions of principal stresses and also greatest shear stress.	[12M]
			OR	
	b		i) Draw Mohr's circle when the component is subjected to state of pure shear.	[6M]
			ii) Define and explain the maximum strain energy theory of failure.	[6M]
			Unit-III	
3	a		A simply supported beam of span 10 m carry as UDL of 10 KN/m over a length of 3 m from left support and also from right support. Draw SF and BM diagram.	[12M]
			OR	
	b		Draw SFD and BMD for the beam shown below	[12M]

			Unit-IV	
4	a	i) Derive an expression for the shear stress at any point in the cross-section of a beam?		[6M]
		ii) A 3 m long rectangular beam of section 100 mm x 200 mm is loaded with a point load of30000 N distant 1 m from the right-hand support. Find the maximum shear stress in the beam Also find the shearing stress at a layer 20 mm below the top of the beam at a section 1 m to the right of the left-hand support.		[6M]
		OR		
	b	i) Derive the equation M/I = f/y = E/R.		[6M]
		ii) Discuss the assumptions in pure bending theory.		[6M]
5		Unit-V		
	a	Derive the relation for a circular shaft when subjected to torsion as T/J = τ/R = GΘ/L Where T is torque transmitted, J = polar moment of inertia, τ = Max. Shear stress, R = radius of shaft, G= modulus of rigidity, Θ = angle of twist, L= length of shaft.		[12M]
		OR		
	b	A built-up cylindrical shell of 300mm diameter, 3m long and 6mm thick is subjected to an internal pressure of 2MN/m². Determine the change in length, diameter and volume of the cylinder under that pressure if the efficiencies of the longitudinal and circumferential joints are 80% and 50% respectively. Take E=200GN/m². Poisson's ratio=0.35		[12M]

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

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) Differentiate between stone work and brick work.	[6M]
			ii) Write a brief note on the characteristics of a good tile.	[6M]
			OR	
	b		i) How are artificial stones prepared? What are its different forms?	[6M]
			ii) Briefly explain the working of Bull's trench kiln for the burning of bricks.	[6M]
			Unit-II	
2	a		What is meant by seasoning of timber? Why is artificial seasoning adopted? Describe its various methods.	[12M]
			OR	
	b		i) Write a brief note on the alternative materials for wood.	[4M]
			ii) State the importance of reinforced plastics.	[4M]
			iii) Mention in brief the factors affecting physical properties of steel.	[4M]
			Unit-III	
3	a		i) Briefly describe the practical tests for limestones.	[6M]
			ii) What are the precautions to be taken in handling lime?	[6M]
			OR	
	b		i) Explain the functions of cement ingredients.	[6M]
			ii) Enumerate the laboratory tests for cement and describe any two of them.	[6M]
			Unit-IV	
4	a		i) Explain, with the help of sketches, various types of shallow foundations.	[6M]
			ii) Describe the procedure of constructing the Terrazzo flooring.	[6M]
			OR	
	b		i) Compare merits and demerits of flat and pitched roof.	[6M]
			ii) Write a brief note on pre-fabricated roofs.	[6M]
			Unit-V	
5	a		i) Describe the method of damp proofing for the basement in an area having high water table.	[6M]
			ii) Explain the step by step procedure of painting a new wood work.	[6M]
			OR	
	b		i) Briefly explain about the constituents of a paint.	[6M]
			ii) What do you understand by scaffolding? What are the essential requirements.	[6M]

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

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) Discuss the multiple excited magnetic field system in electromechanical energy conversion systems and also obtain the expression for field energy in the system.	[10M]
		ii) Explain the working principle of DC Generator	[2M]
		OR	
	b	i) Classify the DC Generators according to their excitation and explain each one with a neat sketch.	[8M]
		ii) A short shunt compound generator delivers a load current of 30 A at 220 V, and has armature, series-field and shunt-field resistance of 0.05 Ω, 0.30 Ω and 200 Ω respectively. Calculate the induced emf and armature current. Allow 1.0 V per brush as contact drop.	[4M]
		Unit-II	
2	a	i) What is the significance of Back EMF in DC motor and derive the condition for maximum power developed by a DC motor.	[5M]
		ii) Derive the Torque Equation for DC Motor and also explain Armature torque and shaft torque of a DC motor.	[7M]
		OR	
	b	i) The armature winding of a 4-pole, 250 V DC shunt motor is lap connected. There are 120 slots, and each slot containing 8 conductors. The flux per pole is 20 mWb and current taken by the motor is 25 A. The resistance of armature and field circuit are 0.1 Ω and 125 Ω respectively. If the rotational losses amount to be 810 W find, the gross torque, useful torque and the efficiency of the motor.	[6M]
		ii) Draw the power stages of DC motor and also give the applications of DC Motor.	[6M]
3		**Unit-III**	
	a	i) Explain the Ward-Leonard speed control method of DC shunt motor with a neat sketch.	[6M]
		ii) A 4-pole series-wound fan motor runs normally at 600 r.p.m on a 250 V DC supply taking 20 A. The field coils are connected at in series. Estimate the speed and current taken by the motor if the coils are reconnected in two parallel groups of two in series. The load torque is increases as the square of	[6M]

		the speed. Assume that the flux is directly proportional to the current and ignore losses.	
		OR	
	b	i) Explain with a neat diagram the working of a three point starter used for DC shunt motor?	[6M]
		ii) The Hopkinson's test on two similar shunt machines gave the following full load data: Line voltage = 110 V field currents are 3 A and 3.5 A Line current = 48 A Armature resistance of each is 0.035 Ω Motor armature current = 230 A. Calculate the efficiency of each machine assuming a brush contact drop of 1 volt per brush.	[6M]
4		Unit-IV	
	a	i) Derive the E.M.F equation of a single phase transformer.	[5M]
		ii) Differentiate the core type and shell type transformers in any eight aspects.	[7M]
		OR	
	b	i) Explain about the equivalent circuit of a single phase transformer and draw the phasor diagram of single phase transformer with capacitive load.	[8M]
		ii) A 10 kVA, 500/250 V, single-phase transformer has its maximum efficiency of 94% when delivering 90% of its rated output at unity power factor. Estimate its efficiency when delivering its full-load output at power factor of 0.8 lagging.	[4M]
5		Unit-V	
	a	i) Write down the conditions for parallel operation of three-phase transformer.	[4M]
		ii) Explain the Scott connection of transformer with neat diagrams.	[8M]
		OR	
	b	i) Explain with the help of connection diagrams the operation of off – load and on – load tap changers.	[12M]

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

Sub Code: 19BCE3TH05   ENGINEERING SURVEYING

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) Describe the methods of determining the width of a river, (a) with the chain only. (b) with the chain and optical square.	[6M]
			ii) A survey line CD intersects a high building. To prolong the line beyond this obstacle, a perpendicular DE, 150 m long, is set out at D. From E two lines EF and EG are set out at right angles of 450 and 600 with ED respectively. Determine the lengths of EF and EG in order that the points F and G may lie on the prolongation of CD, and also the obstructed distance DF.	[6M]
			OR	
	b		i) Define surveying. Explain in detail the classification of surveying.	[6M]
			ii) Find the maximum permissible error in laying off the direction of the offset so that the maximum displacement may not exceed 0.025 cm given that the length of the offset is 15 m, the scale is 1 cm = 70 m and the maximum error in the length of offset is 75 cm.	[6M]
			Unit-II	
2	a		i) What is meant by a closing error in a closed traverse? How would you adjust it graphically?	[6M]
			ii) Convert the following whole circle bearings to quadrantal bearings. (a)42° 30' (b) 126° 15'	[6M]
			OR	
	b		i) What is meant by local attraction? How is it detected? How are the observation bearings corrected for local attraction?	[6M]
			ii) Express the following reduced bearings as whole bearings. (a)N650 12'E (b) S360 48'E	[6M]
3	a		**Unit-III**	
			i) Describe in detail the process of profile levelling.	[6M]
			ii) Four sight rails are to be erected at four points A, B,C and D 60 m apart in a straight line. The invert level of the sewer at D is 86.48 m. The sewer is on a gradient of 1 in 120 rising from D to A. Surface pegs are driven at A, B, C and D and their reduced levels are 90.03, 89.85, 88.92 and 88.46 respectively. The height of the sight rail at D is 1.62 m. Find the suitable length of the bonding rod, and the heights of the sight rail above the surface pegs at A, B and C.	[6M]

