CBCS SCHEME - Make-Up Exam

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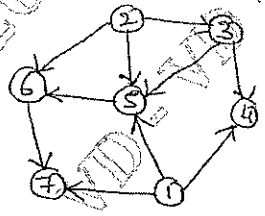
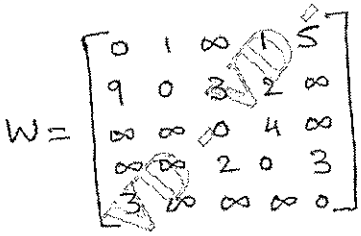
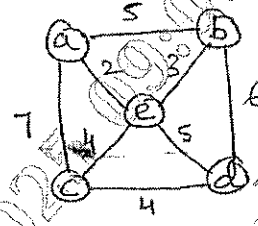
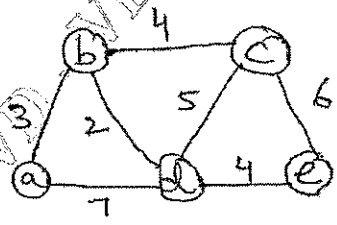
BCS401

Fourth Semester B.E/B.Tech. Degree Examination, June/July 2025
Analysis & Design of Algorithms

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Explain the algorithm design and analysis process in detail.	10	L2	CO1
	b.	Define Algorithm. Explain the asymptotic notations with example.	10	L2	CO1
		OR			
2	a.	Design an algorithm to search an element in an array using sequential search. Discuss. the best-case, worst-case and average-case efficiency of this algorithm.	10	L3	CO1
	b.	Give the general plan for analyzing time efficiency of recursive algorithms and also analyze the tower of Hanoi recursive algorithm.	10	L3	CO1
		Module – 2			
3	a.	Apply quick sort algorithm to sort the list : 5, 3, 1, 9, 8, 2, 4, 7. Draw the tree of recursive calls made while tracing.	10	L3	CO2
	b.	Write Merge Sort Algorithm. Find the efficiency of the algorithm.	10	L2	CO2
		OR			
4	a.	Obtain the topological sort for the graph Fig. Q4 (a) using (i) Source Removal Method. (ii) Depth first Search Method.  Fig. Q4 (a)	10	L3	CO2
	b.	Explain Strassen's Matrix Multiplication. Apply Strassen's matrix multiplication to multiply the following matrices: $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.	10	L3	CO2

		Module – 3			
5	a.	Define AVL tree with an example. Construct an AVL tree of the list of keys : 5, 6, 8, 3, 2, 4, 7 indicating each step of key insertion and rotation.	**10**	**L3**	**CO3**
	b.	Define Heap. Apply heap sort to sort the list of numbers : 2, 9, 7, 6, 5, 8 in ascending order using array representation.	**10**	**L3**	**CO3**
		OR			
6	a.	Define 2-3 Tree. Construct 2-3 tree for the list of keys : 9, 5, 8, 3, 2, 4, 7 by indicating each step of key insertion and node splits.	**10**	**L3**	**CO3**
	b.	Design Har'spool algorithm for string matching. Apply this algorithm to find the pattern BARBER in the text : JIM_SAW_ME_IN_A_BARBERSHOP	**10**	**L3**	**CO3**
		Module – 4			
7	a.	Apply Floyd's algorithm to find the all pair shortest path for the given adjacency matrix. Fig. Q7 (a).  Fig. Q7 (a)	**10**	**L3**	**CO4**
	b.	Write Kruskal's algorithm to find minimum spanning tree. Illustrate with the following graph Fig. Q7 (b).  Fig. Q7 (b)	**10**	**L3**	**CO4**
		OR			
8	a.	Write Dijkstra's algorithm to find single source shortest path. Apply same for the given Fig. Q8 (a), a as the source vertex.  Fig. Q8 (a)	**10**	**L3**	**CO4**

