

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

**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																
1	<b>Unit-I</b>																	
	a (i) Find a real root of the equation $x^3 - 5x + 1 = 0$ , using Bisection method correct to two decimal places.	[6M]																
	(ii) Find the root of the equation $x \log_{10}(x) = 1.2$ , using False position method	[6M]																
	<b>OR</b>																	
b	<p>By Newton's forward interpolation formula find the polynomial which takes the following values</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">x</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">2</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">8</td> <td style="padding: 2px;">10</td> <td style="padding: 2px;">12</td> </tr> <tr> <td style="padding: 2px;">f(x)</td> <td style="padding: 2px;">12</td> <td style="padding: 2px;">42</td> <td style="padding: 2px;">144</td> <td style="padding: 2px;">366</td> <td style="padding: 2px;">756</td> <td style="padding: 2px;">1362</td> <td style="padding: 2px;">2232</td> </tr> </table> <p>Either using Newton's backward formula or by Lagrange's formula find the value of <math>f(1)</math>. Analyse the answers that you get by direct substitution in the polynomial with the answer through Newton's backward formula or Lagrange formula.</p>	x	0	2	4	6	8	10	12	f(x)	12	42	144	366	756	1362	2232	[12M]
x	0	2	4	6	8	10	12											
f(x)	12	42	144	366	756	1362	2232											
2	<b>Unit-II</b>																	
	a Evaluate $y(2)$ from $\frac{dy}{dx} = \frac{2y}{x}$ , $y(1) = 2$ , using $h = 0.25$ by (i) Euler's method; and (ii) Heun's method (modified Euler's method) Also compare the answers of (i) and (ii) with the analytical solution.	[12M]																
	<b>OR</b>																	
	b (i) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ using Simpson's (3/8) <sup>th</sup> rule.	[6M]																
(ii) Determine $\int_0^{\frac{\pi}{2}} \cos x dx$ , by Trapezoidal rule using 4 subintervals.	[6M]																	
3	<b>Unit-III</b>																	
	a Determine the inverse Laplace transform of $\ln \left[ \frac{s^2 + a^2}{(s+b)^2} \right]$ .	[6M]																
	Solve the following differential equation $y'' + 2y' + 5y = e^{-t} \sin t$ , $y(0) = 0$ , $y'(0) = 1$ by Laplace transform.	[6M]																

		OR	
	b	(i) Find $L\{te^{3t} \sin 2t\}$	[6M]
	b	(ii) Find $L\left\{\frac{\cos 4t \cdot \sin 2t}{t}\right\}$	[6M]
Unit-IV			
4	a	(i) Find the Fourier series for the function defined by $f(x) = \begin{cases} -1, & \text{for } -\pi < x < 0 \\ 0, & \text{for } x = 0 \\ 1, & \text{for } 0 < x < \pi \end{cases}$	[6M]
		Using the same, prove that $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots = \frac{\pi}{4}$ .	
		(ii) Demonstrate the half range sine series for $f(x) = x \cos x$ , in $(0, \pi)$ .	[6M]
OR			
	b	(i) Obtain the Fourier series expansion of $f(x)$ given that $f(x) = (\pi - x)^2$ in $(0, 2\pi)$ .	[6M]
	b	(ii) Expand the function $f(x) = x^2$ as a Fourier series in $[-\pi, \pi]$ .	[6M]
Unit-V			
5	a	(i) Using Fourier integral, show that $e^{-x} \cos x = \frac{2}{\pi} \int_0^{\infty} \frac{\lambda^2 + 2}{\lambda^4 + 4} \cos \lambda x \cdot d\lambda$	[6M]
	a	(ii) If $F(p)$ is the complex Fourier transform of $f(x)$ , then the complex Fourier transform of $f(x-a)$ is $e^{ipa} F(p)$	[6M]
	OR		
	b	(i) Given $F[e^{-x^2}] = \sqrt{\pi} e^{-s^2/4}$ , predict the Fourier transform of (a) $e^{-x^2/3}$ (b) $e^{-4(x-3)^2}$	[6M]
		(ii) Apply Convolution theorem to show $\int_0^{\infty} \frac{t^2}{(4+t^2)(t^2+9)} dt = \frac{\pi}{10}$ .	[6M]

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

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
1	Unit-I	
	a	i) Explain the role of importance of geology in civil engineering. [6M]
		ii) Explain the process of Weathering in Granite [6M]
	OR	
	b	i) What are the Branches of Geology? Explain. [6M]
		ii) What are the types of Rivers? Explain the geological work of RIVERS [6M]
2	Unit-II	
	a	What are the physical, chemical and biological factors of weathering and explain? [12M]
	OR	
	b	i) Write the physical properties of QUARTZ group of minerals. [4M]
		ii) Write the importance of different physical properties in mineral identification. [4M]
	iii) Write about Igneous rocks textures and structures. [4M]	
3	Unit-III	
	a	i) Draw the types of folds and give their mechanism with sketches. [6M]
		ii) Enumerate the unconformity its types, mechanism and their importance in civil engineering. [6M]
	OR	
	b	i) Classify and describe the different types of faults in rocks and explain how they are recognized in the field? [6M]
	ii) What are the parts of joints and give their classification [6M]	
4	Unit-IV	
	a	i) Define focus and epicenter of earthquake? Explain the classification and causes of earthquakes. [6M]
		ii) Write the physical property, principle, parameters and equipments in Gravity methods. [6M]
	OR	
	b	i) Explain the classification of Landslides. [6M]
	ii) Describe the seismic wave refraction method for two layer case with horizontal interface. [6M]	
5	Unit-V	
	a	i) What is tunnel? Explain its types, what are their advantages. [6M]
		ii) Geological considerations in the selection of a dam site. [6M]
	OR	
	b	i) Explain the influence of rock types for successful construction of dams. [6M]
	ii) Discuss geological considerations for a successful reservoir site [6M]	

