22CHU309N / 22BCU311N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Common to Branches – **CHEMISTRY & BIOCHEMISTRY**

PHYSICS - I

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The frequency of simple harmonic motion is _____. a) number of vibrations per second b) number of oscillations per second c) number of rotations per second d) number of twists per second	K1	CO1
	2	In the longitudinal mode of Melde's experiment, the tuning fork vibrates _____ the length of the string. a) up and down with b) perpendicular to c) along the direction of d) side by side with	K2	CO1
2	3	Lubrication is used to _____. a) increase friction b) decrease friction c) increase temperature d) decrease speed	K1	CO2
	4	Surface tension decreases with _____ of the liquid. a) increase in surface area b) increase in temperature c) increase in density d) decrease in pressure	K2	CO2
3	5	Which of the following processes cause a decrease in entropy? a) melting of ice b) evaporation of water c) freezing of water d) boiling of water	K1	CO3
	6	Helium II is formed when Helium I is cooled below_____ a) 2.19K b) 2.17K c) 2.71K d) 2.41K	K2	CO3
4	7	The capacitance of a parallel plate capacitor increases with_____. a) decreasing plate area of capacitor b) increasing distance between plates c) using dielectric slab between them d) using copper plates	K1	CO4
	8	In a purely resistive circuit, the value of power factor is _____. a) zero b) one c) infinity d) half	K2	CO4
5	9	Dispersion of light is caused by_____. a) equal speed of all colours in a medium b) different speeds of different colours in medium c) reflection d) absorption	K1	CO5
	10	Constant deviation prisms are commonly used in _____. a) telescopes b) cameras c) binoculars d) spectrometers	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Discuss on the laws of transverse vibration of strings.	K2	CO1
		(OR)		
	11.b.	Describe the measurement of frequency of AC main using Sonometer with neat sketch.		
2	12.a.	Examine on the determination of Rigidity modulus of a wire by torsional pendulum.	K4	CO2
		(OR)		
	12.b.	Simplify on the molecular theory of surface tension of liquids.		
3	13.a.	Examine and discuss on the Porous plug experiment using Joule-Kelvin effect.	K4	CO3
		(OR)		
	13.b.	Analyze on the change of entropy in a reversible process by plotting a PV diagram.		
4	14.a.	Construct a capacitor using a pair of metal plates and derive an expression for the energy stored in the charged capacitor.	K3	CO4
		(OR)		
	14.b.	Develop and derive the expression for peak, average and RMS value of an alternating current.		
5	15.a.	Illustrate on the calculation of refractive index of a prism by grazing incidence method.	K3	CO5
		(OR)		
	15.b.	Outline the construction and use of direct vision prisms.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze on the production of Ultrasonic waves using Piezo electric method.	K4	CO1
2	17	Analyze on the comparison of viscosities of two liquids using burette method with neat sketch.	K4	CO2
3	18	Examine on Liquefaction of gases. Illustrate on Linde's process of liquefaction of air.	K4	CO3
4	19	Examine on Biot-Savart law. Derive an expression for the magnetic field induction(B) along the axis of a coil carrying current.	K4	CO4
5	20	Examine the air cell method of determining the refractive index of a liquid with neat sketch.	K4	CO5

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fourth Semester)

Common to Branches – **CHEMISTRY & BIOCHEMISTRY**

PHYSICS-II

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The optical path difference in a wedge-shaped film is a) $\mu t \cos(\beta + \gamma)$ b) $2\mu t \cos(\beta + \gamma) + \lambda/2$ c) $2\mu t \cos(\beta + \gamma) - 3\lambda/4$ d) $2\mu t \cos(\beta + \gamma) - \lambda/2$	K1	CO1
	2	X-ray crystallography uses which characteristic of light? a) Polarization b) Interference c) Diffraction d) Coherency	K2	CO1
2	3	The principal quantum number (n) in the hydrogen atom represents: a) Angular momentum b) Energy level c) Spin of the electron d) Magnetic quantum number	K1	CO2
	4	The ground state of the hydrogen atom corresponds to which set of quantum numbers? a) $n = 1, l = 0, m = 0$ b) $n = 1, l = 1, m = 0$ c) $n = 2, l = 0, m = 0$ d) $n = 2, l = 1, m = 0$	K2	CO2
3	5	Heavy nuclei must be such that they can be fissioned by neutrons of energy such substance are called? a) fission fragments. b) fission neutrons c) fission species d) fission element	K1	CO3
	6	_____ is usually expressed in a unit of Nuclear binding energy. a) Mev b) ev c) kev d) Joules	K2	CO3
4	7	For Einstein's relation, $E^2 - p^2c^2 =$ a) m_oc^2 b) m^2c^4 c) m_oc^4 d) m^2c^6	K1	CO4
	8	The Schrodinger wave equation is a mathematical depression describing a) Energy of the electron b) Momentum of the electron c) Position of the electron d) All of the above	K2	CO4
5	9	The Zener diode is used as a) Shunt regulator b) Series regulator c) Rectifiers d) Clamper	K1	CO5
	10	Electro-optical effect is produced in a) LCD b) LED c) OFC d) OLED	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Identify the condition $2\mu t\cos(\beta + \gamma) = n\lambda$ for destructive interference in a thin wedge shaped film?	K3	CO1
		(OR)		
	11.b.	Make use of Fresnel diffraction to explain rectilinear propagation of light.		
2	12.a.	Differentiate between the magnetic dipole moment of orbital and spin motion?	K4	CO2
		(OR)		
	12.b.	Bring out the importance of any two quantum numbers.		
3	13.a.	Explain the facts on Shell model of the nucleus.	K5	CO3
		(OR)		
	13.b.	Discuss on the importance of Geiger Muller counter.		
4	14.a.	Explain on Length Contraction.	K6	CO4
		(OR)		
	14.b.	Assess the physical significance of Schrodinger's wave function.		
5	15.a.	Prove the De Morgans theorem with its truth table and figure.	K5	CO5
		(OR)		
	15.b.	Construct the basic gates using discrete components with suitable figure and satisfying truth table.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe on the construction of Michelson interferometer and its results.	K3	CO1
2	17	Differentiate the atomic model and vector model of an atom.	K4	CO2
3	18	Classify the types of nuclear fission reactors.	K4	CO3
4	19	Derive Lorentz transformation equations.	K5	CO4
5	20	Explain why NAND gate is called as universal building block.	K5	CO5