<table>
<tr><td></td><td>b.</td><td>Construct a Huffman tree and resulting code word for the following :
<table>
<tr><td>Symbol</td><td>A</td><td>B</td><td>C</td><td>D</td><td>-</td></tr>
<tr><td>Frequency</td><td>0.35</td><td>0.1</td><td>0.2</td><td>0.2</td><td>0.15</td></tr>
</table>
Encode the text DAD. Decode the text 100110110111101.</td><td>10</td><td>L3</td><td>CO4</td></tr>
<tr><td colspan="6">Module – 5</td></tr>
<tr><td>9</td><td>a.</td><td>Construct a state space tree to solve force queen's problem using backtracking.</td><td>10</td><td>L3</td><td>CO5</td></tr>
<tr><td></td><td>b.</td><td>Solve the following instance of the knapsack problem by using branch and bound method.
<table>
<tr><td>Item</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Weight</td><td>4</td><td>7</td><td>5</td><td>3</td></tr>
<tr><td>Value</td><td>$40</td><td>$42</td><td>$25</td><td>$12</td></tr>
</table>
Capacity W = 10</td><td>10</td><td>L3</td><td>CO5</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>10</td><td>a.</td><td>Construct a state space tree for subset sum problem using branch and bound for the set S = {3, 5, 6, 7} and d = 15</td><td>10</td><td>L3</td><td>CO5</td></tr>
<tr><td></td><td>b.</td><td>Explain the following terms :
(i) P – Problems
(ii) NP – Problems
(iii) NP – Complete Problems
(iv) NP – Hard Problems.</td><td>10</td><td>L2</td><td>CO5</td></tr>
</table>

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CBCS SCHEME

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BCS402

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Microcontrollers

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the major design rules to implement the RISC design philosophy.	08	L2	CO1
	b.	Differentiate between RISC and CISC processors.	04	L2	CO1
	c.	Explain ARM core data flow model, with neat diagram.	08	L2	CO1
		OR			
Q.2	a.	With the help of bit layout diagram, explain Current Program Status Register (CPSR) of ARM.	08	L2	CO1
	b.	With an example, explain the pipeline in ARM.	05	L2	CO1
	c.	Discuss the following with diagrams: (i) Von-Neuman architecture with cache (ii) Harvard architecture with TCM	07	L2	CO1
		Module – 2			
Q.3	a.	Explain the different data processing instructions in ARM.	08	L2	CO2
	b.	Explain the different branch instructions of ARM.	04	L2	CO2
	c.	Explain the following ARM instructions: (i) MOV r_1, r_2 (ii) ADDS r_1, r_2, r_4 (iii) BIC r_3, r_2, r_5 (iv) CMP r_3, r_4 (v) UMLAL r_1, r_2, r_3, r_4	08	L2	CO2
		OR			
Q.4	a.	Explain the different load store instructions in ARM.	08	L2	CO2
	b.	With an example, explain full descending stack operations.	07	L2	CO2
	c.	Develop an ALP to find the sum of first 10 integer numbers.	05	L3	CO2
		Module – 3			
Q.5	a.	List out basic C data types used in ARM. Develop a C program to obtain checksums of a data packet containing 64 words and write the compiler output for the above function.	08	L2	CO3
	b.	Explain the C looping structures in ARM.	08	L2	CO3
	c.	Explain pointer aliasing in ARM.	04	L2	CO2

		OR			
Q.6	**a.**	With an example, explain function calls in ARM.	**08**	**L2**	**CO3**
	b.	Explain register allocation in ARM.	**07**	**L2**	**CO3**
	c.	Write a brief note on portability issues when porting C code to ARM.	**05**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain the ARM processor exceptions and modes, vector table and exception priorities.	**10**	**L2**	**CO4**
	b.	Explain the interrupts in ARM.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain the ARM firmware suite and red hat redboot.	**10**	**L2**	**CO4**
	b.	Explain the sandstone directory layout and sandstone code structure.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the basic architecture of a cache memory and basic operation of a cache controller.	**10**	**L2**	**CO5**
	b.	With a neat diagram, explain a 4 KB, four way set associative cache.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the write buffers and measuring cache efficiency.	**08**	**L2**	**CO5**
	b.	Explain the cache policy.	**12**	**L2**	**CO5**

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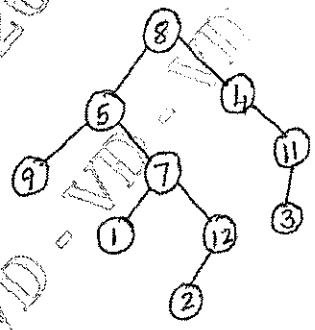
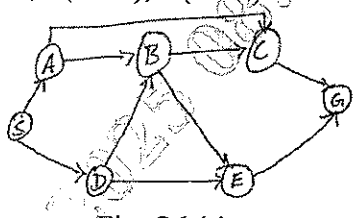
BAD402

