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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. Semester - II****Course Name: Introduction to IT Verticals****Course Code: CST123**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all.

(10×2=20)

a.	What was the intended objective for creating blockchain? a. Research project b. Peer-to-peer electronic cash system c. Open-source network for connecting banks d. None of the above	CO2	PO1, PO2, PO3
b.	The _____ uses these services pay-as-you-go model. a) Cloud providers b) Clients c) End users d) Cloud users	CO2	PO1, PO2, PO3
c.	What is the first step of a blockchain project? a. Planning and specification of requirements b. Feasibility study c. Definition of project goals d. Design of user interface	CO5	PO4 PO3
d.	Which of the following is not a cybercrime? a) Denial of Service b) Man in the Middle c) Malware d) AES	CO5	PO4 PO5
e.	Which of the following is a component of cyber security? a) Internet Of Things b) AI c) Database d) Attacks	CO5	PO4 PO5
f.	Which of the following is a type of cyber attack? a) Phishing b) SQL Injections c) Password Attack d) All of the above	CO4	PO4 PO5
g.	Which of the following is not an advantage of cyber security? a) Makes the system slower b) Minimizes computer freezing and crashes c) Gives privacy to users d) Protects system against viruses	CO2	PO2 PO3
h.	Which of the following is not a type of cloud? a) Private b) Public c) Protected d) Hybrid	CO5	PO4 PO5
i.	In this type of cloud, an organization rents cloud services from cloud providers on-demand basis. a) Private b) Public c) Protected d) Hybrid	CO1	PO1 PO2
j.	In this type of cloud, the cloud is composed of multiple internal or external cloud. a) Private b) Public c) Protected d) Hybrid	CO5	PO4 PO5

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

a.	What is open source?	CO2	PO1, PO2, PO3
b.	Why cyber security important?	CO3	PO3 PO4
c.	What is Deep Learning?	CO5	PO4 PO3
d.	What is IoT?	CO5	PO4 PO5
e.	What is Block chain?	CO5	PO4 PO5
f.	What is Dev Ops?	CO4	PO4 PO5
g.	What is big data?	CO2	PO2 PO3

(3×10=30)

Q.3. Structured Question (Attempt any three out of four)

a.	(i). Define Bit coin and mention two operations performed in Bit coin (ii) Describe various functional blocks of IoT. (iii) What is "Artificial Intelligence and Artificial Intelligence Technique"?	CO5	PO4 PO5
b.	(i) Identify any two advantages of distributed computing. (ii) Define crypto currency and give some examples. (iii) Explain SaaS.	CO5	PO4 PO5
c.	(i) Identify the major players involved in cloud computing. (ii) Describe digital signature. (iii) Demonstrate the need of private cloud.	CO4	PO4 PO5
d.	(i) Analyze the challenges in architectural design of cloud (ii) List out the advantages of Crypto currencies. (iii) Name the essential characteristics of cloud computing.	CO2	PO2 PO3

(2×15=30)

Q.4. Long Answer / Essay type (Attempt any two out of three)

a.	(i) Bring out the differences between private cloud and public cloud. (ii) Differentiate centralized and distributed network	CO5	PO4 PO5
b.	(i) Illustrate the evolutionary trend towards distributed and cloud computing. (ii) Briefly explain how AI Technique can be represented and list out some of the task domain of AI.	CO4	PO4 PO5
c.	(i) Interpret the cloud resource pooling. (ii) Describe the characteristics of IoT	CO2	PO2 PO3

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. Semester - II****Course Name: Digital Electronics****Course Code: CST124**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objective Type: Very short answer questions. Attempt all.**(10 x 2 = 20)**

a.	Convert the following number to Octal: $(425)_6$	C.O. – 01
b.	Convert $(378)_{10}$ to binary, then convert it from binary to octal.	C.O. – 01
c.	What is Stuck-at-1 fault?	C.O. – 04
d.	What are the different ways to reduce a Boolean expression?	C.O. – 02
e.	List the truth table of the function: $F = C + A'B'$	C.O. – 02
f.	$A = 10110011$ and $B = 11101100$, find the eight-bit result XNOR operation.	C.O. – 02
g.	Write the truth table of the S-R flip-flop.	C.O. – 04
h.	Define Moore machine.	C.O. – 03
i.	How many states will be there in Johnson & Ripple counters?	C.O. – 04
j.	What is the difference between a glitch and a hazard?	C.O. – 03