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

**Sub Code: 19BCE3TH04**

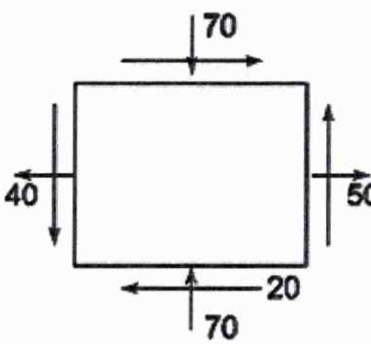
**MECHANICS OF SOLIDS**

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	<p>a</p> <p>A compound tube consists of a steel tube 150mm internal diameter and 10 mm thickness and an outer brass tube 170 mm internal diameter and 10mm thickness. The two tubes are of same length. The compound tube carries an axial load of 1000 kN. Find the stresses and load carrying by each tube and the amount it shortens. Length of tube is 150 mm. Take <math>E_s = 2 \times 10^5 \text{ N/mm}^2</math> and <math>E_c = 1 \times 10^5 \text{ N/mm}^2</math>.</p>	[12M]
	OR	
	<p>b</p> <p>A reinforced concrete column 50 cm x 50 cm in section is reinforced with 4 steel bars of 2.5 cm diameter, one in each corner. The column is carrying a load of 2000 kN. Find the stresses in the concrete and steel bars. Take modulus of elasticity of steel and concrete as <math>2.1 \times 10^5 \text{ N/mm}^2</math> and <math>1.4 \times 10^4 \text{ N/mm}^2</math> respectively.</p>	[12M]
Unit-II		
2	<p>a</p> <p>Find the major and minor principal stresses and planes on which they act for the plane stress system shown in figure. Show the stress and planes on a neat sketch using Mohr's circle.</p> <div style="text-align: center;">  </div>	[12M]
	OR	
	<p>b</p> <p>At a point in a beam the normal stress along the length is <math>80 \text{ N/mm}^2</math>. The shear stress at that point is positive of magnitude <math>35 \text{ N/mm}^2</math>. Find the stresses on a plane whose normal is inclined at <math>30^\circ</math> to the longitudinal axis. Also find the principal stresses and planes on which they act.</p>	[12M]
Unit-III		
3	<p>a</p> <p>A fixed beam has a span of 8 m and carries a uniformly distributed load of 40 kN/m over the whole length and a point load of 64 kN at 3 m from the left support. Find the fixed end moments and the reactions at the supports. Draw the shear force and bending moment diagrams for the beam.</p>	[12M]

	OR		
	b	<p>A simply supported beam of length 10 m carries the UDL and two-point loads as shown in figure. Draw the shear force and bending moment diagrams for the beam.</p>	[12M]
	Unit-IV		
4	a	<p>i) A rectangular beam of size 100 mm x 200 mm is used as a beam of span 5 m. The beam is loaded by a concentrated load at the center at <math>30^\circ</math> to the vertical. Find the maximum value of the concentrated load, if the maximum bending stress is not to exceed 10 Mpa.</p>	[8M]
		<p>ii) Write the assumptions of Euler's theory.</p>	[4M]
	OR		
	b	<p>A simply supported beam of span 10 m is 350 mm deep. The section of the beam is symmetrical. The moment of inertia of the section is <math>9.5 \times 10^7 \text{ mm}^4</math>. If the permissible bending stress is <math>120 \text{ N/mm}^2</math>. Find the UDL that can be applied at the centre of the span. Neglect the dead load of the beam.</p>	[8M]
		<p>ii) Write the assumptions in theory of pure bending.</p>	[4M]
	Unit-V		
5	a	<p>A thin cylindrical shell 3 m long has 1m internal diameter and 15 mm metal thickness. Calculate the hoop and longitudinal stresses induced and also the change in the dimensions of the shell, if it is subjected to an internal pressure of <math>1.5 \text{ N/mm}^2</math>. Take <math>E = 2 \times 10^5 \text{ N/mm}^2</math> and poisson's ratio = 0.3. Also calculate change in volume.</p>	[12M]
		OR	
	b	<p>A closed cylindrical vessel made of steel plates 4 mm thick with plane ends, carries fluid under pressure of <math>3 \text{ N/mm}^2</math>. The diameter and length of the cylinder is 25 cm and 75 cm respectively. Calculate the longitudinal and hoop stresses in the cylinder wall and determine the change in diameter, length and Volume of the cylinder. Take <math>E = 2.1 \times 10^5 \text{ N/mm}^2</math> and <math>1/m = 0.286</math>.</p>	[12M]

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

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														
1	Unit-I															
	a	<p>i) Discuss the different sources of error in chain surveying. [4M]</p> <p>ii) An embankment is to be formed with its center line on the ground sloping upwards at 1 in 20. If the formation width is 12 m and if the formation heights at the beginning, middle and end of the embankment are 6 m, 4.5 m and 3 m respectively at intervals of 30 m and the side slope is 2 in 1. Find the volume of earthwork by Simson's rule. [8M]</p>														
	OR															
	b	<p>i) Explain the methods of ranging. [4M]</p> <p>ii) An embankment is to be formed with its center line on the ground sloping upwards at 1 in 20. If the formation width is 12 m and if the formation heights at the beginning, middle and end of the embankment are 6 m, 4.5 m and 3 m respectively at intervals of 30 m and the side slope is 2 in 1. Find the volume of earthwork by Trapezoidal rule. [8M]</p>														
	Unit-II															
	a	<p>Following are the observed magnetic bearings of the traverse legs:</p> <table style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 15%;">Line</th> <th style="width: 20%;">PQ</th> <th style="width: 20%;">QR</th> <th style="width: 20%;">RS</th> <th style="width: 25%;">SP</th> </tr> </thead> <tbody> <tr> <td>FB</td> <td style="text-align: center;">74° 20'</td> <td style="text-align: center;">107° 20'</td> <td style="text-align: center;">224° 50'</td> <td style="text-align: center;">200° 15'</td> </tr> <tr> <td>BB</td> <td style="text-align: center;">256° 00'</td> <td style="text-align: center;">286° 20'</td> <td style="text-align: center;">44° 50'</td> <td style="text-align: center;">126° 00'</td> </tr> </tbody> </table> <p>At what stations local attraction is suspected? Determine the correct bearings of the traverse legs and also calculate the included angles. [12M]</p>	Line	PQ	QR	RS	SP	FB	74° 20'	107° 20'	224° 50'	200° 15'	BB	256° 00'	286° 20'	44° 50'
Line	PQ	QR	RS	SP												
FB	74° 20'	107° 20'	224° 50'	200° 15'												
BB	256° 00'	286° 20'	44° 50'	126° 00'												
OR																
b	<p>The magnetic bearing of a line was found to be N 60° 30' W in 1992, when the declination was 5° 10' E. Find its present magnetic bearing, if declination is 3° W. [6M]</p> <p>The bearing taken for two lines are as follows:</p> <table style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 15%;">Line</th> <th style="width: 40%;">Fore Bearing</th> <th style="width: 45%;">Back Bearing</th> </tr> </thead> <tbody> <tr> <td>AB</td> <td style="text-align: center;">S 37° 30' E</td> <td style="text-align: center;">322° 30' (WCB)</td> </tr> <tr> <td>BC</td> <td style="text-align: center;">223° 15' (WCB)</td> <td style="text-align: center;">N 44° 15' E</td> </tr> </tbody> </table> <p>Compute the interior angle at B. [6M]</p>	Line	Fore Bearing	Back Bearing	AB	S 37° 30' E	322° 30' (WCB)	BC	223° 15' (WCB)	N 44° 15' E						
Line	Fore Bearing	Back Bearing														
AB	S 37° 30' E	322° 30' (WCB)														
BC	223° 15' (WCB)	N 44° 15' E														