Fourth Semester B.E/B.Tech. Degree Examination, June/July 2025
Artificial Intelligence

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Define Artificial Intelligence (AI). Explain the historical development of AI.	10	L2	CO1
	b.	Explore the relationship between rationality and decision making in AI systems.	10	L2	CO1
		OR			
2	a.	Define Intelligent agents and explain PEAS specification of intelligent agents.	10	L1 L2	CO2
	b.	Differentiate between simple reflex agents, model-based agents, goal based agents and utility based agents.	10	L2	CO2
		Module – 2			
3	a.	Explain in detail step by step illustration of how breadth first search works.	10	L2	CO1
	b.	Define five components of a problem. Write a complete state space for a vacuum cleaner to clean 2 squares P and Q. Q is to the right of P.	10	L3	CO2
		OR			
4	a.	Explain the key principles of depth-first search as an uninformed search strategy.	10	L2	CO1
	b.	Define DFS. Write the DFS with pruning for this graph with source node = 8 and goal = 3. Full steps to be written for full marks.  Fig. Q4 (b)	10	L3	CO2
		Module – 3			
5	a.	Explain the role of heuristics in informed search strategies. How do heuristics contribute to finding optimal solutions?	10	L2	CO1

	b.	Explain the A* search algorithm, emphasizing the role of heuristic functions in its operation.	10	L2	CO1
		OR			
6	a.	Apply the Greedy best first search to find the solution path from S to G. Write all steps as well as open and closed lists for full marks. S(h = 7), A(h = 9), B(h = 4), C(h = 2), D(h = 5), E(h = 3), G(h = 0).  Fig. Q6 (a)	10	L3	CO2
	b.	Describe the Wumpus World environment and its significance in AI. What challenges does the Wumpus world pose for intelligent agents.	10	L2	CO1
		Module – 4			
7	a.	Compare and contrast propositional inference with first order logic intference. What additional capabilities does FOL inference offer?	10	L4	CO3
	b.	Explain various ambiguities in Natural Language Processing with examples and summarize in the form of a table about formal languages and their onto logical and epistemological commitments.	10	L3	CO2
		OR			
8	a.	"Everyone who loves all animals is loved by someone". Illustrate the procedure by translating the sentence in the form of First order resolution.	10	L4	CO3
	b.	Write the algorithm for backward chaining and prove Tree for finding criminal (waste) using backward chaining.	10	L3	CO2
		Module – 5			
9	a.	Write the representation of Bayes Theorem. In a class, 70% children were full sick due to viral fever and 30% due to Bacterial fever. The probability of observing temperature for viral is 0.78 and for Bacterial is 0.31. If a child develops high temperature, find the child's probability of having viral infection.	10	L3	CO2
	b.	Explain the concept of full joint distributions in the context of uncertain knowledge. How does it represent the relationships between variables?	10	L2	CO2
		OR			
10	a.	Explain marginalization and normalization with a full joint distribution of (toothache, catch, cavity).	10	L2	CO1
	b.	Explain ES (Expert System) shell that simplify the process of creating a knowledge base of Expert System.	10	L2	CO1

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BCS403

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Database Management Systems

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the types of attributes with example.	4	L2	CO1
	b.	Define database. Explain the main characteristics of the database approach.	8	L2	CO1
	c.	Show the ER diagram for an EMPLOYEE database by assuming your own entities (minimum 4) attributes and relationships, mention cardinality ratios wherever appropriate.	8	L3	CO2
		OR			
Q.2	a.	Describe the three schema architecture.	4	L2	CO1
	b.	Explain the component models of DBMS and their interaction with the help of diagram.	8	L2	CO1
	c.	Design ER diagram for a university database by assuming your own entities (4). Mention primary key , constraints and relationships.	8	L3	CO2
		Module – 2			
Q.3	a.	Explain relational model constraints.	6	L2	CO1
	b.	Explain the characteristics of relations with suitable example for each.	6	L2	CO1
	c.	Considering the following schema : Sailors (sid , sname , rating , age) Boats (bid , bname , color) Reserves (sid , bid , day) Write a relational algebra queries for the following : i) Find the names of sailors, who have reserved red and a green boat. ii) Find the names of sailors who have reserved a red boat. iii) Find the names of sailors who have reserved a red or green boat. iv) Find the names of sailors who have reserved all boats.	8	L3	CO1
		OR			
Q.4	a.	Explain the steps to convert the basic ER model to relational Database schema.	6	L2	CO1
	b.	Explain Unary relational operations with example.	6	L2	CO1