Z-Z-Z END

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PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Common to Branches - **COMPUTER SCIENCE / INFORMATION TECHNOLOGY / COMPUTER TECHNOLOGY / COMPUTER SCIENCE WITH DATA ANALYTICS**

DIGITAL FUNDAMENTALS AND COMPUTER ARCHITECTURE / FUNDAMENTALS OF DIGITAL COMPUTERS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	In the Indian numbering system, the number 1,00,000 is called: a) One million b) One lakh c) One crore d) One arab	K2	CO1
	2	Who compiled and published the system known as "Vedic Mathematics" in the 20th century? a) Aryabhata b) Bhaskaracharya c) Swami Bharati Krishna Tirthaji d) Ramanujan	K2	CO1
2	3	Compute the 1's complement of the binary number 1011101. a) 0101110 b) 1001101 c) 0100010 d) 1100101	K2	CO2
	4	Which of the following is a universal gate? a) AND gate b) OR gate c) XOR gate d) NAND gate	K1	CO2
3	5	Identify the number of cells in a K-map for a Boolean function with three variables a) 3 b) 4 c) 8 d) 16	K2	CO3
	6	An encoder is a: a) Sequential circuit b) Combinational circuit c) Logical circuit d) None of the mentioned	K2	CO3
4	7	Which register is used to keep track of the location of the top of the stack? a) Instruction Register (IR) b) Program Counter (PC) c) Stack Pointer (SP) d) Accumulator (AC)	K1	CO4
	8	Main memory is also known as: a) Secondary memory b) Tertiary memory c) Primary memory d) Virtual memory	K1	CO4
5	9	The CISC stands for _____. a) Computer Instruction Set Compliment b) Complete Instruction Set Compliment c) Computer Indexed Set Components d) Complex Instruction set computer	K1	CO5
	10	Which of the following is an advantage of parallel processing? a) Increased cost b) Slower execution c) Faster data processing d) Reduced resource utilization	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Expound on Indian contributions to mathematics.	K2	CO1
		(OR)		
	11.b.	Explain the applications of Vedic mathematics in detail.		
2	12.a.	Explore the Components of a Digital Computer.	K3	CO2
		(OR)		
	12.b.	List out the various logic gates in digital computer and explain with diagram and truth table.		
3	13.a.	Simplify the Boolean function $f(x,y,z) = \sum(0,2,4,5,6)$ using Map method.	K3	CO3
		(OR)		
	13.b.	Construct a 3-to-8 line decoder and explain in detail.		
4	14.a.	Illustrate the conversion process of the expression A*B+C*D of infix notation to the reverse polish notation using stack.	K4	CO4
		(OR)		
	14.b.	Discuss in detail about the associative memory.		
5	15.a.	Describe the parallel processing in detail with an example.	K4	CO5
		(OR)		
	15.b.	Demonstrate the pipeline unit for floating-point addition and subtraction with an example.		