		OR	
	b	i) What is meant by grade contouring? Describe in detail how you would locate it in the field.	[6M]
		ii) Describe fully, with sketches, the characteristics of contours and explain the uses of contour maps.	[6M]
4		Unit-IV	
	a	i) Explain the procedure of measurement of a horizontal angle with a theodolite.	[6M]
		ii) Following are the lengths and bearings of a traverse ABCD Line　　　　Length (m)　　　　Bearing AB　　　　248.0　　　　30^0 BC　　　　320.0　　　　140^0 CD　　　　180.0　　　　210^0 Calculate the length and bearing of the line DA.	[6M]
		OR	
	b	i) Describe in detail the linear methods of setting out of curves.	[8M]
		ii) Briefly explain reiteration method.	[6M]
5		Unit-V	
	a	i) State the advantages and disadvantages of plane tabling.	[6M]
		ii) What is meant by two point problem? Explain how it is solved.	[6M]
		OR	
	b	i) What is meant by plane tabling? When do you recommend it?	[4M]
		ii) Describe with sketches, the methods of plane tabling.	[8M]

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

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) Differentiate between stone work and brick work.	[6M]
			ii) Write a brief note on the characteristics of a good tile.	[6M]
			OR	
	b		i) How are artificial stones prepared? What are its different forms?	[6M]
			ii) Briefly explain the working of Bull's trench kiln for the burning of bricks.	[6M]
			Unit-II	
2	a		What is meant by seasoning of timber? Why is artificial seasoning adopted? Describe its various methods.	[12M]
			OR	
	b		i) Write a brief note on the alternative materials for wood.	[4M]
			ii) State the importance of reinforced plastics.	[4M]
			iii) Mention in brief the factors affecting physical properties of steel.	[4M]
			Unit-III	
3	a		i) Briefly describe the practical tests for limestones.	[6M]
			ii) What are the precautions to be taken in handling lime?	[6M]
			OR	
	b		i) Explain the functions of cement ingredients.	[6M]
			ii) Enumerate the laboratory tests for cement and describe any two of them.	[6M]
			Unit-IV	
4	a		i) Explain, with the help of sketches, various types of shallow foundations.	[6M]
			ii) Describe the procedure of constructing the Terrazzo flooring.	[6M]
			OR	
	b		i) Compare merits and demerits of flat and pitched roof.	[6M]
			ii) Write a brief note on pre-fabricated roofs.	[6M]
			Unit-V	
5	a		i) Describe the method of damp proofing for the basement in an area having high water table.	[6M]
			ii) Explain the step by step procedure of painting a new wood work.	[6M]
			OR	
	b		i) Briefly explain about the constituents of a paint.	[6M]
			ii) What do you understand by scaffolding? What are the essential requirements.	[6M]

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

Sub Code: 19BEE3TH01   ELECTRONIC DEVICES AND CIRCUITS

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 about Fermi level in intrinsic and extrinsic semiconductors.	[6M]
		ii)	Find the concentration of holes and electrons in n-type silicon at 300°K, if the conductivity is 300 S/cm. Also find these values for p-type silicon. Given that for silicon at 300 0K, $n_i = 1.5 \times 10^{10}$ /cm3 , $\mu_n = 1300$ cm²/V-s and $\mu_p = 500$ cm²/V-s.	[6M]
			OR	
	b	i)	The reverse saturation current Io in a germanium diode is 6µA. Calculate the current flowing through the diode when the applied forward bias voltages are 0.2V, 0.3V, and 0.4V at room temperature.	[6M]
		ii)	Define diode capacitances with expressions and their significance.	[6M]
			Unit-II	
2	a	i)	Explain how the Zener diode is used for the regulation purpose.	[6M]
		ii)	Compare LED and photodiode.	
			OR	
	b	i)	With circuit and necessary waveforms explain the operation of bridge rectifier with filter.	[6M]
		ii)	An ac supply of 230V is applied to a half-wave rectifier circuit through a transformer with a turns ratio of 10:1. Find (a) DC output voltage (b) PIV. Assume the diode to an ideal one.	[6M]
			Unit-III	
3	a	i)	Explain how the transistor works as a switch.	[6M]
		ii)	Draw the circuit diagram of an NPN junction transistor CE configuration and describe the static input and output characteristics. Also, Define active, saturation and cut-off regions and saturation resistance of a CE transistor.	[6M]
			OR	
	b	i)	Define transistors α, β, and γ. Obtain the relation between them.	[6M]
		ii)	Determine I_C, I_E and α for a transistor circuit having I_B=10µA and β=100	[6M]
			Unit-IV	
4	a	i)	What is Biasing? Explain the need for it. List out different types of biasing methods.	[6M]
		ii)	In a Self-bias circuit containing R_1=50kΩ, R_2=25kΩ, R_E=1kΩ, R_C=3kΩ, β=100, V_{cc}=15V, V_{BE}=0.6V. Find the operating point, S, S' and S''.	[6M]
			OR	
	b	i)	Define compensation techniques. Discuss various compensation techniques using diodes and transistors.	[6M]
		ii)	Explain Fixed bias method and derive the expression for stability factor. Discuss the advantages and disadvantages of the circuit.	[6M]
			Unit-V	
5	a	i)	Write Shockley's equation for JFET and hence sketch the transfer curve defined by I_{DSS} = 12 mA and V_P = -6 V.	[6M]
		ii)	Differentiate n-channel MOSFET and p-channel MOSFET.	[6M]
			OR	
	b	i)	Explain the construction and working of SCR.	[6M]
		ii)	What is UJT and draw the Construction, operation of a UJT along with its characteristics.	[6M]

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

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	
	a	i) Explain about the three-phase delta connected system and derive the relationship between line current and phase current in the three phase balanced delta connected system.	[6M]
		ii) A 220 V, 3-phase voltage is applied to a balanced delta-connected load. The RMS value of the phase current is 20 ∟30°A. Determine (i) magnitude and phase of the line current (ii) total power received by the three-phase load (iii) value of the resistive portion of the phase impedance. Also, draw the phasor diagram showing clearly the line voltages, phase current and line currents.	[6M]
1		OR	
	b	i) Draw the waveforms of three-phase voltages and explain the advantages of three-phase system over single-phase system.	[5M]
		ii) Three coils, each having a resistance of 20 Ω and a reactance of 15 Ω, are connected in star to a 400 V, three-phase, 50 Hz supply. Calculate (a) line current, (b) power supplied, and (c) power factor. If three capacitors, each of same capacitance, are connected in delta to the same supply so as to form a parallel circuit with the above coils, calculate the capacitance of each capacitor to obtain a resultant power factor of 0.95 lagging.	[7M]
2		Unit-II	
	a	i) Explain with circuit the Balanced three phase four wire supply with three phase unbalanced star connected load.	[6M]
		ii) An unbalanced four wire star connected load has a balanced voltage of 440V. The loads are	[6M]