Unit-III			
3	a	Following consecutive readings were taken with a level along a sloping ground line AB at a regular distance of 20 m by using 4m leveling staff as 0.352, 0.787, 1.832, 2.956, 3.758, 0.953, 1.766, 2.738, 3.872, 0.812, 2.325 and 3.137. The RL of point A is 320.288 m. Rule out a page of field book apply usual check and calculate the reduced levels of points. Also calculate the gradient of line AB.	[12M]
	OR		
	b	i) What are the corrections and precautions to be taken in leveling work? Explain them in detail.	[8M]
		ii) Write the characteristics and uses of contours.	[4M]
Unit-IV			
4	a	A theodolite was set up at a distance of 180 m from a light house and the angle of elevation to its top and depression to its base were observed as $22^{\circ} 45'$ and $1^{\circ} 12'$ respectively. The reading on a staff held on BM on RL 175.590 m was 1.85 m with line of collimation horizontal. Calculate the (i) height of light house (ii) RL of top.	[12M]
	OR		
	b	i) Describe the temporary and permanent adjustments of a theodolite.	[6M]
		ii) Explain the types of curves with neat sketches.	[6M]
Unit-V			
5	a	i) What is plane table surveying? When is it preferred? Write the advantages and disadvantages of plane table surveying.	[6M]
		ii) Illustrate the different operation involved in temporary adjustment of plane table surveying.	[6M]
	OR		
	b	i) Elucidate the errors in plane table surveying.	[6M]
		ii) Describe the "two-point problem" in plane table surveying with neat sketch.	[6M]

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

**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) What are rock forming minerals? Explain the cornice and corbel in stone masonry work with sketches. [6M]
		ii) State the general qualities of brick as ISI and also discuss the general principles in Brick Masonry Construction? [6M]
	OR	
	b	i) What are the different types of tiles and List out the characteristics of a good tile? [6M]
	ii) Enumerate the properties and uses of Gypsum and Bitumen. [6M]	
Unit-II		
2	a	i) Explain the classification of wood used in buildings in detail? [6M]
		ii) Explain about Galvanized Iron, Fiber – Reinforced Plastics [6M]
	OR	
	b	i) What do you understand by natural seasoning of wood? [4M]
		ii) Distinguish English bond and Flemish bond. [4M]
	iii) Discuss about alternative materials for wood [4M]	
Unit-III		
3	a	i) List out the constituents of limestone. Explain the importance of each [6M]
		ii) Describe in detail how lime is manufactured? [6M]
	OR	
	b	i) What are the various laboratory tests for cement? [6M]
	ii) Explain any two laboratory test for cement? [6M]	
Unit-IV		
4	a	i) Explain with a neat sketch about king post truss. [6M]
		ii) Define a neat roof and mention its advantages & disadvantages over pitched roofs. [6M]
	OR	
	b	i) List out the various types of foundations in construction industry? Explain them briefly? [6M]
	ii) Classify various types of lintels and discuss their relative use. [6M]	
Unit-V		
5	a	i) Explain pointing and plastering [6M]
		ii) List out the damp proofing and water proofing materials in construction and explain each in brief manner? [6M]
	OR	
	b	i) Discuss the requirement of good paint. [6M]
	ii) What is the function, use of form work and scaffolding in building construction? [6M]	

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

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	
1	Unit-I		
	a	i) Draw the cross section of the generator and explain about the generation of three phase voltages? [6M] ii) Three impedances of each $(5.7+j11.4)$ ohms, connected in star are connected to a 210V, 3 phase 50Hz supply. Determine the line currents? [6M]	
	OR		
	b	i) Draw the equivalent circuit and analyze the three phase three wire supply connected to balanced delta connected load with relevant expressions? [6M] ii) Each phase of a balanced three phase delta connected load has a 0.43 Henry inductor in series with a parallel combination of 7.2 micro farad capacitor and 101 ohms resistor. If a 3 phase voltage of 186V at a frequency of 412 rad/sec is applied to this load, find the phase current, line current and the total power absorbed by the load? [6M]	
	2	Unit-II	
		a	Analyze the un balanced star connected load supplied from a 3 phase balanced 3 wire supply by using loop current and node voltage methods? [12M]
OR			
b		i) Explain the procedure of 3 phase power measurement by using two single phase watt meters? Also draw the circuit diagram? [6M] ii) Analyze the equivalent circuit of 3 phase 4 wire supply connected to the un balanced star connected load? [6M]	
3	Unit-III		
	a	i) Derive and analyze the steady state response of RL series circuit with DC input voltage? [6M] ii) Describe the procedure for transient response analysis by using differential equation method? [6M]	
	OR		
	b	i) Derive and analyze the steady state response of RC series circuit with AC input voltage? [6M] ii) Describe the procedure for transient response analysis by using Laplace transform method? [6M]	
	4	Unit-IV	
		a	i) Derive and analyze the relation between admittance and impedance parameters of a 2 port network? [6M] ii) Present the detailed procedure to derive the transmission parameters of a 2 port network? [6M]
OR			
b		i) Derive and analyze the relation between inverse hybrid and impedance parameters of a 2 port network? [6M] ii) Obtain the equivalent two port network from the cascaded connection of two 2 port networks? [6M]	