SECTION –C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Elaborate the Encoding Knowledge in ancient texts.	K4	CO1
2	17	Express the function $F(w,x,y,z) = y'z + wxy' + wxz' + w'x'z$ in a sum of minterms and a product of maxterms.	K4	CO2
3	18	Simplify the following Boolean function using Map method: i) $F(w,x,y,z)=\sum(0,1,2,4,5,6,8,9,12,13,14)$ ii) $F=A'B'C'+B'CD'+A'BCD'+AB'C'$	K4	CO3
4	19	Analyse the different Addressing modes using suitable examples.	K4	CO4
5	20	Explore the RISC pipeline in detail.	K4	CO5

Z-Z-Z END

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PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Common to Branches - **COMPUTER SCIENCE / INFORMATION TECHNOLOGY / COMPUTER TECHNOLOGY / COMPUTER NETWORKING & MOBILE APPLICATIONS / COMPUTER SCIENCE WITH DATA ANALYTICS**

PROGRAMMING AND PROBLEM SOLVING USING C

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following programming paradigms is associated with modular design? A) Object-Oriented Programming B) Functional Programming C) Procedural Programming D) All of the above	K1	CO1
	2	Estimate the output of **printf("%d", 10 / 4);** in C. A) 2.5 B) 2 C) 3 D) 2.0	K2	CO1
2	3	Tabulate the correct order of execution in a for loop. A) Initialization → Condition → Update → Body B) Condition → Initialization → Body → Update C) Initialization → Body → Condition → Update D) Body → Initialization → Condition → Update	K1	CO2
	4	Classify which of the following is a valid way to declare and initialize a string in C. A) char str[5] = "Hello"; B) char str[] = "Hello"; C) string str = "Hello"; D) char str = "Hello";	K2	CO2
3	5	Identify the valid index range for an array int a[5];. A) 1 to 5 B) 0 to 4 C) 0 to 5 D) -1 to 4	K1	CO3
	6	Identify the operator used to access the value stored at the memory address of a pointer. A) & B) * C) -> D) .	K2	CO3
4	7	Identify the correct statement about a function prototype. A) It is written after main() only B) It specifies function name, parameters, and return type before its use C) It allocates memory for function variables D) It executes the function automatically	K1	CO4
	8	Compare structure and union. Which statement is true? A) Both allocate separate memory for each member B) Union allocates shared memory for all members C) Structure cannot contain arrays D) Union supports nested definitions, but structure does not	K2	CO4
5	9	Describe what happens when a file is opened with "w" mode. A) Opens for writing only B) Opens for appending only C) Opens for writing, deletes existing contents D) Opens for both reading and writing	K1	CO5
	10	Which of the following is argv[0] when a program runs. A) First command line argument B) Program name/path C) Null character D) Last argument	K2	CO5

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SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Apply the steps involved in program development and demonstrate with suitable examples.	K3	CO3
		(OR)		
	11.b.	Write a C program to demonstrate formatted input/output using scanf() and printf()		
2	12.a.	Review the advantages and disadvantages of using the goto statement in C.	K2	CO2
		(OR)		
	12.b.	Discuss the importance of string conversion functions in handling user input.		
3	13.a.	Discuss how arrays are related to strings in terms of declaration and storage.	K3	CO3
		(OR)		
	13.b.	Illustrate with a program how to assign the address of a variable to a pointer.		
4	14.a.	Examine the definition of function in C and explain its general syntax with an example.	K4	CO4
		(OR)		
	14.b.	Analyze the difference between a structure and a union		
5	15.a.	Discriminate between formatted and unformatted file I/O functions.	K1	CO5
		(OR)		
	15.b.	What are command line arguments in C? Examine their purpose with an example.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze identifiers and keywords in C with suitable examples.	K4	CO1
2	17	Explore about Standard Functions of string handling with examples.	K4	CO2
3	18	How arrays of pointers are useful in handling function arguments? Justify with an example.	K4	CO3
4	19	Define a function prototype and Develop a program with a function prototype for addition of two numbers.	K4	CO4
5	20	List out the steps involved in performing file operations in C, with example.	K4	CO5

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Second Semester)

Common to Branches - **INFORMATION TECHNOLOGY & COMPUTER TECHNOLOGY**

DATA STRUCTURES

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Select the logical or Mathematical model that organizes data a) Data type b) Data Item c) Data Structure d) Data records	K1	CO1
	2	Give the string operation that finds the position of a string pattern that appears first in a text a) Indexing b) Substring c) Concatenation d) Length	K2	CO1
2	3	Write the Algorithm that efficiently finds a target item in a sorted list by repeatedly dividing the search interval in half. a) Binary Search b) Linear search c) Index Search d) Sequential Search	K1	CO2
	4	Predict the complexity of Merge-sort algorithm a) O(2 log n) b) O(n2) c) O (n) d) O(n log n)	K2	CO2
3	5	What is the situation when one wants to delete data from a data structure that is empty? a) Overflow b) Underflow c) Garbage d) Free pool	K1	CO3
	6	Identify the linked list whose last node points back to the first node. a) Circular list b) Two way list c) Head list d) Doubly list	K2	CO3
4	7	Write down the place where deletion of an item takes place in queue. a) Rear b) Front c) Top d) Middle	K1	CO4
	8	Give the other name for Reversed polish notation. a) Prefix b) Infix c) Postfix d) Suffix	K2	CO4
5	9	Specify the branch of tree that represents maximum number of nodes in it. a) Depth b) Path c) Branch d) Leaf	K1	CO5
	10	Predict the other name for Self-balancing binary trees. a) Binary trees b) Binary search trees c) Skewed trees d) AVL trees	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain Traversing in linear arrays.	K6	CO1
		(OR)		
	11.b.	Explain String operations: substring and concatenation with examples.		
2	12.a.	Demonstrate Linear Search with its Algorithm.	K3	CO2
		(OR)		
	12.b.	Illustrate Insertion Sort Algorithm for a given set of data.		
3	13.a.	Compare and Contrast linked list and two way list.	K2	CO3
		(OR)		
	13.b.	Discuss about Deleting the node following a given node algorithm in linked list.		
4	14.a.	Explain list representation of a priority queue.	K6	CO4
		(OR)		
	14.b.	Explain Recursion for finding factorial of a number.		
5	15.a.	Explain Linked representation of binary trees.	K6	CO5
		(OR)		
	15.b.	Explain Sequential representation of graphs.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain about two dimensional arrays and summarize the algorithm to perform matrix multiplication.	K6	CO1
2	17	Employ Merge Sort Algorithm for a set of data and compute its complexity.	K3	CO2
3	18	Explain insertion of a node at the beginning of a list and after a given node in linked list.	K2	CO3
4	19	Explain the algorithm to transform infix expressions into postfix expressions.	K6	CO4
5	20	Formulate Preorder and Inorder tree traversal.	K6	CO5