		Z1=(10+j5)Ω, Z2=(3+j4)Ω, Z3=(15-j20)Ω. Calculate the (a)Line currents (b) Current in neutral wire (c) Total Power.	
		OR	
	b	i) Illustrate Two Wattmeter method to measure the power in three phase unbalanced star load.	[6M]
		ii) The two wattmeter method is used to measure power in a three phase star connected load. The wattmeter readings are -560W and 800W and the line voltage is 208V. Calculate (a) Total active power (b) Power factor (c) Reactive Power (d) Phase impedance also conclude the impedance is inductive or capacitive?	[6M]
3	a	**Unit-III**	
		i) A series RC circuit excited with DC voltage at t=0. Find the expression of current, voltage across resistor and voltage across capacitor.	[6M]
		ii) A series RL circuit consists of resistor of 10Ω and an inductor of 20mh. A constant voltage of 20V is applied to the circuit at t=0. Obtain the current equation. Determine the voltage across the resistor and the inductor.	[6M]
		OR	
	b	i) For an RC series circuit, a sinusoidal voltage applied at t=0. Find the expression of current.	[6M]
		ii) A series R–L circuit with R = 30 ohms and L = 15 H has a constant voltage V = 60 V applied t = 0. Determine the current I, the voltage across resistor, and the voltage across the inductor.	[6M]
4	a	**Unit-IV**	
		i) Explain about H-Parameters and draw its equivalent circuit? Derive the Expression for H Parameters in terms of Y-parameters.	[6M]
		ii) Find Z and H parameters for given network shown below.	[6M]

		OR	
	b	i) Two identical sections of the network shown in below are connected in cascade. Obtain the transmission parameters of the overall connection. 	[6M]
		ii) Find the lattice equivalent of a symmetric π-network shown in figure below 	[6M]
5	a	**Unit-V**	
		i) List and explain the different types of filters.	[6M]
		ii) A low-pass filter is composed of a symmetrical π section. Each series branch is a 0.02 H inductor and shunt branch is a 2 μF capacitor. Find (a) cut-off frequency, (b) nominal impedance, (c) characteristic impedance at 200 Hz and 2000 Hz, (d) attenuation at 200 Hz and 2000 Hz, and (e) phase shift constant at 200 Hz and 2000 Hz.	[6M]
		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 35mH in the series arm and two capacitors of 0.4 μF in the shunt arm. Calculate the cutoff frequency, design impedance, characteristic impedance and phase shift at 3kHz.	[6M]

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

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)

Questions
1. Unit-I

a. i) State and explain coulomb's law with necessary equations [6M]

ii) A pair of negative and positive charges of 10μC each are separated by A distance of 0.1m along the x-axis. Find the dipole moment. [6M]

OR

b.i) Prove that the electric field intensity is the negative gradient of potential [6M]

ii) The potential at a point A is 10 volts and at B it is 15 volts. If a charge, Q=10μC is moved from A to B, what is the work required to be done? [6M]

2.Unit-II

a. Derive the boundary conditions for electrostatic fields [12M]

OR

b i) State and explain Gauss law with applications.[6M]

ii) Derive an expression for equation of continuity [6M]

3.Unit-III

a. i) State Ampere's circuital law. Specify the conditions to be met for determining magnetic field strength H, based on Ampere's circuital law. [6M]

ii) A circular loop located on $x^2 + y^2 = 9$, Z=0 carries a direct current of 10 A along a_φ. Determine H at (0, 0, 4) and (0, 0,-4). [6M]

OR

b i) Find the magnetic field intensity and flux density at a point P which is at a distance h from a straight line conductor carrying a current I ampere. [6M]

ii) Using Biot-Savart's law, derive the magnetic field intensity on the axis of a circular loop carrying a steady current I.[6M]

4 Unit-IV

a. i) Derive Lorentz force equation and explain its significance [6M]

ii) A toroid coil of 600 turns has a mean radius of 50cm and radius for the winding of 4cm. Find the value of average self-inductance with an iron core of μr=900. [6M]

OR

b i) Derive the expression for Torque on a current loop placed in a magnetic field[6M]

  ii) Obtain an expression for the self-inductance of a toroid of a circular cross-section, with N closely spaced turns. [6M]

5.Unit-V

a i) Explain how the concept of displacement current was introduced by Maxwell to account for the production of magnetic field in the empty space. [6M]

ii) Starting from Faraday's law of electromagnetic induction, derive the Maxwell equation

$$\nabla X E = \frac{-\partial B}{\partial t} [6M]$$

OR

b. i) Explain in detail about Poynting vector.[6M]

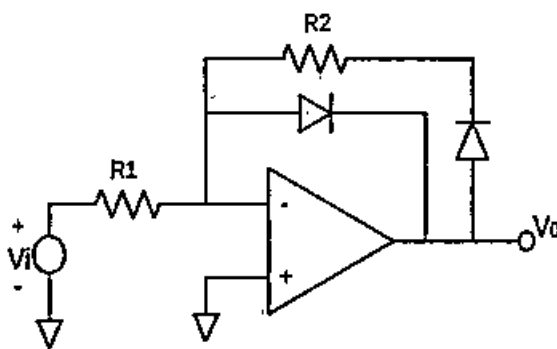 ii) State and explain Maxwell's equations in integral and point form in free space[6M]

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

Sub Code: 19BEE3TH06   ANALOG ELECTRONICS

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 about trans-conductance amplifier.	[6M]
		ii) Explain the characteristics of negative feedback amplifiers.	[6M]
		OR	
	b	i) Explain about the feedback topologies.	[6M]
		ii) Differentiate voltage series and current shunt feedback amplifiers.	[6M]
		Unit-II	
2	a	i) Derive an expression for output of a low pass RC circuit excited by pulse input.	[6M]
		ii) A 10 Hz square wave is fed to an amplifier. Calculate and plot the output waveforms under the following conditions: The lower 3 db frequency is a) 0.3 Hz b)3 Hz c) 30 Hz.	[6M]
		OR	
	b	i) Design a two level clipper for bias voltages V1 = 4V and V2= -4V. Use practical diodes.	[6M]
		ii) Design a diode clamper circuit to clamp the positive peaks of the input signal at zero level. The frequency of the input signal is 500 Hz.	[6M]
3		**Unit-III**	
	a	i) An opamp has a slew rate of 0.8 V/μs. If the input signal varies by 0.35 V in 14 μs, find the voltage gain.	[6M]
		ii) Given op amp is ideal, Find the output voltage V_o for a Figure. (i) for $V_i>0$ (ii) for $V_i<0$.	[6M]
		OR	
	b	i) Given op amp is ideal, Find the V_0 for the Figure.	[6M]