Unit-V			
5	a	i) A proto type high pass filter has a cut off frequency of 8.5kHz and nominal impedance of 6.4 ohms. Determine the values of inductance and capacitance used in the filter?	[6M]
		ii) Describe the nature of characteristic impedance in pass and stop bands of the filters with necessary equations?	[6M]
	OR		
	b	i) Compare the characteristic features and design aspects of low pass and band pass filters?	[6M]
ii) A 'T' section low pass filter has an inductance of 32 mH in each of the series arms and a shunt arm capacitance of 0.22 micro farads. Find the cut off frequency, characteristic impedance, ratio of input and output voltages and phase shift at 1.2kHz and 5.6kHz?		[6M]	

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# NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

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

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
1	Unit-I	
	a	i) By using the core and armature diagram, analyze the energy conversion through magnetic field? [6M]
		ii) Compare the total flux linkages verses current characteristics for linear and non linear relationships? [6M]
	OR	
	b	i) Draw the characteristics and prove that co-energy is the complementary of field energy? [6M]
		ii) a 6 pole lap wound armature rotated at 320 r.p.m is required to generate 246V. The useful flux per pole is 0.03 wb. If the armature has 124 slots find the number of conductors per slot and hence calculate the actual value of the flux required to generate the same voltage for wave wound? [6M]
2	Unit-II	
	a	Analyze the demagnetization, cross magnetization effect and suggest the corrective measures to counter act the armature reaction in DC machines? [12M]
	OR	
	b	i) List out and justify the constant losses and variable losses in a DC machine? [6M]
	ii) A 16kW, 240V, DC shunt generator has armature and field resistances of 0.02 ohms and 189 ohms respectively. Find the total armature power developed when it is working as generator delivering 15kW and as motor taking 15kW input? [6M]	
3	Unit-III	
	a	i) Draw the circuit diagram and explain the objectives and outcomes of separation of losses test on DC machines? [6M]
		ii) It is desired to reduce the speed of 440V, 11HP, shunt motor by 25% by insertion of a resistance in the armature circuit. The torque is to remain unchanged. If the full load efficiency is 87%, find the necessary resistance? The field current as constant at 1.2A and the armature resistance is 0.2 ohms? [6M]
	OR	
	b	i) Draw the circuit diagram and explain the objectives and outcomes of retardation test on DC machines? [6M]
		ii) Compare the characteristic features and design aspects of 3 point and 4 point starters used to start DC motor? [6M]
4	Unit-IV	
	a	i) Analyze the lagging load effect on the regulation of a transformer by drawing the phasor diagram? [6M]
		ii) Explain in detail about the parallel operation of transformers having equal voltage ratios? [6M]

	OR	
	i) Analyze the leading load effect on the regulation of a transformer by drawing the phasor diagram?	[6M]
	ii) The primary and secondary voltages of an auto transformer are 200V and 145V respectively. Find the current in the different parts of the winding when the load current is 92A. Also calculate the saving of the copper material?	[6M]
	Unit-V	
5	i) Draw the vector diagram and explain the properties of three phase star-delta connected transformer?	[6M]
	ii) With neat diagram describe the OFF load tap changer and write its drawbacks?	[6M]
	OR	
	i) Draw the vector diagram and explain the properties of three phase delta-star connected transformer?	[6M]
	ii) With neat diagram describe the ON load tap changer and write its drawbacks?	[6M]

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

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	
1	Unit-I		
	a	i) Derive an expression for electric field intensity due to a charge distribution along the surface. [8M] ii) Derive relation between electric field intensity and potential gradient. [4M]	
	OR		
	b	i) Define electric dipole and dipole moment. [4M] ii) Derive an expression for energy density and energy stored in an electrostatic field. [8M]	
	2	Unit-II	
		a	State Gauss's law and explain the applications of Gauss's law for symmetrical electrostatic fields. [12M]
OR			
b		i) What is the difference between conduction current density and convection current density. [4M] ii) what are the boundary conditions considered at an interface separated by two different dielectric media. [8M]	
3	Unit-III		
	a	i) State and explain Ampere's circuital law. [6M] ii) Derive expression for magnetic field intensity due to a current carrying rectangular loop. [6M]	
	OR		
	b	i) Prove that $\text{Div}(\mathbf{B})=0$ . [4M] ii) Explain the properties of Scalar and Vector magnetic potentials. [8M]	
4	Unit-IV		
	a	i) Derive torque expression for current carrying loop placed in magnetic field. [6M] ii) Derive Lorentz force equation. [6M]	
	OR		
	b	i) Derive self inductance of a solenoid. [6M] ii) Derive expression for force between two current elements. [6M]	
5	Unit-V		
	a	i) Define Displacement current and skin effect. [6M] ii) Explain about Static and dynamic induced emfs. [6M]	
	OR		
	b	State and prove Poynting theorem [12M]	

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

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
<b>Unit-I</b>		
1	a i) A vertical tie, fixed rigidly at the top end consist of a steel rod 2.5 m long and 20 mm diameter encased throughout in a brass tube 20 mm internal diameter and 30 mm external diameter. The rod and the casing are fixed together at both ends. The compound rod is loaded in tension by a force of 10 kN. Calculate the maximum stress in steel and brass. Take $E_s=2 \times 10^5 \text{N/mm}^2$ and $E_b=1 \times 10^5 \text{N/mm}^2$ .	[8M]
	ii) Draw stress strain diagram for ductile materials and indicate all salient features on it.	[4M]
	<b>OR</b>	
	b i) What is proof resilience and modulus of resilience. ii) Derive the formula for elongation of uniformly tapered circular cross section bar under axial load. Also deduce the relation for strain energy stored in the bar.	[8M]
<b>Unit-II</b>		
2	a Draw the B. M. D and S. F.D <div style="text-align: center; margin-top: 10px;"> </div>	[12M]
	b A simply supported beam of length 6m is loaded with gradually varying load of 0KN/m from left support 750KN/m to right support. Draw the shear force and bending moment diagrams for the beam.	[12M]
<b>Unit-III</b>		
3	a i) A simply supported symmetric I-section has flanges of size 200 mm X 15 mm and its overall depth is 520 mm. Thickness of web is 10mm. It is strengthened with a plate of size 250 mm X 12mm on compression side. Find the moment of resistance of the section if permissible stress is 160 MPa. How much uniformly distributed load it can carry if it is used as a cantilever of span 3.6m.	[6M]