Z-Z-Z END

22CMU208N/ 22CTU208N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Second Semester)

Common to Branches - **COMPUTER SCIENCE & COMPUTER TECHNOLOGY**

MATHEMATICS FOR COMPUTING- II

Time: Three Hours **Maximum: 75 Marks**

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	____ different sets of truth values assignments for the variables P, Q *and* R. (a) n (b) ∞ (c) 2^n (d) 2^3	K1	CO1
	2	$(P \Leftrightarrow Q) \Leftrightarrow$ _____ (a) $(P \wedge Q) \vee (\neg P \wedge \neg Q)$ (b) $(P \vee Q) \wedge (\neg P \vee \neg Q)$ (c) $(P \wedge Q) \wedge (\neg P \wedge \neg Q)$ (d) $(\neg P \wedge \neg Q)$	K2	CO1
2	3	The number of elements in A is equal to the number of elements in B is called____ (a) Equivalence set (b) equal (c) null set (d) disjoint set	K1	CO2
	4	A relation R is defined on the set of integers by R = { (a,b) : a -b is even} Then R is (a) reflexive only (b) symmetric only (c) reflexive, symmetric and transitive (d) none of these	K2	CO2
3	5	_____ function have the same domain and range (a) Composite function (b)Identity (c) Invertible (d) Cartesian	K1	CO3
	6	If f = {(1, 1), (2, 3), (3, 1), (4, 2)}, and g = {(1, 2), (2, 3), (3, 1), (4, 2)}, then g ∘ f = ____ (a) {(1, 2), (2, 1), (3, 2), (4, 3)} (b) {(1, 2), (2, 1), (3, 1), (4, 3)} (c) {(1, 2), (2, 1), (3, 4), (4, 3)} (d) {(1, 1), (2, 2), (3, 2), (4, 3)}	K2	CO3
4	7	A graph whose edge set is empty is called a _____ (a) Null graph (b) empty graph (c) disconnected graph (d) edge connected graph	K1	CO4
	8	If a graph G has more than one component then G is called ____ graph. (a) Connected (b) disconnected (c) complete (d) complete bipartite	K2	CO4
5	9	Peterson graph is _____ (a) Eulerian and Hamiltonian (b) Eulerian but not Hamiltonian (c) Hamiltonian but not Eulerian (d) Not Eulerian and not Hamiltonian	K1	CO5
	10	In a graph G , to find a closed walk running through every edge of G exactly once such a walk is called ____ (a) Hamiltonian line (b) Euler line (c) components (d) disconnected	K2	CO5

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SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Constructs the truth table for the formula $(P \wedge Q) \vee (\neg P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$	K3	CO1
		(OR)		
	11.b.	Verify whether $(P \to Q) \Rightarrow (\neg Q \to \neg P)$ is a tautology.		
2	12.a.	(i)Explain equivalence relation (ii) Define incidence matrix.	K2	CO2
		(OR)		
	12.b.	If $A = \{1,5\}$, $B = \{6,7,8,9\}$ *and* $C = \{6,7,10\}$ Show that $A \times (B \cup C) = (A \times B) \cup (A \times C)$		
3	13.a.	Let $f : A \to B$ and $g : B \to C$ be both one-one and onto functions then prove that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$	K3	CO3
		(OR)		
	13.b.	Let A={1,2,3,4} Le R={(1,1), (1,2), (2,3),(2,4),(3,4),(4,1),(4,2)} and S={(3,1),(4,4), (2,3),(2,4),(1,1),(1,4)} be two relations on A. compute (i) Is (1,3) ε R∘R? (ii) Is (4,3) εS∘R? (iii) Is (1,1) εR∘S? (iv) S∘R, (v) R∘S		
4	14.a.	Prove that a simple graph with n vertices and k components can have at most $\frac{(n-k)(n-k+1)}{2}$ edges.	K3	CO4
		(OR)		
	14.b.	Prove that the number of vertices of odd degree in a graph is always even.		
5	15.a.	Explain shortest path problem.	K2	CO5
		(OR)		
	15.b.	Explain Fluery's algorithm to trace an Eulerian trail in an even graph.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Discuss all the connectives.	K4	CO1
2	17	Explain types of Digraph.	K3	CO2
3	18	Explain the types of relations.	K5	CO3
4	19	Discuss about the types of graphs.	K4	CO4
5	20	Prove that a connected graph G is an Euler graph if all vertices of G are of even degree.	K4	CO5