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

Sub Code: 19BME3TH01   FLUID MECHANICS AND HYDRAULIC MACHINERY
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	
	a		i) Define Density, Specific weight, Specific Volume and Viscosity of Fluid. $CO1, K_2$	[6M]
			ii) Determine the intensity of shear of an oil having viscosity = 1 poise. The oil is used for lubricating the clearance between a shaft of diameter 10 cm and its journal bearing. The clearance is 1.5 mm and the shaft rotates at 150 rpm. $CO1K_3$	[6M]
1			OR	
	b		i) Define pressure. Derive an expression for pressure intensity at a point in a fluid.	[6M]
			ii) A simple U-tube manometer containing mercury is connected to a pipe in which an oil of specific gravity 0.8 is flowing in a pipe line. The pressure in the pipe is vacuum. The other end of the manometer is open to the atmosphere. Find the vacuum pressure in the pipe, if the difference of mercury level in the two limbs is 200 mm and height of oil in the left limb from the centre of the pipe is 150 mm below.	$CO1$ K_4 [6M]
			Unit-II	
	a		Define Bernoulli's equation and derive an expression for Bernoulli's equation from Euler's equation. State the assumptions made. $CO2$ K_4	[12M]
			OR	
2			i) Differentiate between (a) Steady and un-steady flows (b) Uniform and non-uniform flows. $CO2$ K_3	[4M]
			ii)Explain velocity and acceleration of a fluid particle. $CO2$ K_2	[4M]
	b		iii)A submarine moves horizontally in sea and has its axis 15 m below the surface of water. A pitot-tube properly placed just in front of the sub-marine and along its axis is connected to the two limbs of a U-tube containing mercury. The difference of mercury level is found to be 170 mm. Find the speed of the sub-marine knowing that the specific gravity of mercury is 13.6 and that of sea-water is 1.026 with respect of fresh water. $CO2 K_4$	[4M]
			Unit-III	
	a		i) Define displacement thickness. Derive an expression for the displacement thickness. $CO3$ K_4	[6M]
			ii) A thin plate is moving in still atmospheric air at a velocity of 5 m/s. The length of the plate is 0.6 m and width 0.5 m. Calculate (i) the thickness of the boundary layer at the end of the plate and (ii) drag force on one side of the plate. Take density of air as 1.24 kg/m³ and kinematic viscosity 0.15 stokes.	$CO3K_4$ [6M]
3			OR	
	b		i) What are types of similarities? Obtain expressions for similarities. $CO3$ $K2$	[6M]
			ii) A pipe of diameter 1.5 m is required to transport an oil of sp. gravity 0.9 and viscosity 3×10^{-2} poise at the rate of 3000 litres/sec. Tests were conducted on a 0.15 m diameter pipe using water at 20°C. Find the velocity and rate of flow in the model. Viscosity of water at 20°C = 0.01 poise. $CO3 K_4$	[6M]

		Unit-IV		
4	a	i) Obtain an expression for force exerted by the jet on a moving inclined plate in the direction of the jet. _cou_ _k_ _4_	[6M]
		ii) A jet of water of diameter 150 mm strikes a flat plate normally with a velocity of 12m/sec. The plate is moving with a velocity of 6 m/sec in the direction of the jet and away from the jet. Find (i) the force exerted by the jet on the plate, (ii) work done by the jet on the plate per second, (iii) power of the jet and (iv) efficiency of the jet. _cou_ _ku_	[6M]
		OR		
	b	i) Obtain an expression for the work done per second by water on runner of a Pelton wheel. Also obtain the condition for maximum efficiency. _cou_ _ky_	[6M]
		ii) A Kaplan turbine working under a head of 29 m develops 1287.5 kW shaft power. If the speed ratio is equal to 2.1, flow ratio = 0.62, diameter of the boss = 0.34 times the diameter of the runner and overall efficiency of the turbine = 89%, find the diameter of the runner and the speed of turbine. _cou_ _ky_	[6M]
5	a	Unit-V		
		i) Define specific speed of a centrifugal pump. Derive an expression for the same.	[6M] _cos_
		ii) A reaction turbine works at 500 rpm under a head of 100 m. The diameter of turbine at inlet is 1 m and flow area is 0.35 m². The angles made by absolute and relative velocities at inlet are 15⁰ and 60⁰ respectively with the tangential velocity. Determine (a) Volume flow rate (b) Power developed (c) Efficiency. Assume whirl at outlet to be zero.	_cork_ₐ [6M]
		OR		
	b	i) Obtain an expression for work done by the reciprocating pump. _cos_ _k4_	[6M]
		ii) A single-acting reciprocating pump, running at 50 rpm delivers 0.00736 m³/sec of water. The diameter of the piston is 200 mm and stroke length are 300 mm. The suction and delivery heads are 3.5 m and 11.5 m respectively. Determine (i) Theoretical discharge (ii) Coefficient of discharge (iii) % Slip (iv) Power required to run the pump _cor_ _ky_	[6M]

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

Sub Code: 19BME3TH03   MATERIAL SCIENCE AND METALLURGY

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) Show that the atomic packing factor for HCP is 0.74	[6M]
			ii) Explain Hume-Rothery conditions for unlimited solid solubility	[6M]
			OR	
	b		i) Explain eutectoid system with a neat sketch in a Binary phase diagram.	[6M]
			ii) Explain Gibbs phase rule and Lever rule with the help of suitable example.	[6M]
			Unit-II	
2	a		i) Explain the structure and applications of plain carbon steel.	[6M]
			ii) Briefly explain the effect of alloying elements on properties of steel.	[6M]
			OR	
	b		i) Write the composition and structure of White Cast iron and Grey Cast iron.	[6M]
			ii) Write the properties and applications of Malleable Cast iron.	[6M]
			Unit-III	
3	a		i) Define the heat treatment and classify the various heat treatment processes.	[6M]
			ii) Differentiate between Annealing and Normalizing.	[6M]
			OR	
	b		i) Write full name of TTT diagram and explain how it is constructed.	[6M]
			ii) Explain Carburizing and Cyaniding in brief.	[6M]
			Unit-IV	
4	a		What are the advantages of aluminum alloys over other alloys? Where are they used?	[12M]
			OR	
	b		Explain the structure and properties of pure Titanium and applications of any one Titanium alloy.	[12M]
			Unit-V	
5	a		i) What is meant by tampered glass? Explain	[6M]
			ii) What is a Composite material? How it is classified? Explain briefly	[6M]
			OR	
	b		i) Explain the different stages of manufacturing of powder metallurgy component	[8M]
			ii) List any four advantages of powder metallurgy	[4M]

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

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 following terms • Thermodynamic system, surroundings and boundary • Thermodynamic process, cycle • Thermodynamic equilibrium	[6M]
			ii) A cylinder contains 5 m³ of ideal gas at a pressure of 1 bar. The gas is compressed in a reversible isothermal process till its pressure increases to 5 bar. Determine the work required for this process.	[6M]
			OR	
	b		i) List various temperature scales and write the relations between different temperature scales	[6M]
			ii) Describe the working of constant volume gas thermometer and state the reasons why it is preferred over a constant pressure gas thermometer	[6M]
			Unit-II	
2	a		i) An electric generator coupled to a wind mill produces an average electric power output of 5kW.The power is used to charge a storage battery. Heat transfer from the battery to the surroundings occurs at a constant rate of 0.6kW. Determine the total amount of energy stored in the battery, in kJ, in 8 hours of operation.	[6M]
			ii) A piston cylinder device machine containing fluid system has a stirring device in the cylinder. The piston is frictionless and it is held down against the fluid due to atmospheric pressure of 101.325KPa. The stirring device is turned 10,000 revolutions with an average torque against the fluid of 1.275Nm. Meanwhile the piston of 0.6m diameter moves out 0.8m Find the net work transfer for the system.	[6M]
			OR	
	b		i) Air at 80 kPa and 127°C enters an adiabatic diffuser steadily at a rate of 600 kg/h and leaves at 100 kPa. The velocity of the airstream is decreased from 230 to 30 m/s as it passes through the diffuser. Find (i) the exit temperature of the air (ii) the exit area of the diffuser	[6M]
			ii) Write the steady flow energy equation for a multiple inlet and multiple outlet in a control volume and explain the various terms in it.	[6M]
3			**Unit-III**	
	a		i) State and prove Carnot's theorem	[6M]
			ii) Two reversible heat engines 1 and 2 are connected in series such that 1 is rejecting heat	[6M]

