USN | N | V | 2 | 3 | K | 1 | 0 | | | |

NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

I Sem B. Tech (CBCS) Mid Semester Examinations - I, September 2023

PH1004-1 – QUANTUM COMPUTING AND MODERN PHYSICS

Duration: 1 Hour

Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

			Marks	BT*	CO*	PO*
		Unit – I				
1.	a)	Write any three differences between classical computing and quantum computing.	3	L*2	1	1
	b)	What is a Linear Vector Space? Explain its Axioms.	4	L2	1	1
	c)	Show that, $A = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} & \frac{-i}{\sqrt{2}} \end{bmatrix}$ is unitary.	3	L3	1	1
2.	a)	Outline the different postulates of Quantum mechanics.	3	L2	1	1
	b)	Explain Dirac notation with its properties.	4	L2	1	1
	c)	If $\|\psi\rangle = A[2\|0\rangle + 3i\|1\rangle]$, then find $\langle\psi\|\psi\rangle$.	3	L3	1	1
		Unit – II				
3.	a)	Explain the terms Orthogonality, Orthonormality and Normalization.	3	L1	1	1
	b)	What are Pauli matrices?Explain the interaction of Pauli matrices on 0 and 1 states.	4	L2	1	1
	c)	If $\|\alpha\rangle = \begin{pmatrix} a \\ b \end{pmatrix}$ and $\|\beta\rangle = \begin{pmatrix} c \\ d \end{pmatrix}$ then prove that $\langle\alpha\|\beta\rangle = (\langle\beta\|\alpha\rangle)^*$	3	L3	1	1
4.	a)	Explain the interaction of Identity matrix on 0 and 1 states.	3	L2	1	1
	b)	What are qubits? Write any four properties of qubits.	4	L2	1	1
	c)	If $\|\psi\rangle = \begin{bmatrix} 3+i \\ 1-i \end{bmatrix}$ and $\|\varphi\rangle = \begin{bmatrix} 3i \\ 4 \end{bmatrix}$ Find their inner product.	3	L3	1	1

BT* Bloom's Taxonomy, L* Level;CO* Course Outcome; PO* Program Outcome

****

USN | | | | | | | | | | |

NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

I Sem B.Tech. (CBCS) Mid Semester Examinations - I, September 2022

Duration: 1 Hour

MA1002-1 – CALCULUS AND DIFFERENTIAL EQUATIONS

Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

			Marks	BT*	CO*	PO*
		Unit – I				
1.	a)	Derive the expression for the radius of curvature in the Cartesian form.	5	L*1	1	1
	b)	Show that, the angle at the point of intersection of the curves $r = 3\cos\theta$ and $r = 1 + \cos\theta$ is $\frac{\pi}{6}$.	5	L2	1	2
2.	a)	Obtain the series expansion of $f(x) = \frac{1}{1+x}$ up to third degree terms.	5	L3	1	2
	b)	Find the derivative of arc, $\frac{ds}{dt}$ for the curve $x = e^t \sin t, y = e^t \cos t$.	5	L2	1	2
		Unit – II				
3.	a)	Verify Lagrange's mean value theorem for $f(x) = x(x-1)(x-2)$ in $\left(0, \frac{1}{2}\right)$.	4	L3	1	2
	b)	i)If $z = f(x,y), x = e^u \cos v, y = e^u \sin v$ then prove that $x\frac{\partial z}{\partial v} + y\frac{\partial z}{\partial u} = e^{2u}\frac{\partial z}{\partial y}$				
		ii) If $u = \sin\left(\frac{x}{y}\right)$ where $x = e^t, y = t^2$ then find $\frac{du}{dt}$ as a function of t.	6	L2	2	2
4.	a)	If $u = x^2 - y^2, v = 2xy$ and $x = r\cos\theta, y = r\sin\theta$ then show that $\frac{\partial(u,v)}{\partial(r,\theta)} = 4r^3$.	5	L3	2	2
	b)	Find Taylor's expansion of $f(x,y) = \tan^{-1}\left(\frac{y}{x}\right)$ about the point (1,1) up to second degree terms.	5	L3	2	2

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

****

USN | | | | | | | | | | |

NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

I Sem B.Tech. (CBCS) Mid Semester Examinations - I, September 2022

CS1001-1 – PROBLEM SOLVING THROUGH PROGRAMMING

Duration: 1 Hour

Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

		Marks	BT*	CO*	PO*
	Unit – I				
1. a)	Describe the various steps involved in program development with a neat diagram.	5	L*2	1	1
b)	Define the following terms i. Algorithm ii. Flowchart and write an algorithm and flowchart for computing Sum and Average of Three numbers.	5	L3	1	1
2. a)	Explain classification of Computers.	5	L2	1	1
b)	Define C token. List and explain any 4 rules for forming Identifiers with relevant examples.	5	L2	1	1
	Unit – II				
3. a)	Define Type Conversion in C. Explain its types with suitable examples.	5	L2	2	1
b)	Solve the following expressions i) a/b <= c-d+a%10-b = = d >=e !=b where a=100,b=20,c=10,d=5,e=1 ii) - - a*(5+b)/12- c++ *b+15%4 where a=3,b=4, c=5	5	L3	2	1
4. a)	Explain the following unformatted input and output function with syntax, code snippets and the output. i) gets( ) ii) putchar( )	5	L2	2	1
b)	Write a C program to find the Volume of Cylinder. Formula: $V=\pi r^2 h$	5	L3	2	1

T* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

****

USN | | | | | | | | | |

NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

II Sem B.Tech. (CBCS) Mid Semester Examinations - I, February 2023

CS1001-1 – PROBLEM SOLVING THROUGH PROGRAMMING

ration: 1 Hour Max.

*Note: Answer any **One** full question from **each Unit.***

		Marks	BT*	C
	Unit – I			
a)	List and explain the types of computers based on their capacity.	5	L*2	
b)	Write an algorithm and flowchart to find the area and circumference of a circle.	5	L3	
a)	Define the following with an example: i. Token ii. Datatype iii. Keyword iv. Identifier v. constant	5	L2	
b)	Write a C program to swap two integers without using temporary variable.	5	L3	
a)	Explain any five Bitwise operators with an example for each.	5	L2	
b)	Write a C program to find maximum and minimum of three numbers using ternary operator.	5	L3	
a)	Explain the following formatted input and output function with syntax and example. i. scanf ii. printf	5	L2	
b)	Evaluate the following expressions: i) a+2>b || !c && a==d * a-2<=e where a=11, b=6,c=0,d=7,e=5 ii) m= i++ + j++ + ++k where i=5, j=5,k=6	5	L3	

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

****

USN

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(Off-Campus Centre of Nitte (Deemed to be University))

I Sem B.Tech. (CBCS) Mid Semester Examinations - I, September 2022

MA1002-1– CALCULUS AND DIFFERENTIAL EQUATIONS

uration: 1 Hour

Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

			Marks	BT*	CO*	PO*
		Unit – I				
1.	a)	With usual notation prove that $\tan\phi = r\frac{d\theta}{dr}$.	5	L*1	1	1
	b)	Show that the radius of curvature of the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ at the point $\left(\frac{a}{4}, \frac{a}{4}\right)$ is $\frac{a}{\sqrt{2}}$.	5	L2	1	2
2.	a)	Find the series expansion of the function $\log(1+x)$ up to 3 non vanishing terms.	5	L2	1	2
	b)	Show that the curves $r^2 \sin 2\theta = a^2$ and $r^2 \cos 2\theta = b^2$ cut each other orthogonally.	5	L3	1	2
		Unit – II				
3.	a)	Verify Cauchy's mean value theorem for $f(x) - \frac{x^3}{4} - 4x$, $g(x) = x^2$ in (0, 3).	4	L3	1	2
	b)	i) If $u = f(e^{y-z}, e^{z-x}, e^{x-y})$ then prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$.	6	L2	2	2
		ii) If $u = x^3 y e^z$ where $x = t, y = t^2, z = \log t$ then find $\frac{du}{dt}$.				
	a)	If $u = 2axy$, $v = a(x^2 - y^2)$ and $x - r\cos\theta, y - r\sin\theta$ then find $\frac{\partial(u,v)}{\partial(r,\theta)}$.	5	L3	2	2
	b)	Find Taylor's expansion of $f(x,y) - e^x \cos y$ about the point $\left(1, \frac{\pi}{4}\right)$ up to second degree terms.	5	L3	2	2

oom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

****

USN | | | | | | | | | | |

NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

I Sem B.Tech. (CBCS) Mid Semester Examinations - I, September 2022

HU1001-1 – TECHNICAL ENGLISH

uration: 1 Hours

Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

		Marks	BT*	CO*	PO*
	Unit – I				
a)	Transcribe the words into IPA and Mark the Primary Stress (I-V) and transcribe the words in IPA into English (VI-X). i) Educate ii) Democracy iii) Maintain iv) Sing v) Zero vi) /weɪt/ vii) /vɔɪs/ viii) /ˈʌŋkl/ xi) /fiːld/ x) /riːd/	05	L*3	1	12
b)	Discuss Word Stress. State any three rules to substantiate.	05	L2	1	12
a)	Transcribe the plural forms of words (I-V) and past tense forms of words (VI-X) into IPA. i) Keep ii) Dog iii) Prize iv) Book v) Brush vi) Amaze vii) Divide viii) Hunt xi) Try x) Love	05	L3	1	12
b)	List the differences between British and American accent of English Language.	05	L1	1	12
	Unit – II				
a)	Is Spoken Communication different from Written Communication?	05	L1	2	9,11
b)	Discuss the term Communication.	05	L2	2	9,11
a)	Explain the essentials of effective communication.	05	L2	2	9,11
b)	Describe some of the barriers to communication.	05	L2	2	9,11

loom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

****