Z-Z-Z END

TOTAL PAGES: 2

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PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Common to Branches – **COMPUTER SCIENCE / COMPUTER TECHNOLOGY /**

MATHEMATICS FOR COMPUTING - I

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The rank of a matrix is always, A) Equal to the number of columns B) Greater than the number of rows C) Less than or equal to the smaller of the number of rows or columns D) The square of the number of rows	K1	CO1
	2	Which statement is true if all eigenvalues of a matrix are distinct? A) The matrix is not invertible B) The matrix has linearly dependent eigenvectors C) The matrix must be symmetric D) The matrix can be diagonalized	K2	CO1
2	3	Which of the following is a linear differential equation? A) $y''+y^2=0$ B) $yy''+y'=0$ C) $y''+yy'=0$ D) $y''+xy'+y=0$	K1	CO2
	4	The complete integral for the equation $Z = p^x+qy+pq$ is A) $Z = ax + by + ab$ B) $Z = ax + bx + a^2$ C) $Z = ax + by + b^2$ D) $Z = ax + bx + a$	K2	CO2
3	5	In Gauss elimination, the coefficient matrix is transformed into: A) Upper triangular matrix B) Lower triangular matrix C) Diagonal matrix D) Identity matrix	K1	CO3
	6	Which method converge, if the coefficient matrix is diagonally dominant and non-singular ? A) Jacobi B) seidal C) both D) none	K2	CO3
4	7	The value of interpolation step h in Newton's formulas is: A) $h = x_{i+1} - x_i$(constant for all i) B) $h = x_{i+1} - x_i$(variable) C) $h = x - x_0$ D) $h = x - x_n$	K1	CO4
	8	If the degree of the polynomial used in Newton's interpolation is n, then it requires A) n data points B) $n+1$ data points C) $2n$ data points D) Infinite data points	K2	CO4
5	9	The local truncation error in Euler's method is of order: A) O(h) B) $O(h^2)$ C) $O(h^3)$ D) $O(h^0)$	K1	CO5
	10	The modified Euler's method is also called A) Runge-Kutta 2nd order method B) Newton's method C) Heun's method D) Adams-Bashforth method	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Find the rank of a matrix $A=\begin{pmatrix}1&2&3&4\\2&4&6&8\\1&1&1&1\\0&1&2&3\end{pmatrix}$	k2	CO1
		(OR)		
	11.b.	Find the characteristic equation and inverse of $A=\begin{pmatrix}1&0&2\\0&2&1\\2&0&3\end{pmatrix}$		
2	12.a.	Solve $\frac{dy}{dx}=\frac{y}{x}$, $y(1)=2$.	K3	CO2
		(OR)		
	12.b.	Solve $p^2+q^2=npq$.		
3	13.a.	Solve the system, by Gauss-Elimination method, $2x+3y-z=5; 4x+4y-3z=3; 2x-3y+2z=2$	K3	CO3
		(OR)		
	13.b.	Solve, by using Gauss seidal method , $28x+4y-z=32; x+3y+10z=24; 2x+17y+4z=35$		
4	14.a.	From the following data, find $\frac{dy}{dx}$ for x=1.05 X: 1.00 1.05 1.10 .15 1.20 1.25 1.30 Y: 1.00000 1.02470 1.04881 1.07238 1.09544 1.11803 1.14017	K3	
		(OR)		
	14.b.	Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's rule by dividing the range into 6 equal parts.		
5	15.a.	Use Euler's method , solve the differential equation, $\frac{dy}{dx}=x+y, y(0)=1$ for $x=0.0(0.2)1.0$	K2	CO5
		(OR)		
	15.b.	Use the second-order Runge–Kutta method (RK2) with step size $h=0.1$ to approximate $y(0.1)$, given $\frac{dy}{dx}=x+y, y(0)=1$		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Examine the consistency of the following equations and if it is consistent solve the equations 2x+y-z=1 ; x-y+2z =3: 3x+2y+z=4.	K4	CO1
2	17	Solve $(D+1)^2 y = 6te^{-t}$.	K3	CO2
3	18	Solve by using Gauss Jordan method $10x+y+z=12; x+10y+z=12; x+y+10z=12$	K3	CO3
4	19	Compute the first two derivatives of $(x)^{1/3}$ at x=50 and x=56 gives the table below X: 50 51 52 53 54 55 56 Y: 3.6840 3.7084 3.7325 3.7563 3.7798 3.8030 3.8259	K2	CO4
5	20	Apply Modified Euler method with step size $h=0.2$ to estimate $y(0.4)$, given: $\frac{dy}{dx}=x^2+y, y(0)=1$.	K2	CO5