Q.2. Short Answer Type: Attempt any Five out of seven.**(5 x 4 = 20)**

a.	What is Half-Adder? Draw its function table and logic diagram.	C.O. – 02
b.	What is PLD? Write about the three types of PLDs.	C.O. – 05
c.	What is a PLA programming table? Give an example.	C.O. – 05
d.	Write the design procedure of combinational circuits.	C.O. – 02
e.	What is Truth Table? Give an example.	C.O. – 02
f.	What is a Characteristic Equation? Give two examples.	C.O. – 03
g.	What is the difference between combinational and sequential circuits?	C.O. – 02

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Q.3. Structured Questions: Attempt any Three out of four.

(3 x 10 = 30)

a.	i. Define Hazard? Explain the different types of Hazards with example.	C.O. – 04
	ii. Realize a Full-subtractor using 4x1 MUX.	C.O. – 02
b.	Define the following terms and give two examples for each of them: a) Minterm b) Maxterm c) Canonical form d) Standard form e) Prime Implicant	C.O. – 02
c.	Write the Truth and Excitation tables for:	C.O. - 04
	a) J-K flip-flop and b) Delay or Data flip-flop.	
d.	An 8 x 1 multiplexer has the data inputs I_0 through I_7 are as follows: $I_1 = I_2 = I_7 = 0$; $I_3 = I_5 = 1$; $I_0 = I_4 = I_6 = D'$. Determine the Boolean function that the multiplexer implements.	C.O. - 02

Q.4. Long Answer: (Attempt any Two out of Three.)

(2 x 15 = 30)

a.	i. Write all the Huntington Postulates.	C.O. – 02
	ii. Realize Ex-OR & NAND using a minimum number of NAND and NOR gates	C.O. – 02
b.	Simplify the following Boolean Expressions using K-MAPs & Tabular method.	C.O. – 03
	a) $F(x, y, z) = \sum M(1, 3, 5, 9)$ b) $F(w, x, y, z) = \prod M(0, 2, 4, 5, 6, 8, 12, 13, 14)$	
c.	i. Draw the internal logic diagram of the 3x8 line Encoder.	P.O. – 01
	ii. Simplify the following boolean expression using K-Map and verify using Tabulation method then implement using conventional logic gates. $F(x, y, z) = \sum M(1, 3, 7, 11, 15) + \sum d(0, 2, 5)$	C.O. - 03

END SEMESTER EXAMINATION, JUNE- 2025
B. Tech. Semester - II

Course Name: Human Values & Professional Ethics**Course Code: HST121****Time allotted: 03 Hours****Note: Read all the instructions carefully.****Max. Marks: 100****Q.1. Objectives Type****(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all.****(10×2=20)**

a.	What is meant by unconditional care?	PO-6,8,12 CO-1
b.	What is emotional empathy?	PO-6,8,12 CO-1
c.	Name one form of love.	PO-6,8,12 CO-1
d.	What is a value crisis?	PO-6,8,12 CO-2
e.	How does honesty build trust?	PO-6,8,12 CO-3
f.	Name any two social values that are declining.	PO-6,8,12 CO-1
g.	What is meant by Niyama?	PO-6,8,12 CO-2
h.	How the concept of "Sanyam" in ensuring health?	PO-6,8,12 CO-3
i.	What does the Code of Ethics promote in a workplace?	PO-6,8,12 CO-4
j.	What is intellectual property in computer ethics?	PO-6,8,12 CO-4