		directly to 2. Engine 1 receives 200 kJ at a temperature of 421°C from a hot source, while Engine 2 is in communication with a cold sink at a temperature of 4.4°C. The work output of 1 is two times that of 2. Calculate (i) the intermediate temperature between 1 and 2, (ii) the efficiency of each engine, and (iii) the heat rejected to the cold sink.	
		OR	
	b	i) Two kg of water at 90°C are mixed adiabatically with 3.5 kg of water at 20°C in a constant pressure of 1 atmosphere. Find the increase in the entropy of the total mass of water due to the mixing process (Cp of water = 4.187 kJ/kg K).	[6M]
		ii) A refrigeration cycle has a coefficient of performance equal to 75% of the value for a reversible refrigeration cycle operating between cold and hot reservoirs at -5°C and 40°C, respectively. For operation at steady state, determine the net power input, in kW per kW of cooling, required by (i) the actual refrigeration cycle and (ii) the reversible refrigeration cycle. Compare values.	[6M]
4		Unit-IV	
	a	i) Draw the phase equilibrium diagram of water on p-v and p-T coordinates by clearly indicating various constant property lines	[8M]
		ii) A mixture of gases contains 4.76 mole of Ne, 0.74 mole of Ar and 2.5 mole of Xe. Calculate the partial pressure of gases, if the total pressure is 2 atm. at a fixed temperature.	[4M]
		OR	
	b	i) What do you understand by quality of steam or dryness fraction. Indicate constant quality lines on T-s and h-s diagrams.	[6M]
		ii) Carbon(C) is burned with dry air. The volumetric analysis of products is 10.06% CO2, 0.42% CO, 10.69% O2 and 78.83%N2. Determine(a) air-fuel ratio(b) the percentage of excess air	[6M]
5		Unit-V	
	a	i) Derive the expression for the efficiency of Otto cycle	[6M]
		ii) An air-standard dual cycle with a compression ratio of 14, has the minimum temperature and pressure of 300K and 0.95 bar, respectively. The cylinder volume is 3 Litres and 6.5 kJ of energy is added as heat of which one-third is added at constant volume and the rest at constant pressure. Calculate the maximum pressure in the cycle, the temperature of the gas before and after the constant pressure energy addition, the energy rejected as heat and thermal efficiency of the cycle. For air Cv = 0.717 kJ/kgK	[6M]
		OR	
	b	i) Briefly explain Vapor compression refrigeration cycle by providing a layout of VCR system and indicate the processes on T-s and h-s diagrams	[6M]
		ii) An engine operating on air-standrad Diesel cycle sucks in air at 1 bar and 300 K and compresses it to 40 bar before fuel injection. If the energy added (per cycle) as heat is 600 kJ/kg air, calculate (i) compression ratio (ii) cut-off ration (iii) thermal efficiency (iv) work done per kg. Take Cp of air = 1.0045 kJkgK	[6M]

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

Sub Code: 19BME3TH05   MECHANICS OF SOLIDS
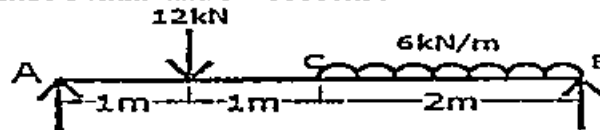
Time: 3 hours   (ME)   Max. Marks: 60

Note: Answer All FIVE Questions.

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

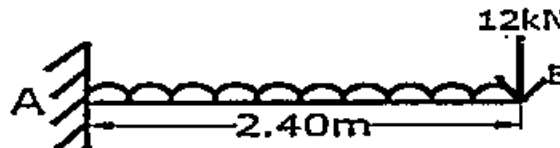| Q.No			Questions	Marks
			Unit-I	
1	a		Two vertical rods, one of steel and other of copper, are each rigidly fastened at the upper end 550mm apart. Each rod is 3 meters long and 100mm² in cross-sectional area. A horizontal cross bar connects the lower ends of the rods and on it is placed a load of 12KN so that cross bar remains horizontal. Find the position of the load on cross bar and estimate the stress in each rod. Assume E_r=0.21MN/mm², E_c=0.12MN/mm²	[12M]
			OR	
	b	i)	Derive an expression for maximum stress induced in a bar when it is subjected to an impact load of P. Assume the length of the bar is l and area of cross section A. The top end of the bar is fixed to a ceiling and the load falls from a height of h on to a collar attached at the lower end of the bar.	[6M]
		ii)	A bar 100cm in length is subjected to an axial pull such that the maximum stress is equal 150MPa. Its area of cross-section is 2cm² over a length of 95cm and for the middle 5cm length it is only 1cm². If E=200GPa Calculate the strain energy stored in the bar.	[6M]
			Unit-II	
2	a	i)	Define a beam.	[2M]
		ii)	Draw SFD and BMD for an overhanging beam subjected to UDL of w per unit length throughout its length. The beam has a total length of l and equal overhangs each of length a at both ends.	[10M]
			OR	
	b		A beam of 10 m length is simply supported at its ends. It carries a UDL of 20 kN/m run over the length of left half of its span, together with concentrated loads of 40 kN and 20 kN situated at 1.5 m and 2.5 m respectively from right hand support. Draw SFD and BMD.	[12M]
			Unit-III	
3	a	i)	Show that the maximum shear stress induced in a beam of rectangular cross-section is 50% greater than its mean value.	[6M]
		ii)	A circular beam of 10.5 cm diameter is subjected to a shear force of 5 kN. Calculate the value of maximum shear stress and sketch the variation of shear stress along the depth of the beam.	[6M]
			OR	
	b		Stating the assumptions of pure bending, derive the Flexure formula.	[12M]

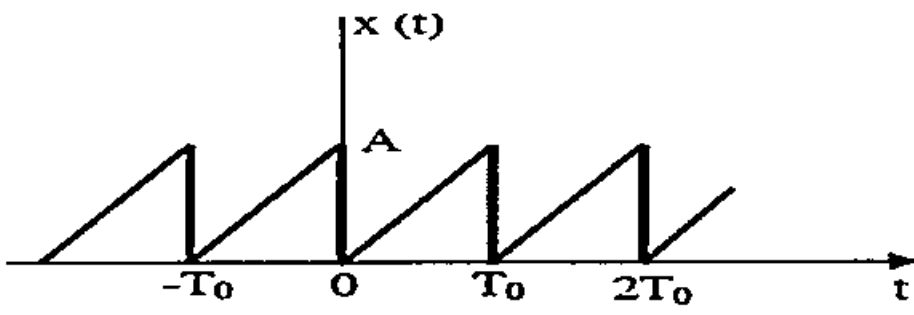|		Unit-IV	
4	a	A beam AB of span 4m is simply supported at the ends and loaded as shown below. Determine the Deflection at point C, Maximum deflection, and Slope at end A. Take $E=2\times10^5 N/mm^2$ and $I = 1000cm^4$. 12kN 6kN/m A C B 1m — 1m — 2m	[12M]
		OR	
	b	A Cantilever beam 2.4m long is loaded as shown below. Calculate the slope and deflections at free end. If the section is rectangular 120mm X 240mm.Take $E=0.11\times10^5 N/mm^2$ 12kN A B 2.40m	[12M]
5		Unit-V	
	a	i) Derive the torsion equation with usual notations	[6M]
		ii) Derive the equation of maximum torque transmitted by a circular solid shaft	[6M]
		OR	
	b	An external pressure of 10 MPa is applied to a thick cylinder of 300 mm outer diameter and 150 mm inner diameter. If the maximum hoop stress permitted on the inside wall is 35 MPa, calculate the maximum internal pressure that can be applied. Plot the radial and hoop stress distributions across the thickness of the cylinder. Also calculate the longitudinal stress induced in the shell.	[12M]