	c.	Consider the relation schema Employee database. EMPLOYEE (Fname ,Minit , Lname , SSn , Bdates , Address , Sex , Salary Super_SSn , Dno) DEPARTMENT (Dname , Dnumber , Mgr_SSn , Mgr_start_date) PROJECT (Pname , PNumber , Plocation , Dnum) WORKS_ON (Essn , Pno , Hours) DEPENDENT (Essn , Dependent_name , sex, Bdate , Relationship) Write relational algebra queries for the following : i) Retrieve the name and address of all employees who work for the 'Research' department. ii) List the names of all employees with 2 or more dependents. iii) Find the names of employees who work on all the projects controlled by department number 5. iv) List the names of employees who have no dependents.	8	L3	CO3
		Module – 3			
Q.5	a.	What is the need for normalization? Explain second and third normal form with examples.	6	L2	CO4
	b.	Outline constraints in SQL.	6	L2	CO1
	c.	Identify the given Relation R(ABCDE) and its instance, check whether FDS given hold or not. Give reasons. i) $A \rightarrow B$ ii) $B \rightarrow C$ iii) $D \rightarrow E$ iv) $CD \rightarrow E$. A B C D E a_1 b_1 c_1 d_1 e_1 a_1 b_2 c_1 d_1 e_1 a_2 b_2 c_1 d_2 e_3 a_2 b_3 c_3 d_2 e_2	8	L3	CO4
		OR			
Q.6	a.	What is Multivalued dependency? Explain 4NF and 5NF with suitable example.	6	L2	CO4
	b.	Outline the informal design guidelines for relational schema.	6	L2	CO4
	c.	Consider relation R with following function dependency : EMPPROJ (SSn , Pnumber , Hours , Ename , Pname , Plocation) SSN , Pnumber → Hours, SSN → Ename Pnumber → Pname , Plocation. Is it 2NF? Verify? If no give reason.	8	L3	CO4

		Module – 4			
Q.7	**a.**	Consider the following schema for a company database : Employee (FName , LName , SSn , Adderss , Sex , Salary , Dno , Super_SSn) Department (Dname , Dnumber , mgr_SSn, mgr_st_date) Project (Pname , Pnumber , Plocation , Dnum) WORKS_on (Essn , Pno , Hours) DEPENDENT (Essn , Dependent name , Sex , Bdate, relationship). Write the SQL queries for the following : i) List the names of managers who have atleast one dependent (use correlated nested). ii) Retrieve the name of each employee who has a dependent with the same first name and is the same sex as the employee. iii) For each project retrieve the project number , project name and the number of employees who work on that project. iv) Retrieve the SSN of all employees who work on project number 1, 2 or 3. (Use IN). v) Find the sum of the salaries of all employees of the 'Research' department as well as maximum salary , minimum salary , average salary in this department.	**10**	**L3**	**CO3**
	b.	Why concurrency control is needed? Demonstrate with an example.	**10**	**L2**	**CO5**
		OR			
Q.8	**a.**	Consider the following schedule. The actions are listed in the order they are scheduled and prefixed with the transaction name. S1 : T1 : R(X) , T2 : R(X) T1 : W(Y) , T2 : W(Y) , T1 : R(Y) , T2 : R(Y) S2 : T3 : W(X) , T1 : R(X) , T1 : W(Y) , T2 : R(Z) , T2 : W(Z) , T3 : R(Z) For each schedule answer the following : i) What is the precedence graph for the schedule? ii) Is the schedule conflict_serializable? If so what are all the conflicts equivalent serial schedules? iii) Is the schedule view serializable? If so what are all the view equivalent serial schedules?	**10**	**L3**	**CO5**
	b.	Explain triggers with example write a trigger in SQL to call a procedure "Inform_Supervisor" whenever an employees salary is greater than the salary of his or her direct supervisor in the COMPANY database.	**10**	**L3**	**CO5**
		Module – 5			
Q.9	**a.**	Describe the two – phase locking protocol for concurrency control provide example to illustrate how it ensures serializability in transaction schedule.	**10**	**L2**	**CO5**
	b.	Explain the characteristics of NOSQL system.	**10**	**L2**	**CO6**
		OR			
Q.10	**a.**	Explain binary locks and shared lock with algorithm.	**10**	**L2**	**CO5**
	b.	Explain MongoDB data model, CRUD operations and distributed system characteristics.	**10**	**L2**	**CO6**