	ii) A simply supported beam of 2m span carries a U.D.L. of 140 kN/m over the whole span. The cross section of the beam is T-section with a flange width of 120mm, web and flange thickness of 20mm and overall depth of 160mm. Determine the maximum shear stress in the beam and draw the shear stress distribution for the section	[6M]
<b>OR</b>		
b	A steel beam of I – section, 200mm deep and 160mm wide has 16 mm thick flanges and 10mm thick web. The beam is subjected to a shear force of 200 KN. Determine the shear stress distribution over the beam section if the web of the beam is kept horizontal.	[6M]
<b>Unit-IV</b>		
a	A simply supported beam of 8m carries a partial u d l of intensity 5KN/m and length 2m, starting from 2m from the left end. Find slope at left support and central deflection. Take $E = 200\text{Gpa}$ and $I = 8 \times 10^8 \text{mm}^4$	[12M]
<b>OR</b>		
b	A simply supported beam of span 6m carries two point loads of 60KN and 50KN at 1m and 3m respectively from the left end. Find the position and magnitude of max. deflection. Take $E = 200\text{ GPa}$ and $I = 8500\text{cm}^4$ . Also determine the value of deflection at the same point if one more load of 60KN is placed over the left support.	[12M]
<b>Unit-V</b>		
a	i) A solid shaft of 200mm diameter has the same cross sectional area as a hollow shaft of the same material with inside diameter of 150mm. Find the ratio of powers transmitted by both the shafts at the same angular velocity.	[6M]
	ii) Derive the expression for circumferential stress for a thin cylinder.	[6M]
<b>OR</b>		
b	A shell 3.25m long and 1m diameter is subjected to an internal pressure of 1.2 N/mm <sup>2</sup> . If the thickness to the shell is 10mm, find the circumferential and longitudinal stresses. Find also the maximum shear stress and changes in dimensions of the shell. Take $E = 200\text{ kN/mm}^2$ , poisson's ratio=0.3.	[12M]

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

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																			
1	Unit-I																				
	a i) Find a negative root of the equation $2x^3 + x^2 - 20x + 12 = 0$ by bisection method, correct upto three decimal places.	[6M]																			
	ii) Find the root of $x^3 + x - 1 = 0$ by iteration method, given that root lies near 1.	[6M]																			
	OR																				
	b i) Find the positive real root of the equation $\cos(x) = xe^x$ using Regula falsi method, correct to three decimal places.	[6M]																			
	ii) Obtain iterative formula for $\sqrt[k]{N}$ using Newton-Raphson method. Hence, find the $\sqrt[3]{24}$ correct to four decimal places.	[6M]																			
2	Unit-II																				
	i) Show that $1 + \frac{\delta^2}{2} = \sqrt{1 + \delta^2 \mu^2}$ Where $\delta$ and $\mu$ are central difference operator and averaging operator, respectively.	[6M]																			
	ii) Show that $n$ th differences of the $n$ th degree are constant and all higher order differences are zero.	[6M]																			
	OR																				
	b i) In the table below, the values of $y$ are consecutive terms of a series of which 23.6 is the 6 <sup>th</sup> term. Find the first and tenth terms of the series:	[6M]																			
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 2px;">x:</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">8</td> <td style="padding: 2px;">9</td> </tr> <tr> <td style="padding: 2px;">y:</td> <td style="padding: 2px;">4.8</td> <td style="padding: 2px;">8.4</td> <td style="padding: 2px;">14.5</td> <td style="padding: 2px;">23.6</td> <td style="padding: 2px;">36.2</td> <td style="padding: 2px;">52.8</td> <td style="padding: 2px;">73.9</td> </tr> </table>	x:	3	4	5	6	7	8	9	y:	4.8	8.4	14.5	23.6	36.2	52.8	73.9				
x:	3	4	5	6	7	8	9														
y:	4.8	8.4	14.5	23.6	36.2	52.8	73.9														
ii) A curve passes through the point (0, 18), (1, 10), (3, -18) and (6, 90). Find the slope of the curve at $x=2$ .	[6M]																				
3	Unit-III																				
	a i) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. Find the initial acceleration using entire data.	[6M]																			
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 2px;">time t (seconds)</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">10</td> <td style="padding: 2px;">15</td> <td style="padding: 2px;">20</td> </tr> <tr> <td style="padding: 2px;">velocity v (m/s)</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">14</td> <td style="padding: 2px;">69</td> <td style="padding: 2px;">228</td> </tr> </table>	time t (seconds)	0	5	10	15	20	velocity v (m/s)	0	3	14	69	228								
	time t (seconds)	0	5	10	15	20															
	velocity v (m/s)	0	3	14	69	228															
	ii) Apply Runge-Kutta fourth order method to find approximate value of $y$ for $x=0.2$ , in steps of 0.1, if $\frac{dy}{dx} = \frac{y^2 - 2x}{y^2 + x}$ , given that $y=1$ when $x=0$ .	[6M]																			
OR																					
b i) Compute the value of $\int_{0.2}^{1.4} (\sin(x) - \log(x) + e^x) dx$ using Simpson's $\frac{1}{3}$ th rule	[6M]																				
ii) The velocity $v$ of a particle at distance $s$ from a point on its linear path is given by the following table:	[6M]																				
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 2px;">s(m)</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">2.5</td> <td style="padding: 2px;">5.0</td> <td style="padding: 2px;">7.5</td> <td style="padding: 2px;">10</td> <td style="padding: 2px;">12.5</td> <td style="padding: 2px;">15.0</td> <td style="padding: 2px;">17.5</td> <td style="padding: 2px;">20.0</td> </tr> <tr> <td style="padding: 2px;">v(m/s)</td> <td style="padding: 2px;">16</td> <td style="padding: 2px;">19</td> <td style="padding: 2px;">21</td> <td style="padding: 2px;">22</td> <td style="padding: 2px;">20</td> <td style="padding: 2px;">17</td> <td style="padding: 2px;">13</td> <td style="padding: 2px;">11</td> <td style="padding: 2px;">9</td> </tr> </table>	s(m)	0	2.5	5.0	7.5	10	12.5	15.0	17.5	20.0	v(m/s)	16	19	21	22	20	17	13	11	9	
s(m)	0	2.5	5.0	7.5	10	12.5	15.0	17.5	20.0												
v(m/s)	16	19	21	22	20	17	13	11	9												