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

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	
1	a	i)	Deduce the condition under which two signals $f_1(t)$ and $f_2(t)$ are said to be orthogonal to each other. Hence, prove that $\cos nw_0 t$ and $\cos mw_0 t$ are orthogonal over any interval $(t_0, t_0 + 2\Pi/W_0)$ for integer values of x and y.	[6M]
		ii)	Determine the power and rms value of signal $x(t) = 10\sin 2\Pi t + 20\cos 4\Pi t$	[6M]
			OR	
	b	i)	Test whether the signal $x(t) = e^{-2t}u(t)$ and $x(n) = 1/2\, nu(n)$ energy or power signal and calculate the even and odd components of the given signal $x(t) = t^2 + t + 3$	[6M]
		ii)	Evaluate mean square error for a rectangular function defined by $f(t) = 1; 0 < t < \Pi$; and $-1; \Pi < t < 2\Pi$ approximate the above function by a single sinusoid $\cos(t)$ approximation. Also show what happens when more number of sinusoidals are used for approximations.	[6M]
			Unit-II	
2	a		Calculate the trigonometric Fourier series and exponential Fourier series for the signal x(t)	[12M]
			OR	
	b	i)	Discuss the concept of trigonometric Fourier series and derive the expressions for coefficients.	[4M]
		ii)	Prove any 3 properties of Fourier Series.	[4M]
		iii)	Evaluate the exponential Fourier series for the signal $x(t) = \sin^2 t + \cos 3t$	[4M]

		Unit-III	
3	a	i) Evaluate the Fourier Transform of (i) Triangular pulse with period T = 4 Sec and amplitude A = 20V. (ii) One cycle of cos wave	[6M]
		ii) Determine the Fourier transform of impulse and Signum function and sketch its phase spectrum.	[6M]
		OR	
	b	i)Determine the Fourier Transform for double exponential pulse whose function is given by $y(t) = e^{2\bullet t}$ Also draw its magnitude and phase spectra	[6M]
		ii) Evaluate the Fourier transform of a gate pulse of unit height, unit width and centered at t=0.	[6M]
		Unit-IV	
4	a	i)Evaluate the Inverse Z transform of $$X(z) = \frac{z^2}{z^2 - z + 0.25} \quad |Z| < 0.5$$	[6M]
		ii)Determine the Laplace transform of the following signals i) Impulse function ii) unit step function iii) A sin w_0t u(t)	[6M]
		OR	
	b	i) Determine the Laplace transform of the signal x(t) =e^{-at}u(t) + e^{-bt} u(-t)	[6M]
		ii) Evaluate the Z transform of $$x(n) = 3\left(\frac{1}{2}\right)^n u[n] - 2\left(\frac{1}{4}\right)^n u[-n-1]$$	[6M]
		Unit-V	
5	a	i) Determine whether the following systems are time invariant or not, causal or not and linear or non linear (i) $y(t) = 5t^2 x(t)$ (ii)3(2t+1)e$^{x(t)}$ (iii) y(n) = 3nx(n+2)	[6M]
		ii) Determine the Nyquist sampling rate and Nyquist sampling interval for the signal x(t) = 10sinc^2 (100Πt	[6M]
		OR	
	b	i) Prove the sampling theorem for a band limited signals and sketch the relevant waveforms	[6M]
		ii) Find the frequency component at the output for a input signal of g(t) =Sin(300Πt) + 2Cos(180Πt), which is sampled at a sampling frequency of 300Hz. Assume the sampled signal is transmitted through an ideal LPF with a cut-off frequency of 250Hz.	[6M]

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

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) 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. Carryout computations up to 7th stage.	[6M]
		ii) Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of False position correct to 3 Decimal places.	[6M]
		OR	
	b	i) Using Iterative method, find the real root of the equation $x \log_{10}(x) = 1.2$ correct to five decimal places.	[6M]
		ii) By Newton-Raphson's method, find a root of the equation $x e^x - 2 = 0$ correct to 3 decimal places.	[6M]
2		**Unit-II**	
	a	i) Find the missing values in the following table:	[12M]

x	45	50	55	60	65
F(x)	3	-	2	-	-2

ii) State Newton's forward interpolation formula. Using it to calculate the value of $exp(1.85)$ given the following table:

x	1.7	1.8	1.9	2.0	2.1	2.2	2.3
$Y=f(x)=e^x$	5.474	6.050	6.686	7.389	8.166	9.025	9.974

OR

b) i) Interpolate by means of Gauss's forward interpolation formula, the population of a town for the year 1974, given that   [6M]

Year	1939	1949	1959	1969	1979	1989
Population (in thousands)	12	15	20	27	39	52

ii) Given the values   [6M]

x	5	7	11	13	17
f(x)	150	392	1452	2366	5202

Using Lagrange's interpolation formula, find f(10).

			Unit-III	
3	a	i) Find the value of y for $x = 0.1$ by Picard's method, given that $\dfrac{dy}{dx} = \dfrac{y-x}{y+x}$, $y(0) = 1$.		[6M]
		ii) Find by Taylor's series method, the value of y at $x = 0.1, 0.2$ to 5 places of decimals from $\dfrac{dy}{dx} = x^2 y - 1$, $y(0) = 1$.		[6M]
		OR		
	b	i) Using modified Euler's method, find an approximate value of y when $x = 0.3$, given that $\dfrac{dy}{dx} = x + y$, $y=1$ when $x=0$.		[6M]
		ii) Using Runge-Kutta method of 4th order, Solve $\dfrac{dy}{dx} = \dfrac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2, 0.4$.		[6M]

			Unit-IV	
4	a	i) If $f(z)$ is an analytic function with constant modulus, then show that $f(z)$ is constant.		[6M]
		ii) Find the analytic function $f(z) = u + iv$, if $u = e^{2x}(x \cos(2y) - y \sin(2y))$.		[6M]
		OR		
	b	i) If $f(z)$ is a regular function of z, then prove that $\left(\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2}\right)\lvert f(z)\rvert^2 = 4\lvert f^1(z)\rvert^2$.		[6M]
		ii) Show that the curves $r^n = \alpha \sec(n\theta)$ and $r^n = \beta \operatorname{Cosec}(n\theta)$ cut orthogonally.		[6M]

			Unit-V	
5	a	i) Evaluate $\displaystyle\int_0^{2+i}(\bar{z})dz$ along (i) the line $y = x/2$ (ii) the real axis to 2 then vertically to $2 + i$.		[6M]
		ii) Evaluate $\displaystyle\int_C \dfrac{\sin^2(z)}{\left(z - \dfrac{\Pi}{6}\right)^3} dz$ where C is the circle $\lvert z\rvert = 1$.		[6M]
		OR		
	b	i) Expand $f(z) = \dfrac{1}{(z-1)(z-2)}$ in the region (I) $\lvert z\rvert < 1$ (ii) $1 < \lvert z\rvert < 2$ (iii) $\lvert z\rvert > 2$.		[6M]
		ii) By integrating around a unit circle, evaluate $\displaystyle\int_0^{2\Pi} \dfrac{\cos(3\theta)}{5 - 4\cos(\theta)} d\theta$.		[6M]