Z-Z-Z END

25HTU102/ 22HMB102N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc/ BVoc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Common to Branches – **HOSPITALITY AND TOURISM MANAGEMENT/ HOSPITALITY MANAGEMENT**

FOOD AND BEVERAGE SERVICE – I

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Name the section responsible for serving food and drink to guests in a hotel. a) Housekeeping b) Front office c) Food and Beverage Service d) Kitchen	K1	CO1
	2	Which of the following best defines Intra-departmental relationship? a) Relation with other departments b) Relation within the same department c) Relation with suppliers d) Relation with customers	K1	CO1
2	3	Identify the room used for storing silverware in a restaurant. a) Pantry b) Still room c) Silver room d) Hot plate	K1	CO2
	4	What is the primary use of Hot Plate in a restaurant? a) Keeping food warm before service b) Cleaning utensils c) Displaying desserts d) Mixing beverages	K1	CO2
3	5	Where is a cycling menu used? a) Hotels b) Airlines c) Industrial canteens d) Fine dining restaurants	K1	CO3
	6	How many standard courses does a French classical menu consist of? a) 8 b) 10 c) 13 d) 14	K2	CO3
4	7	Give the full form of EPOS used in billing? a) Electronic Point of Sale b) Employee Point of Service c) Easy Payment Option System d) Extent Payment of Sale	K2	CO4
	8	How many copies of the KOT are mode in the duplicate system of order taking? a) One b) Two c) Three d) Four	K2	CO4
5	9	How is the black tea and green tea differentiated by? a) Tea plant used b) Fermentation process c) Drying temperature d) Packaging	K2	CO5
	10	Express the correct gas in aerated drinks used to produce fizz. a) Oxygen b) Nitrogen c) Carbon dioxide d) Hydrogen	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the types of restaurants and describe any two with their salient features.	K2, K3	CO1
		(OR)		
	11.b.	Draw the organizational chart of a food and beverage service department and outline the roles and duties of key personnel.		
2	12.a.	Express about the different types of Crockery and Cutleries used in restaurants with suitable examples	K3	CO2
		(OR)		
	12.b.	Ascertain the functions of the Still Room and the Hot Plate section in a restaurant.		
3	13.a.	Determine the factors that influence the styles of service.	K3	CO3
		(OR)		
	13.b.	Examine the characteristics, applications advantages and disadvantages of Static Menu and Cyclic Menu.		
4	14.a.	Discuss about the characteristics, advantages, disadvantages of manual billing and computerized billing.	K2	CO4
		(OR)		
	14.b.	Summarize the characteristics of Bill as Cheque system and Bill with Order system quoting suitable examples.		
5	15.a.	Explain the different types of coffee commonly served in food and beverage establishments.	K2	CO5
		(OR)		
	15.b.	Elaborate on milk- based drinks.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain on the intra- and inter-departmental relationships of the food and beverage service department and its significance on the smooth functioning of a restaurant.	K2	CO1
2	17	Discuss in detail on the various types of food service equipments used in restaurants and explain the functions of ancillary sections.	K2	CO2
3	18	Illustrate the different styles of food service and describe the procedure for laying a cover for a full-course meal.	K3	CO3
4	19	Explore the methods of taking orders and billing systems in food and beverage service. Express the different payment methods used in restaurants.	K3	CO4
5	20	Determine the step-by-step process of manufacturing Tea.	K3	CO5

Z-Z-Z END

22ITU206N/22CTU206N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Second Semester)