		Estimate the time taken by the particle to traverse the distance of 20 meters using Simpson's $\frac{3}{8}$ th rule	
		Unit-IV	
4	a	i) Prove that the function $f(z)$ defined by $f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, z \neq 0, f(0) = 0$ is continuous and the Cauchy-Riemann equations are satisfied at the origin, yet $f'(0)$ does not exist.	[6M]
		ii) Find the analytic function, whose real part is $\frac{\sin 2x}{\cosh 2y - \cos 2x}$ .	[6M]
	OR		
	b	i) Show that $z^n$ is analytic. Hence find its derivative.	[6M]
ii) If $f(z)$ is analytic function, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)  f(z) ^2 = 4  f'(z) ^2$		[6M]	
		Unit-V	
5	a	i) Verify Cauchy's theorem for the integral of $z^3$ taken over the boundary of the triangle with vertices (1,2),(1,4),(3,2)	[6M]
		ii) If $\phi(\zeta) = \oint_C \frac{3z^2 + 7z + 1}{z - \zeta} dz$ , where $C$ is the circle $ z  = 2$ . Find the values of $\phi(3), \phi'(1-i)$ , and $\phi''(1-i)$ .	[6M]
	OR		
	b	i) Find the Laurent's expansion of $f(z) = \frac{7z-2}{(z+1)z(z-2)}$ in the region $1 < z+1 < 3$ .	[6M]
ii) Evaluate $\int_0^{2\pi} \frac{\cos 3\theta}{5 - 4\cos\theta} d\theta$ .		[6M]	

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

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)

No		Questions	Marks
		<b>Unit-I</b>	
1	a	i) Calculate the resistivity of silicon if donor type of impurity is added to the extent of 1 atom per $10^8$ silicon atom, at 300k and assume $\mu_n = 1300\text{cm}^2/\text{V-sec}$ .	[6M]
		ii) Explain the formation of depletion region in a PN junction.	[6M]
	<b>OR</b>		
	b	i) Derive the expression for the conductivity of extrinsic n type and p type semiconductor.	[6M]
ii) A P-N junction silicon diode has a reverse saturation current of 50nA at room temperature 27k. If the new reverse saturation current is observed to be 160nA, calculate the value of new temperature.		[6M]	
		<b>Unit-II</b>	
2	a	Explain the working of Tunnel diode and Zener diode and its V-I characteristics. And what is the sufficient condition for tunnelling.	[12M]
		<b>OR</b>	
	b	i) Derive the expression for ripple for the circuit FWR with inductor filter.	[4M]
		ii) Give the list of different filters used in rectifier and their merits and demerits.	[4M]
		iii) Describe the principal of operation of an LCD.	[4M]
		<b>Unit-III</b>	
3	a	i) Explain input and output characteristics of a transistor in CB configuration.	[6M]
		ii) Compare the performance of BJT as an amplifier in CE, CB, CC configuration	[6M]
	<b>OR</b>		
	b	i) Determine $I_c$ , $I_E$ and $\alpha$ for a transistor circuit having $I_B = 15\mu\text{A}$ and $\beta = 150$ .	[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]	
		<b>Unit-IV</b>	
4	a	i) Explain the collector to base bias method along with circuit diagram and derive the stability factor for it.	[6M]
		ii) In a silicon transistor with a fixed bias, $V_{cc} = 9\text{V}$ , $R_c = 3\text{k}\Omega$ , $R_B = 8\text{k}\Omega$ , $\beta = 50$ , $V_{BE} = 0.7\text{V}$ . Find the operating point and stability factor.	[6M]
	<b>OR</b>		
	b	i) What is thermal runaway? Derive relevant expressions to obtain thermal stability.	[6M]
ii) What is Biasing? Explain the need of it. List out different types of biasing methods.		[6M]	

5		i) With the help of neat diagram explain the voltage divider biasing method for FET	[6M]
	a	ii) Define the following	[6M]
		a) Drain Resistance	
		b) Amplification factor	
		c) Transconductance	
d) Pinch-off voltage			
OR			
		i) Explain the construction and working of Enhancement MOSFET	[6M]
b		ii) A certain JFET operates in the linear region with a constant drain voltage of 1V. When the gate voltage is 2V, a drain current of 10mA flows, but when gate voltage is changed to 1V, the drain current becomes 22.8mA. Find (a) the pinch-off voltage (b) the channel resistance for zero gate voltage	[6M]

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# NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

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

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
1	<b>Unit-I</b>	
	a i) Define and sketch the following signals: Signum Function, Impulse function, and Unit step function	[6M]
	ii) Write the properties of Impulse function.	[6M]
	<b>OR</b>	
	i) Explain time reversal and time shifting operations by taking one example.	[6M]
	b ii) Determine whether the signal is an energy signal or power signal. $x(t) = e^{-at}u(t)$ ; $a > 0$	[6M]
2	<b>Unit-II</b>	
	a Find the Exponential Fourier Series of X(t) considering the waveform in periodic in nature.	[12M]
	<b>OR</b>	
	i) What are the differences between Fourier series Analysis and Fourier Transforms?	[4M]
	ii) What are the Dirichlet's conditions?	[5M]
b	iii) Write the trigonometric Fourier series representation of periodic signal with fundamental period T0	[3M]
3	<b>Unit-III</b>	
	a i) State and prove Parseval's theorem.	[6M]
	ii) Find the Fourier transform of signum function.	[6M]
	<b>OR</b>	
	i) State and prove the time-convolution property of Fourier transform.	[6M]
b	ii) Obtain the Fourier transform of the following signal $X(t) = A \cdot \sin(\omega_0 t) u(t)$	[6M]

Unit-IV		
4	a	i) State and prove the initial-value and final value theorem of Laplace transform. [6M]
		ii) Determine z-transform, ROC and pole-zero locations of $x[n]=e^{j\omega_0 n} \cdot u(n)$ [6M]
	OR	
	b	i) Find the inverse Laplace transform of the following signal. $X(S) = \frac{s+2}{(s+3) \cdot (s+4)}$ [6M]
	ii) Explain different properties of ROC of Z-transform. [6M]	
Unit-V		
5	a	i) Explain whether the following system is a) time variant or invariant and b) causal or non-causal $X(t) = \cos^3(t) \cdot u(t)$ [6M]
		ii) Define Nyquist Rate and Explain about flat-top sampling. [6M]
	OR	
	b	i) When does aliasing occur? What is anti-aliasing filter? [6M]
	ii) Prove sampling theorem for band limited signals. [6M]	