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

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) Derive the current equation and explain V-I Characteristics of PN Junction diode.	[6M]
		ii) Determine the diffusion coefficients of holes and electronics for germanium at 300° K. The carrier mobilities in cm^2/V-s at 300° K for holes and electronics respectively 3,500 and 1,600. Density of carrier is 2×10^{13}/cm^2. Boltzmann constant k $=1.38 \times 10^{-23}$ J/$^{\circ}$K, e $= 1.602 \times 10^{-19}$C.	[6M]
		OR	
	b	i) Derive an expression for conductivity in a intrinsic semiconductor in terms of electron & hole concentration	[6M]
		ii) Calculate the concentration of holes & electrons in the P-type silicon at 300°K assuming its resistivity as 0.01 Ω-cm, μp=475cm^2/vs, η_i=1.5×10^{10}/cm^3.	[6M]
		Unit-II	
2	a	Compare different types of rectifiers and determine the rating of a transformer to deliver 150 watts of dc power to a load for the following rectifiers. (i) Half wave rectifier. (ii) Full wave rectifier (iii) Bridge rectifier	[12M]
		OR	
	b	i) Explain the construction and working principle of Zener diode.	[4M]
		ii) Design Two-section LC filter to provide an output voltage 10V with a load current of 200 mA and the ripple is limited to 0.1%.	[4M]
		iii) Discuss the construction and working of Tunnel diode.	[4M]
		Unit-III	
3	a	i) Compare CE, CB and CC configurations.	[6M]
		ii) Calculate the minimum base current required for the transistor to enter into saturation. The NPN transistor has α =0.98, I_{co}=1.6μA. This transistor is used in CE configuration with V_{cc}=12V and R_L=6KΩ.	[6M]
		OR	
	b	a) i) Explain about Common Emitter configuration in detail with Input-Output Characteristics.	[8M]

		ii) Calculate I_B and I_C and derive the relationship between α and β Given I_E=2.5 mA, α=0.98 and I_{CBO}=10µA.	[4M]
		Unit-IV	
4	a	Draw the transistor biasing circuit using fixed bias arrangement and explain its principle with suitable analysis.	[6M]
		ii) Evaluate the operating point, S, S', and S". In a Self-bias circuit containing R_1=50K Ω, R_2=25K Ω, Re=1K Ω, RC=3K Ω, β=100, V_{CC}=10V, V_{BE}=0.7V.	[6M]
		OR	
	b	i) Explain the importance of stability of operating point in a transistor	[4M]
		ii) Determine the operating point and stability factor. In a silicon transistor with a fixed bias, Vcc= 9 V, Rc= 3 k Ω, RB= 8k Ω, β = 50, VBE= 0.7V.	[8M]
5	a	**Unit-V**	
		i) Explain the operation of P-channel enhancement type MOSFET with the help of current voltage characteristics	[6M]
		ii) Explain the Construction, Operation and Characteristics of SCR	[6M]
		OR	
	b	i) Calculate the expressions for Zi, Zo and Av for common drain J-FET amplifier	[8M]
		ii) Explain the construction, working and characteristics of UJT.	[4M]

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

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	List and explain IoT levels with practical examples.	[12M]
		OR	
	b	Explain the IoT physical design along with its protocols block diagram for communication.	[12M]
		Unit-II	
2	a	Explain domain specific applications of IoT in agriculture and energy sectors.	[12M]
		OR	
	b	Provide the block diagram representation and schematic diagram to home automation requirements with knows sensor models.	[12M]
		Unit-III	
3	a	i) Differentiate IoT and M2M in various aspects.	[6M]
		ii) How SDN can be used in Level-3 IoT.	[6M]
		OR	
	b	i) Explain the block diagram of M2M gateway.	[6M]
		ii) Compare SDN and NFV for IoT.	[6M]
		Unit-IV	
4	a	i) What is the need for IOT Systems Management? And write simple network management protocol use cases.	[8M]
		ii) Describe network operator requirements.	[4M]
		OR	
	b	i) What are NETCONF, YANG? and compare both of them.	[6M]
		ii) List practical limitations of SNMP in IoT applications.	[6M]
		Unit-V	
5	a	i) What is exemplary Device? Write basic Python script for the light sensor working process in home automation.	[6M]
		ii) Interface the 7 segment led display to the Raspberry Pi. (Show the schematic and code).	[6M]
		OR	
	b	i) Explain the python web application framework concept.	[4M]
		ii) Using the block diagram and schematic model represent the Raspberry Pi based LCD interface.	[8M]

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

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) Define Data Structure. Distinguish between linear and non-linear data structures with suitable examples.	[6M]
		ii) What are the essential characteristics of any recursive algorithm? Discuss them with the help of a sample recursive algorithm.	[6M]
		OR	
	b	i) Design a recursive algorithm to find the GCD of two positive integers. Trace the designed algorithm with an example.	[6M]
		ii) Define Abstract Data Type(ADT). Briefly discuss about the characteristics of an ADT.	[6M]
		Unit-II	
2	a	Write an algorithm for arranging elements in non-descending order using Merge Sort technique and also trace the steps of algorithm with an example.	[12M]
		OR	
	b	i) Design a recursive algorithm for Binary Search.	[4M]
		ii) Distinguish between 'Internal Sorting' and 'External Sorting'. Give at least one example to each category of sorting.	[4M]
		iii) Illustrate the Insertion sort technique with the following list of numbers: 4, 7, 9, 12, 3, 10, 15, 6	[4M]
		Unit-III	
3	a	i) Write algorithms for PUSH and POP operations on STACKS.	[6M]
		ii) Write the Underflow and Overflow conditions in Stacks, Queues and Circular Queues	[6M]
		OR	
	b	i) Write an algorithm to convert Infix expression into its equivalent Postfix form.	[6M]
		ii) Write algorithms for Insertion and Deletion Operations on Circular queues.(Assume that the circular queue is represented using an array)	[6M]
		Unit-IV	
4	a	i) Discuss the merits and demerits of Linked list over Array with suitable example applications/operations	[6M]
		ii) Write the node structure of Single Linked List and write an algorithm to insert a node at position 'p' in a Single Linked List.	[6M]
		OR	
	b	i) Design an algorithm to create a Double Linked List and traverse it in reverse order.	[6M]
		ii) Write algorithms to create a Circular Single linked list.	[6M]
		Unit-V	
5	a	i) Define Graph. Write a algorithm to traverse the graph using BFS graph traversal technique.	[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) Define BST. Construct a BST from the following list of numbers and show the sequence of steps clearly: 10, 20, 14, 3, 8, 9, 7, 15	[6M]
		ii) Discuss about various representation styles of Graphs with an example.	[6M]

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

Sub Code: 19BCI3TH02 **FRONT END WEB TECHNOLOGIES**

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) Design the static web page that display a marks table with three rows and three columns as shown below: Marks1 Marks2 Marks3 90 90 99 81 80 82	[6M]
		ii) Discuss the creation of HTML document with frames.	[6M]
		OR	
	b	i) Discuss about ordered list and various options available for ordered list. Give suitable HTML code	[4M]
		ii) List and Explain Form Elements with an Example	[8M]
		Unit-II	
2	a	Define CSS. Explain inline, internal, external and embedded style sheets with examples.	[12M]
		OR	
	b	i) Discuss about CSS Box Model.	[4M]
		ii) Create a HTML which uses CSS that gives all H1 and H2 elements a padding of 0.5 ems; a grooved border style and a margin of 0.5 ems.	[4M]
		iii) What are differences between div and span tags?	[4M]
		Unit-III	
3	a	i) Describe the various Date Object methods with suitable examples.	[6M]
		ii) Write a script that inputs a line of text, tokenizes it with String method split() and displays the tokens in reverse order.	[6M]
		OR	
	b	i)Explain objects, methods and events in java scripts.	[6M]
		ii) Write a java script to validate a form consisting of a hall ticket number as username and mobile number as password. Also navigate to another web page after validation.	[6M]
		Unit-IV	
4	a	i) Mention the Differences between JavaScript and jQuery.	[6M]
		ii) Explain the Advantages of jQuery?	[6M]
		OR	
	b	i) Explain working with an element's relatives with example	[6M]
		ii) What are the selectors in jQuery and Explain different types of selectors with an Example	[6M]