Common to Branches - **INFORMATION TECHNOLOGY & COMPUTER TECHNOLOGY**

PROGRAMMING IN C++

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Object-Oriented Programming mainly focuses on: a) Functions b) Data c) Algorithms d) Machine code	K1	CO1
	2	Which of the following is an advantage of OOP? a) Increases execution time b) Reusability of code c) Reduces code readability d) Depends only on functions	K2	CO1
2	3	Which function is called automatically when an object is created? a) Destructor b) Constructor c) Friend function d) Inline function	K1	CO2
	4	Static member variables in C++: a) Have only local scope b) Are shared by all objects of the class c) Can only be used inside constructors d) Cannot be initialized	K2	CO2
3	5	Overloading unary operators usually requires: a) One operand b) Two operands c) Three operands d) No operand	K1	CO3
	6	Which of the following is true for operator overloading? a) Return type can change function signature b) We cannot overload relational operators c) Only existing operators can be overloaded d) New operators can be overload	K2	CO3
4	7	Which operator is used to release dynamically allocated memory? a) free b) release) delete d) destroy	K1	CO4
	8	Which function type supports run-time polymorphism? a) Normal function b) Virtual function c) Inline function d) Friend function	K2	CO4
5	9	Function templates are used to: a) Define generic functions b) Replace friend functions c) Define macros d) Avoid recursion	K1	CO5
	10	Multiple catch statements are executed when: a) Exception is thrown multiple times b) One exception matches multiple catches c) Only one matching catch executes d) None of the above	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	List and explain the key concepts of Object-Oriented Programming.	K1	CO1
		(OR)		
	11.b.	Describe the predefined streams available in C++.		
2	12.a.	Define inline functions with examples.	K2	CO2
		(OR)		
	12.b.	Write a note on copy constructors with example.		
3	13.a.	Which operators cannot be overloaded? Why?	K3	CO3
		(OR)		
	13.b.	Discuss the declaration and applications of an array of pointers.		
4	14.a.	What are virtual functions? Explain with examples.	K3	CO4
		(OR)		
	14.b.	Explain the working of new and delete operators in C++.		
5	15.a.	Explain the difference between templates and macros.	K4	CO5
		(OR)		
	15.b.	Write a C++ program that takes two strings from the user, compares them, and prints whether they are equal, or which one is greater.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	How C++ is more secure compared to C in terms of data handling?	K4	CO1
2	17	State the principles of function overloading with example and mention its precautions.	K3	CO2
3	18	Give a brief description about inheritance and its types.	K1	CO3
4	19	What are the steps for performing file operations? Explain with examples.	K2	CO4
5	20	Define exception handling and provide an example that demonstrates the use of multiple catch statements to handle different types of exceptions.	K3	CO5

Z-Z-Z END

22MAU519BN / 23MCU524BN

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Common to Branches – **MATHEMATICS & MATHEMATICS WITH COMPUTER APPLICATIONS**

MAJOR ELECTIVE COURSE – I: NUMBER THEORY

Time: Three Hours | Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	According to Principle of Mathematical Induction, If P(n) is any statement involving natural numbers such that P(1) is true and P(r) = P(r^+) then _____ is true for all N. a) P(n) b) P(0) c) P(n-2) d) None	K1	CO1
	2	An integer a is said to be divisible by a non zero integer if there exits another integer c such that a = bc, then b is called _____ of a. a) Factor b) integral part c) imaginary part d) None	K2	CO1
2	3	A positive integer greater than 1 and not a _____ number is called composite number. a) Factor b) composite c) Prime d) None	K1	CO1
	4	If two adjacent integers are prime then they are called _____ twins. a) Identical b) Siamese c) different d) None	K2	CO1
3	5	According to Fermat's conjecture, the integer F_n = _____. a) 2^{2^n} b) $2^{2^n}+1$ c) n+1 d) None	K1	CO1
	6	Fermat's numbers are _____ . a) Prime b) Co-prime c) composite d) None	K2	CO1
4	7	If n is a prime number then = $(a+b)^n$= _____. a) $(a^n + b^n)\ mod\ n$ b) (a+b) modn c) mod n d) none	K1	CO1
	8	The congruence $x^2 \equiv 1$(modp) has exactly two solutions namely 1 and ___ . a) P-1 b) p c) -1 d) none	K2	CO1
5	9	Any three positive integers x,y,z such that $x^2 + y^2 = z^2$ are called as _____ triple. a) Fermat b) Newton c) Pythagorean d) None	K1	CO1
	10	Every prime P can be represented as a sum of _____ a) four squares b) two squares c) five cubes d) None	K2	CO1

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	State and prove Trichotomy law.	K2	CO1
		(OR)		
	11.b.	Prove that $[a,b] = \frac{ab}{(a,b)}$ where a, b are integers and $[a,b]$ is LCM of a,b and (a, b) is HCF of a,b.		
2	12.a.	Prove that $\frac{n}{\varphi(n)} = \sum_{d/n} \frac{\mu^2(d)}{\varphi(d)}$.	K2	CO3
		(OR)		
	12.b.	Find the highest power of 7 dividing 1000!		
3	13.a.	Prove that Fermat numbers are co-primes.	K2	CO1
		(OR)		
	13.b.	Prove that $3^{4n+2} + 5^{2n+1} = M(14)$.		
4	14.a.	Prove that p! and (p-1)! – 1 are co-primes if p is an odd prime.	K3	CO4
		(OR)		
	14.b.	Solve 5x = 3(mod 24).		
5	15.a.	Find all the Pythagorean triples whose terms are in arithmetic progression.	K4	CO2
		(OR)		
	15.b.	Prove that $x^4 - y^4 = z^4$ has no solution in integers with yz ≠ 0.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Prove by Mathematical induction that $3^{2n-1} + 2^{n+1} = \mu(7)$, where n∈ N.	K2	CO1
2	17	Verify that 220 and 284 are amicable numbers $220 = 2^2.5^1.11^1$	K2	CO3
3	18	Show that every number and its cube when divided by 6 leave the same remainder.	K3	CO4
4	19	Show that$16^{99} \equiv 1$ mod (437).	K4	CO2
5	20	Prove that if n > 1, each non negative primitive solution of $x^2 + y^2 = n$ determine a unique a modulo n such that ax ≡ -1 (mod n).	K3	CO4