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)**(5×4=20)**

a.	Mention any three values essential in human relationships.	PO-6,8,12 CO-1
b.	How does education improve individual understanding?	PO-6,8,12 CO-1
c.	How does the weakening of the family system contribute to value erosion?	PO-6,8,12 CO-3
d.	What is the difference between "Animal Consciousness" and "Human Consciousness"?	PO-6,8,12 CO-3
e.	How can the right understanding and relationships enhance happiness and prosperity?	PO-6,8,12 CO-3
f.	Why are social values important in community life?	PO-6,8,12 CO-2
g.	How does computer ethics relate to cybercrime?	PO-6,8,12 CO-4

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Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

a.	i.	How does value education shape individual behavior?	PO-6,8,12
	ii.	How does it contribute to maintaining social relationships?	CO-1
	iii.	How can value education help in reducing conflicts?	CO-1
b.	i.	What is meant by societal value crisis?	PO-6,8,12
	ii.	Discuss how increasing crime, dishonesty, and corruption reflect a societal value crisis.	CO-2
	iii.	What strategies can restore societal harmony and values?	CO-2
c.	i.	What is the essence of Ahimsa, Satya, and Aparigraha?	PO-6,8,12
	ii.	How do these Yamas influence our interaction with others?	CO-2
	iii.	How can these principles be used to reduce social conflict?	CO-2
d.	i.	Discuss the role of a Code of Ethics in the workplace.	PO-6,8,12
	ii.	How does a Code of Ethics ensure professionalism?	CO-4
	iii.	Give examples where unethical practices harmed reputation.	CO-4

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

a.	i.	What is self-exploration?	PO-6,8,12
	ii.	What are the two levels of verification (Natural acceptance and experiential validation.) in value education?	CO-2
b.	i.	What is the meaning of comprehensive human goals in value education?	PO-6,8,12
	ii.	What is meant by prosperity in value-based living?	CO-3
c.	i.	Define computer ethics.	PO-6,8,12
	ii.	Explain the concept of privacy in computer ethics.	CO- 4

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. Semester - II****Course Name: Software Engineering****Course Code: CST121****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Attempt all.****(10×2=20)**

a.	Give the importance of software engineering.	CO1	PO1
b.	What are the roles of testing tools?	CO4	PO2
c.	What is static and dynamic testing?	CO4	PO2
d.	What is cohesion?	CO3	PO2
e.	What is role of SRS?	CO2	PO2
f.	What is software risks?	CO5	PO4
g.	What do you understand by CMMI?	CO1	PO1
h.	What are the important categories of software?	CO1	PO1
i.	What is design process?	CO3	PO1
j.	What do you understand by UML?	CO3	PO4

Q.2. Attempt any five out of Seven.**(5×4=20)**

a.	Write a short note on software measurement	CO5	PO2
b.	Explain the phases in a typical SDLC process briefly.	CO1	PO1
c.	What is coupling? Explain its types.	CO3	PO1
d.	Explain requirement validation.	CO2	PO1
e.	Distinguish between alpha and beta testing?	CO4	PO2
f.	Explain waterfall model for software life cycle and discuss various activities in each phase	CO1	PO2
g.	Discuss about the 3 golden rules of performing user interface design.	CO3	PO1

Q.3. Attempt any three out of four.**(3×10=30)**

a.	Explain the Following (i)Context Model (ii)Data Model (iii)Object Model	CO2	PO2
b.	Explain the following (i)Unit Testing (ii) Integration Testing (iii)System Testing	CO4	PO3
c.	EXPALIN THE FOLLOWING (i)Software Risk (ii) Risk Projection (iii) Risk Refinement	CO5	PO4
d.	What is requirement engineering process? Explain requirement elicitation and analysis. Explain requirement management.	CO2	PO1

Q.4. Attempt any two out of three.**(2×15=30)**

a.	(i)Differentiate between white box and black box testing. (ii) Discuss about regression testing in detail.	CO4	PO3
b.	(i)Describe the Capability Maturity Model Integration (CMMI) framework for software process improvement. (ii) Explain the Spiral model of software development in detail.	CO1	PO2
c.	(i)Explain software requirement specification in detail. (ii) Explain the functional and non-functional requirements of software?	CO1	PO2

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END SEMESTER EXAMINATION, JUNE- 2025**B. Tech. Semester - II****Course Name: Object Oriented Programming Using C++ Course Code: CST122**

Time allotted: 03 Hours

Note: Read all the instructions carefully.