		Unit-V	
5	a	i) Explain about selectable( ) in jQuery UI	[6M]
		ii) Write jQuery code to demonstrate Accordion and Date Picker.	[6M]
		OR	
	b	i) Explain about Dialogue in jQuery UI.	[6M]
		ii) Write jQuery code to demonstrate the usage of important options disabled, delay, distance and clone in the drag function of jQuery UI	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

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

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
		Unit-I	
1	a	i) Describe the benefit and application of object oriented programing	[6M]
		ii) Explain about Class, Objects and Methods in Java with an example program	[6M]
		OR	
	b	i) Explain any five object oriented features supported by java with examples.	[6M]
		ii) What are the different type of Bitwise and Boolean logical operator in JAVA	[6M]
		Unit-II	
2	a	i) What is constructor? Explain the special properties constructor	[6M]
		ii) Explain the procedure to call super class members with an example.	[6M]
		OR	
	b	i) Discuss the various parameter passing methods in Java. Illustrate with examples	[6M]
		ii) What is the method ? Explain overloading method with a suitable JAVA program	[6M]
		Unit-III	
3	a	i) Write a java program to print factorial of numbers between 1 to n. (n is entered by keyboard).	[6M]
		ii) What is a thread? Describe the complete life cycle of thread with example.	[6M]
		OR	
	b	i) Discuss about thread priorities with an example	[6M]
		ii) Explain in detail the uses of the super keyword with an example program.	[6M]
		Unit-IV	
4	a	i) Read and display text file using classes in java.io package	[6M]
		ii) What is collection in Java? Differentiate between linked list and Array List.	[6M]
		OR	
	b	i) Write a JAVA program to show the use of Abstract class	[6M]
		ii) How to create a user defined exception? Explain with an example	[6M]
		Unit-V	
5	a	i) What is Applet ? What is the main difference between reloading and restarting an applet ?	[6M]
		ii) Create an applet which has a Text Field to accept a URL string, and displays the document of the URL string in a new browser window	[6M]
		OR	
	b	i) What is an event driven programming and how is it structured	[6M]
		ii) Write a JAVA program to create menu in AWT.	[6M]

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

Sub Code: 19BCI3TH04   MATHEMATICAL 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
1			**Unit-I**	
	a		i) Are (P→Q)→R and P→(Q→R) logically equivalent? Justify your answer by using truth table.	[4M]
			ii) Explain pdnf, pcnf with suitable examples.	[8M]
			OR	
	b		i) Show that the following statement is a tautology: [~P∧(P ∨ Q)] ∨ [P ∨ ~(P ∨ Q)]	[6M]
			ii) Show that (P→(Q→R))↔(P→Q)→(P→R).	[6M]
2			**Unit-II**	
	a		i) Verify the validity of the following argument "every living thing is a planet or an animal. Joe's gold fish is alive and it is not a planet. All animals have hearts. Therefore Joe's gold fish has a heart".	[6M]
			ii) If n is a positive integer, using mathematical induction prove that $1.2+2.3+3.4+\ldots\ldots\ldots+n(n+1)=\dfrac{n(n+1)(n+2)}{3}$	[6M]
			OR	
	b		i) Show that $(\exists)x\ P(x) \wedge (\exists)x\ Q(x)$ and $(\exists)x\ (P(x) \wedge Q(x))$ are not logically equivalent.	[6M]
			ii) Show that the following R→~Q, RVS, S→~Q, P→Q, ~P.	[6M]
3			**Unit-III**	
	a		i) Explain isomorphism of two graphs with suitable example	[6M]
			ii) Explain kruskal's algorithm to find minimal spanning tree of the graph with suitable example?	[6M]
			OR	
	b		i) Define Eulerian circuit and Hamiltonian circuit, give an example of graph that has neither an Eulerian circuit nor Hamiltonian circuit.	[6M]
			ii) Is there a Simple Graph with degrees 1,1,3,3,3,3,5,6,8,9? If so justify your answer.	[6M]
4			**Unit-IV**	

		i) Using generating function method solve the recurrence relation $a_n - 3a_{n-1} = n$, $n \geq 1$, given that $a_0 = 1$.	[6M]
4	a	ii) Solve the recurrence relation $a_n - 2a_{n-1} - 3a_{n-2} = 0$, $n \geq 2$ by the generating function method $a_0 = 3$, $a_1 = 1$.	[6M]
		OR	
	b	i) What is a Generating function and explain the operations on generating functions?	[6M]
		ii) Find all solutions of the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$	[6M]

		Unit-V	
5	a	i) Find the number of permutations of the letters of the word MASSASAUGA, • In how many of these, all four A's are together? • How many of these of them begin with S?	[6M]
		ii) Find the number of ways of giving 15 identical gift boxes to 6 persons A, B, C, D, E, F in such a way that the total number of boxes given to A nad B does not exceed 6.	[6M]
		OR	
	b	i) A women has 20 close relatives and she wishes to invite 7 of them to dinner. In how many ways she can invite them in the following situations: (*) Two particular persons will not attend separately. (*) Two particular persons will not attend together.	[6M]
		ii) How many arrangements are there of {8.a, 6.b, 7.c} in which each 'a' is on at least one side of another 'a'?	[6M]

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

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
1			**Unit-I**	
	a		i) Briefly explain 'Three state Bus buffer' with neat diagram. Assume a four line bus.	[6M]
			ii) Draw the logic table of a Full Adder and mention the logic equation for summation and output carry.	[6M]
			OR	
	b		i) Briefly explain the different components of a computer system with proper figure of their interconnection.	[6M]
			ii) Give the hardware implementation of 'Shift operation'.	[6M]
2			**Unit-II**	
	a		i)Explain the phases of an 'Instruction cycle'.	[6M]
			ii) Briefly explain 'Stored program Organization'	[6M]
			OR	
	b		i) Write short note on 'Instruction Code'.	[4M]
			ii) Briefly explain different types of 'Interrupts' occurring in a computer system.	[4M]
			iii) Mention any four 'Data Manipulation' instruction with example.	[4M]
3			**Unit-III**	
	a		i) What are the similarities and dissimilarities among 'Base Register addressing mode' & 'Index Register addressing mode' ?	[6M]
			ii) Differentiate between 'Subroutine' & 'Interrupt Service Routine'.	[6M]
			OR	
	b	i)	How 'Bit-ORing' helps in Micro program sequencer	[6M]

		ii) Represent the following instruction in both Zero address and One address instruction format. A = B*C(G-T)	[6M]
4		**Unit-IV**	
	a	i) In a two level cache system the access time of L1 & L2 caches are 1 & 8 clock cycles respectively. The miss penalty from the L2 cache to main memory is 18 clock cycles. The miss rate of L1 cache is twice that of L2. The average memory access time (AMAT) of this cache system is 2 cycles. Calculate the miss rate of L1 and L2.	[6M]
		ii) Perform Booth multiplication of the following. (-3) x (-2)	[6M]
		OR	
	b	i) Draw the hardware diagram of adder-subtractor unit which can be used both for addition and subtraction.	[6M]
		ii) Draw the memory hierarchy and state which one is the fastest among them in terms of memory access.	[6M]
5		**Unit-V**	
	a	i) Explain the DMA with different registers used during the process.	[6M]
		ii) Differentiate between 'Isolated' and 'Memory-mapped' I/O.	[6M]
		OR	
	b	i) Briefly explain about Daisy chaining in Interrupt handling.	[6M]
		ii) Write short note on 'Asynchronous data transfer'.	[6M]

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