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

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) Explain Various IOT Protocols? [6M] ii) what are various functional Blocks of IOT-Explain? [6M]
	OR	
	b	i) Explain how cloud computing and big data analytics technologies enabled in IOT? [6M] ii) What are the IOT level 1 to level 6 explain? [6M]
	Unit-II	
2	a	Explain how agriculture adopted IOT Technology? Explain smart irrigation system and green house control systems? [12M]
	OR	
	b	i) explain the smart intrusion detection system in home automation process? [4M] ii) Design and explain various components and functionalities of "Shipment monitoring" system? [4M] iii) Explain " smart Indoor Air quality Monitoring" system? [4M]
	Unit-III	
3	a	i) Differentiate between IOT and M2M? [6M] ii) what is network function virtualization? Explain its functionalities? [6M]
	OR	
	b	i) Describe briefly how SDN can be used for various levels of IOT? [6M] ii) Explain the block diagram of M2M gateway? [6M]
	Unit-IV	
4	a	i) Explain SNMP-Simple network management protocol? [6M] ii) Explain various network operator requirements? [6M]
	OR	
	b	i) Explain IOT system management with NETCONF-YANG? [6M] ii) Explain the role of a YANG server? [6M]
	Unit-V	
5	a	i) what is IOT Device? Explain about Exemplary devices? [6M] ii) Explain How Raspberry Pi works on Linux environment? [6M]
	OR	
	b	i) Explain about "Django" python web application frame work [6M] ii) Describe about Restful web API [6M]

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

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
<b>Unit-I</b>		
1	a i) Define Data Structure? Explain various types of data structure?	[6M]
	a ii) Define Recursion? What are the two main components of recursion? Explain with an example pseudo code?	[6M]
	OR	
	b i) Explain different types of recursion with suitable examples?	[6M]
	b ii) Define ADT? Explain its significance and advantages?	[6M]
<b>Unit-II</b>		
2	a i) Write an algorithm for Binary Search? Apply the binary search to find key=25 in the given list 10,20,25,30,35,40,45?	[6M]
	a ii) Illustrate the process of Merge Sort for the given list of elements 7,3,2,16,24,4,11,9?	[6M]
	OR	
	b i) Mention the primary differences between Internal Sorting and External Sorting Techniques? Apply the Insertion Sort on the given list 8,4,6,3,1,9,10,2.	[6M]
	b ii) Write an algorithm for Linear Search? Apply the linear search to find key=20 in the given list 10,20,5,35,15,25,30. Mention the best, average and worst case time complexities of this algorithm?	[6M]
<b>Unit-III</b>		
3	a i) Define Stack? Explain various operations performed on Stack with your own examples?	[6M]
	a ii) Explain the difference between Array representation and Linked representation of Queue with suitable examples?	[6M]
	OR	
	b i) Explain how the given infix expression $A+(B*C)/(E-F)$ can be converted to postfix expression by using stack?	[6M]
	b ii) Define Queue? Explain various operations performed on Queue with examples?	[6M]
<b>Unit-IV</b>		
4	a i) Identify the differences between an Array and Linked List? Explain Linked List ADT?	[6M]
	a ii) Explain various operations performed on Circular Linked List?	[6M]
	OR	
	b i) Is double linked list efficient than single linked list? Justify your answer with example?	[6M]
	b ii) List out various advantages, disadvantages and applications of Linked List?	[6M]
<b>Unit-V</b>		
5	a i) Define Tree data structure? Explain different tree traversal techniques with suitable examples?	[6M]
	a ii) Define Graph? Explain various graph representation techniques with examples?	[6M]
	OR	
	b i) Consider given <b>Inorder Traversal: D B E A F C</b> and <b>Preorder Traversal: A B D E C F</b> . Construct a binary tree by using the given Traversals?	[6M]
	b ii) Explain various Graph Traversal Techniques with suitable examples?	[6M]



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

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
1	Unit-I	
	a	i) Explain HTML heading tags with suitable example. <span style="float: right;">[6M]</span> ii) Write HTML5 and JavaScript code to draw Arc, Circle, Rectangle and Triangle using Canvas. <span style="float: right;">[6M]</span>
	OR	
	b	i) Explain about the following terms with examples (i) Unordered Lists (ii)ordered lists. <span style="float: right;">[6M]</span> ii) Explain the table tags of HTML with suitable example. <span style="float: right;">[6M]</span>
	Unit-II	
2	a	Explain in brief about the different types of CSS with example. <span style="float: right;">[12M]</span>
	OR	
	b	i) Write CSS code that defines five classes of paragraph with different background, color, margins, padding and border style. <span style="float: right;">[6M]</span> ii) Discuss about CSS Box Model with neat diagram. <span style="float: right;">[6M]</span>
3	Unit-III	
	a	Explain control statements in JavaScript with example. <span style="float: right;">[12M]</span>
	OR	
b	i) Write a JavaScript code to change a background color using buttons <span style="float: right;">[6M]</span> ii) Write JavaScript to display whether given number prime or not <span style="float: right;">[6M]</span>	
4	Unit-IV	
	a	i) What is JQuery? List the features of JQuery. <span style="float: right;">[6M]</span> ii) Explain about i)Use on()    ii ) off()    iii) trigger() <span style="float: right;">[6M]</span>
	OR	
	b	i) Discuss about MouseEvents with example. <span style="float: right;">[6M]</span> ii) Explain about i) each( ) ii ) find ( ) iii) is( ) <span style="float: right;">[6M]</span>
5	Unit-V	
	a	i) Explain about selectable( ) in jQuery UI. <span style="float: right;">[6M]</span> ii) Write jQuery code to demonstrate Accordion and Date Picker. <span style="float: right;">[6M]</span>
	OR	
b	How to create a drag and drop feature for reordering the images using HTML CSS and jQueryUI. <span style="float: right;">[12M]</span>	