Max. Marks: 100

Q.1. Attempt all.

		(10×2=20)	
QN	Questions	CO	PO
a.	What do you mean by aggregation?	3	1
b.	Name the operator which cannot be overloaded.	3	1
c.	Differentiate base class and derived class?	2	1
d.	Virtual function is used to achieve _____ polymorphism.	3	1
e.	Function overloading and operator overloading are used to achieve _____ polymorphism.	3	1
f.	What do you mean by generalization?	1	1
g.	Explain the term association.	1	1
h.	Write the syntax to declare an array in C++?	1	1
i.	What do you mean by composition?	3	1
j.	Differentiate abstract class and concrete class?	2	1

Q.2. Attempt any five out of Seven.

(5×4=20)

a.	Explain the concept of garbage collection in C+ with a suitable example.	2	1,2,5
b.	Explain all access specifiers used in C++ with proper syntax or example.	3	1,2
c.	Show the use of abstract class using a suitable program.	3	1,2,5
d.	Differentiate constructor and destructor in C++.	2	1,2
e.	Write a program in C++ to check whether a given number is palindrome number or not.	1	1,2,4,5
f.	Write a program to show the use of constructor overloading?	2	1,2,5
g.	What do you mean by file handling? Explain all the modes used in files. How can we open a file in C++?	4	1,2

Q.3. Attempt any three out of four.

(3×10=30)

a.	i. Explain the role of friend function in C++? Write its rule and program. ii. What do you mean by random access to files? Explain predefined functions that are used for that purpose.	3,4	1,2,3,5
b.	Differentiate virtual function and pure virtual function in detail.	3	1,2
c.	Write a program of hybrid inheritance in C++ using virtual keyword.	2,3	1,2,5
d.	Write a program in C++ to implement the class template and function template to show the use of generic programming.	3,4	1,2,4,5

Q.4. Attempt any two out of three.

(2×15=30)

a.	i. What do you mean by dynamic memory allocation? Explain the use of new and delete operator with suitable example. Also compare it with static memory allocation. ii. What do you mean by garbage Collection? Explain.	2	1,2,3,4,5
b.	i. What do you mean by OOP? Explain all the properties of OOP. ii. What do you mean by inheritance? Explain all its types. Also write a program of single inheritance.	1,2,3	1,2,4,5
c.	What do you mean by exception? How can we handle an exception in C++? Write a program in C++ to handle an exception using try and catch block.	4	1,2,4,5

END SEMESTER EXAMINATION, JUNE- 2025

B. Tech. Semester – II

Course Name: Mathematics II

Course Code: BST121

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type (Very short/MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10 X 2=20)

Ser	Question	CO	PO
a.	A non-homogenous system of equations is inconsistent if	1	1
b.	Define a nilpotent matrix.	1	12
c.	Define the dimension of a finite dimensional vector space.	2	1
d.	Let $T : U \rightarrow V$ be a linear transformation and $\dim(U) = \dim(V) = p$. If null space of T is the zero subspace then T maps linearly independent vectors of U into the linearly independent vectors of V . (True/False)	3	2
e.	A square matrix A of order four has three linearly independent vectors then it diagonalizable. (True/False)	3	2
f.	If two eigenvalues of matrix A are 3 and 15 then value of determinant of $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$.	3	2
g.	Find the normalized vector for the vector $u = (-1, 3, 4)$.	4	1
h.	Under what condition Newton-Raphson iterative method fails.	5	1
i.	Write the formula for Trapezoidal rule.	5	1
j.	The n^{th} difference of a polynomial of the n^{th} degree are constant. (True/False)	5	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven) (5 X 4=20)