Z-Z-Z END

22MAU519AN/23MCU524AN

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Common to Branches – **MATHEMATICS & MATHEMATICS WITH COMPUTER APPLICATIONS**

MAJOR ELECTIVE COURSE – I : ASTRONOMY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Qn No.	Question	K Level	CO
1	1	When will the sun comes to the first point of Libra? (a) March 21 (b) June 21 (c) September 23 (d) December 23	K1	CO1
	2	How will you call the potion of upper transit if a star when it is on the southern side of the zenith ? (a) due east (b) due west (c) due north (d) due south	K2	CO1
2	3	A circumpolar star is a star that, as viewed from a specific location on Earth, (a) Rises in the east and sets in the west every night (b) Remains visible throughout the entire year, regardless of its location (c) Never sets below the horizon and appears to circle around a celestial pole (d) Is always found directly overhead at the observer's zenith	K1	CO2
	4	How can we call the time when the sun is at the depth of 18^0 below the horizon ? (a) Astronomical twilight (b) nautical twilight c) civil twilight (d) twilight	K2	CO2
3	5	Which of these celestial phenomena is caused by atmospheric refraction? (a) The twinkling of stars (b) The flattening of the sun at sunrise/sunset (c) Both (a) and (b) (d) Neither (a) nor (b)	K1	CO3
	6	Why do planets generally not twinkle, unlike stars? (a) Planets are too far away (b) Planets are not point sources of light (c) Planets emit light continuously (d) Planets do not refract light	K2	CO3
4	7	According to Kepler's First Law, where is the Sun located relative to a planet's elliptical orbit? (a) At the center of the orbit. (b) At one of the foci of the ellipse. (c) At both foci. (d) Anywhere along the semi-minor axis	K1	CO4
	8	Kepler's Second Law, the Law of Areas, states that a planet's orbital line covers: (a) Equal distances in equal time intervals. (b) Equal areas in equal time intervals. (c) Equal speeds in equal time intervals. (d) Equal volumes in equal time intervals.	K2	CO4
5	9	The linear diameter of the section of the moon is _____ miles. (a) 7613 (b) 2361 (c) 2163 (d) 2136	K1	CO5

Cont...

5	10	What are the three main types of solar eclipses? (a) Total, partial, and annular (b) Total, partial, and penumbral (c) Annular, penumbral, and blood moon (d) Partial, full, and new	K2	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Qn No.	Question	K Level	CO
1	11.a.	At a place in north latitude ϕ two stars A and B (declinations δ and δ_1 respectively) rise at the same moment and A transits when B is setting, show that $tan\,\phi\,tan\,\delta = 1 - 2tan^2\phi tan^2\delta_1$.	K2	CO1
		(OR)		
	11.b.	Find the relation between R.A and Longitude of the Sun.		
2	12.a.	Define Dip of horizon and derive an expression for Dip.	K2	CO2
		(OR)		
	12.b.	Show that the latitude of a place is equal to the arithmetic mean of the meridian altitudes of a circumpolar star.		
3	13.a.	Write a short note on Geocentric parallax.	K3	CO3
		(OR)		
	13.b.	Compute the coefficient of refraction k satisfying the tangent formula r = k tan z.		
4	14.a.	If v_1 and v_2 are the velocities of the earth at perihelion and aphelion, Examine that $v_1(1-e) = v_2(1+e)$ where e is the eccentricity of earth's orbit.	K4	CO4
		(OR)		
	14.b.	Write the Kepler's laws of planetary motion.		
5	15.a.	If θ and ϕ are the semi vertical angles of the shadow and the cone of penumbra cast by the earth and if s be the semi diameter of the sun, Prove that $2\,sin\,s = sin\,\theta + sin\,\phi$.	K5	CO5
		(OR)		
	15.b.	Determine the angle between a direct common tangent and the line of centre of two circles.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe Celestial Meridian.	K2	CO1
2	17	Find the number of consecutive nights having Twilight throughout night.	K2	CO2
3	18	Taking the correction for refraction in the form $k\,tan\,z$, show that when the zenith distance of the moon is $cos^{-1}\left(\frac{k}{p}\right)$. The horizontal diameter is unaltered and when the zenith distance is $cos^{-1}\left(\frac{k}{p}\right)^{\frac{1}{3}}$ the vertical diameter is unaltered by the combined effect of refraction and parallax ; P being the horizontal parallax of the moon.	K3	CO3
4	19	If $e = sin\,\theta$, Examine that when powers of e are neglected the value of u satisfying Kepler's equation is given by $tan\,u = sec\,\phi\,tan\,2x$ where $tan\,x = tan(45^0 + \frac{\theta}{2})\,tan\frac{m}{2}$.	K4	CO4
5	20	If the inferior ecliptic limits be $\pm\beta$ and if the moon revolves n times as fast as the sun , and its nodes regress θ for every revolution the moon makes round the earth, Prove that the minimum number of solar eclipses occurring at or near a node is $\frac{2(n-1)\beta}{n\theta+2\pi}$.	K5	CO5

Z-Z-Z END