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

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
<b>Unit-I</b>		
1	i) What is an array? How do you declare the array in java? Give examples.	[6M]
	a ii) What is garbage collection? Illustrate the use of finalize () method for garbage collection with an example.	[6M]
	OR	
	b i) What is polymorphism? Explain different types of polymorphisms with examples.	[6M]
	ii) Explain different parts of a Java program with an appropriate example.	[6M]
<b>Unit-II</b>		
2	a i) What is a method? Explain method overloading with a relevant java program.	[6M]
	ii) Describe the process of defining and creating a package with suitable examples.	[6M]
	OR	
	b i) How to design and implement an interface in Java? Give an example.	[6M]
	ii) Explain in detail the uses of the super keyword with an example program.	[6M]
<b>Unit-III</b>		
3	a i) How many ways are possible in java to create multiple threaded programs? Discuss the differences between them with suitable examples.	[6M]
	ii) What is exception handling? Explain an example of exception handling in the case of division by zero.	[6M]
	OR	
	b i) Write a program that creates two threads. First thread prints the numbers from 1 to 100 and the other thread prints the numbers from 100 to 1.	[6M]
	ii) Differentiate between Checked and Unchecked Exceptions with examples	[6M]
<b>Unit-IV</b>		
4	a i) What are the methods available in the Character Streams? Discuss.	[6M]
	ii) What is the difference between ArrayList and LinkedList in collection framework? Explain	[6M]
	OR	
	b i) What is Java Collections Framework? List out some benefits of Collections framework and explain.	[6M]
	ii) Distinguish between Byte Stream Classes and Character Stream Classes.	[6M]
<b>Unit-V</b>		
5	a i) Write an applet code to demonstrate parameter passing to applet.	[6M]
	ii) List and explain the event classes and Listener Interfaces.	[6M]
	OR	
	b i) Write the step wise procedure to create and run an applet.	[6M]
	ii) Differentiate between a Checkbox and a Radio Button with necessary constructors and methods.	[6M]



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

Sub Code: 19BCI3TH05

DATA STRUCTURES

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) Define Data Structure? How Data Structure varies from Data Type? Represent the classification of Data Structures?	[6M]
		ii) Define Algorithm? Explain the main approaches to design an algorithm?	[6M]
	OR		
	b	i) What do you mean by an algorithm analysis? How efficiency of an algorithm is assessed? Explain?	[6M]
		ii) Define ADT? Explain its significance and advantages?	[6M]
2	Unit-II		
	a	i) Write an algorithm for Binary Search? Apply Binary Search to find key=50 in the given list 10,20,30,40,50,60,70? Mention its best, average and worst case time complexities?	[6M]
		ii) Apply the Quick Sort to sort the given list 75,26,15,67,85,54,31,49 in ascending order? Mention its best, average and worst case time complexities?	[6M]
	OR		
	b	i) Write an Algorithm for Linear Search? Analyze its performance?	[6M]
		ii) Illustrate Heap Sort algorithm to sort the given list 4,3,7,1,8,5.	[6M]
3	Unit-III		
	a	i) Define Hashing? Discuss various types of Hashing Methods?	[6M]
		ii) Explain with example how a double linked list is efficient than Single Linked List?	[6M]
	OR		
	b	i) What do you mean by collision in hashing? Summarize various Collision resolution techniques?	[6M]
		ii) Explain various operations performed on Circular Linked List with examples?	[6M]
4	Unit-IV		
	a	i) Define Stack? Explain various operations performed on Stack with examples?	[6M]
		ii) Identify the primary difference between Binary Tree and Binary Search Tree? Construct a BST from given list of elements 6,5,9,10,11,13,4,3,7,12?	[6M]
	OR		
	b	i) Define Queue ADT? Explain various operations performed on Queue with examples?	[6M]
		ii) Consider the given Tree Traversals <b>Inorder: D B E A F C</b> and <b>Preorder: A B D E C F</b> . Construct Binary Tree from the given Traversals?	[6M]
5	Unit-V		
	a	i) Define Heap? Explain various operations performed on Heap with suitable examples?	[6M]
		ii) Define Graph? Explain various graph representation techniques with suitable examples?	[6M]

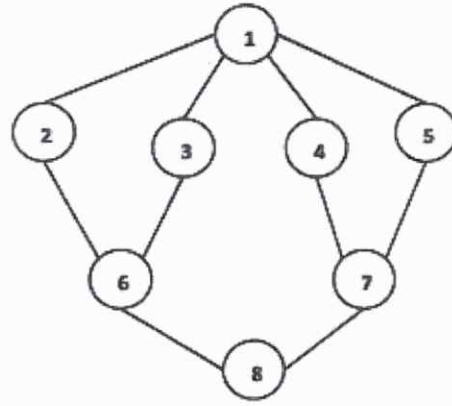
OR

i) Why do we need Heap? Explain different types of Heap? List out the applications of Heap?

[6M]

ii) Illustrate BFS and DFS traversals for the given graph G.

b



**Graph G**

[6M]

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

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) Explain the functional units of computer with neat sketch	[6M]
		ii) What is Register Transfer language? Discuss about the Register transfer with symbols and examples	[6M]
	OR		
	b	i) Explain the various arithmetic micro operations	[6M]
		ii) Compare and Contrast 4 – bit Binary adder and Binary Adder - Subtractor	[6M]
2	Unit-II		
	a	Explain the phases of instruction cycle with flowchart.	[12M]
	OR		
	b	i) Write short note on i) BUN ii) BSA iii) ISZ	[6M]
ii) Discuss about instruction set completeness		[6M]	
3	Unit-III		
	a	i) Explain the design of micro programmed control unit in detail	[6M]
		ii) Differentiate between hardwired and micro programmed computers	[6M]
	OR		
b	i) Explain various instruction formats based on the number of address fields used in the instruction format with an example.	[6M]	
	ii) Compare and contrast CISC and RISC characteristics	[6M]	
4	Unit-IV		
	a	i) What is auxiliary memory? Explain the various memory components used as auxiliary memory in computer systems.	[6M]
		ii) What is the difference between Associative Mapping and Direct Mapping? Explain the advantages and disadvantages	[6M]
	OR		
b	i) Multiple $(-7)_{10}$ with $(3)_{10}$ by using Booth's multiplication. Give the flow table of the multiplication	[12M]	
5	Unit-V		
	a	i) Compare and Contrast Isolated vs memory mapped I/O	[6M]
		ii) What is handshaking? Discuss with neat diagrams	[6M]
	OR		
b	i) How the data transfer to and from peripherals is done? Discuss with neat diagrams and examples	[12M]	