a.	Let V be a vector space of all polynomials. Determine whether the subset W consisting of all polynomials of degree less than equal to n is a subspace of V .	2	2										
b.	Solve the following system of equations by applying elementary row operations $\begin{aligned} x - y + 2z &= 3 \\ x + 2y + 3z &= 5 \\ 3x - 4y - 5z &= -13. \end{aligned}$	1	2										
c.	Find the inverse of the matrix $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ by applying elementary row operations.	1	1										
d.	Check whether the following subset S of V_4 is linearly dependent $S = \{(0, 1, 2, 1), (1, 2, -1, 1), (2, -3, 1, 0), (4, -2, -7, -5)\}$	2	2										
e.	If $y = x^3 + x^2 - 2x + 1$, calculate the value of y for $x = 0, 1, 2, 3, 4, 5$ and form the difference table.	5	1										
f.	Find the cubic polynomial which takes the following values <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>$f(x)$</td><td>1</td><td>2</td><td>1</td><td>10</td></tr></table>	x	0	1	2	3	$f(x)$	1	2	1	10	5	1
x	0	1	2	3									
$f(x)$	1	2	1	10									
g.	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Simpson 1/3 rule with $h = 1/4$.	5	2										

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Q.3. Structured Question (Attempt any three out of four)**(3 X 10=30)**

a.	Verify Cayley-Hamilton theorem for the following matrix and hence find the inverse of the matrix $A = \begin{bmatrix} 2 & -3 \\ 7 & -4 \end{bmatrix}$	3	2
b.	(i) Let $S = (x^3, x^2 + 2x, x^2 + 2, 1 - x)$. Determine whether the polynomial $2x^3 + 3x^2 + 3x + 7$ is in $[S]$. (5)	2	2
	(ii) Extend the set $\{(2, -1, 3)\}$ to form the basis of V_3 . (5)	2	2
c.	(i) Apply Gram-Schmidt process to the vectors $\{(1, 1, 1), (0, 1, 1), (0, 0, 1)\}$ of V_3 to obtain an orthonormal basis for V_3 . (8)	4	2
	(ii) Define algebraic and geometric multiplicity of eigenvalues. (2)	3	1
d.	(i) Using Runge-Kutta method find $y(0.1)$ given that $\frac{dy}{dx} = y - x, y(0) = 2$. Take $h = 0.1$. (5)	5	2
	(ii) Find a root of the equation $e^x - 4x = 0$ using Newton-Raphson method correct up to three places of decimals. (5)		

Q.4. Long Answer / Essay type (Attempt any two out of three)**(2 X 15=30)**

a.	(i) Find the model matrix P which diagonalizes the following matrix A and hence diagonalize the matrix A $A=\begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}.$ (ii) In a vector space V show that for all $u \in V, 0 u = 0$.	3	2																
b.	(i) Show that the linear transformation $T:V_3 \rightarrow V_3$ defined below is neither one-one nor $T(e_1) = e_1 - e_2, T(e_2) = e_3 + 2e_2, T(e_3) = e_1 + e_2 + e_3.$ (9) (ii) <u>Extend</u> the set $S = \{(3, 1, -2)\}_-$ to form the basis of V_3 . (6)	3 2	2 1																
c.	(i)) Find a root of the equation $3x+ \sin x = e^x$ using iteration method. (5) (ii) Find $\frac{dy}{dx}$ at $x = 1.05$ from the following table (5) <table border="1"><tr><td>X</td><td>1</td><td>1.05</td><td>1.1</td><td>1.15</td><td>1.20</td><td>1.25</td><td>1.30</td></tr><tr><td>y</td><td>1</td><td>1.025</td><td>1.049</td><td>1.072</td><td>1.095</td><td>1.118</td><td>1.140</td></tr></table> (iii) Apply two iterations of Gauss-Jacobi method to solve the following system of linear equations $\begin{aligned} 27x + 6y - z &= 85 \\ 6x + 15y + 2 z &= 72 \\ x + y + 54z &= 110. \end{aligned}$ (5)	X	1	1.05	1.1	1.15	1.20	1.25	1.30	y	1	1.025	1.049	1.072	1.095	1.118	1.140	5	2 2 2
X	1	1.05	1.1	1.15	1.20	1.25	1.30												
y	1	1.025	1.049	1.072	1.095	1.118	1.140												