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CBCS SCHEME

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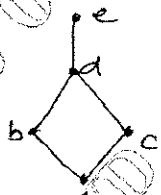
BCS405A

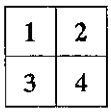
Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Discrete Mathematical Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Tautology, show that $[(p \vee q) \wedge \{(p \to r) \wedge (q \to r)\}] \to r$	6	L1	CO1
	b.	Prove the following using the laws of logic : $\neg [\{(p \vee q) \wedge r\} \to \neg q] \Leftrightarrow \neg [\neg [(p \vee q) \wedge r] \vee . \neg q] \Leftrightarrow q \wedge r$.	7	L2	CO1
	c.	Give i) a direct proof ii) an Indirect proof for the following statement "If n is an odd integer then n + 9 is an even integer".	7	L2	CO1
		OR			
Q.2	a.	Define i) an open statement ii) quantifiers.	6	L2	CO1
	b.	Test the validity of the following arguments. i) $\dfrac{p \wedge q \quad p \to (q \to r)}{\therefore r}$ ii) $\dfrac{P \quad P \to \sim q \quad \sim q \to \sim r}{\therefore \sim r}$	7	L2	CO1
	c.	For the following statements the universe comprises all non – zero integers. Determine the truth value of each statement. i) $\exists x, \exists y\ [xy = 1]$ ii) $\exists x, \forall y\ [xy = 1]$ iii) $\forall x, \exists y\ [xy = 1]$ iv) $\exists x, \exists y\ [(2x + y = 5) \wedge (x - 3y = -8)]$ v) $\exists x, \exists y\ [(3x - y = 17) \wedge (2x + 4y = 3)]$.	7	L2	CO1
		Module – 2			
Q.3	a.	Define the well ordering principle. By Mathematical induction, prove that $1 + 2 + 3 + \ldots + n = \dfrac{1}{2} n(n+1)$, $n \in z^+$.	6	L2	CO2
	b.	Prove that $F_n = \dfrac{1}{\sqrt{5}} \left[\left(\dfrac{1+\sqrt{5}}{2} \right)^n - \left(\dfrac{1-\sqrt{5}}{2} \right)^n \right]$. For F_0 , F_1, F_2 , ... are the Fibonacci numbers.	7	L2	CO2
	c.	Find the number of permutations of the letters of the word 'MASSASAUGA'. In how many of these all four A's are together? How many of them begin with S's?	7	L3	CO2
		OR			

Q.4	a.	Prove that $4n < n^2 - 7$ for all positive integers $n \geq 6$.	6	L2	CO3
	b.	Find the co-efficients of $x^9 y^3$ in the expansion of $(2x - 3y)^{12}$.	7	L3	CO3
	c.	Let $a_0 = 1$, $a_1 = 2$, $a_3 = 3$ and $a_n = a_{n-1} + a_{n-3}$ for $n \geq 3$, prove that $a_n \leq 3^n$ for all +ve integers n.	7	L2	CO3
		Module – 3			
Q.5	a.	State Pigeon hole principle. Prove that if 30 dictionaries in a library contains a total of 61,327 pages then atleast one of dictionaries must have atleast 2045 pages.	6	L2	CO3
	b.	Define power set. For any sets A, B, $C \subseteq U$, prove that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.	7	L2	CO3
	c.	Let f and g be functions from R to R defined by $f(x) = ax + b$ and $g(x) = 1 - x + x^2$ if $(gof)(x) = 9x^2 - 9x + 3$, determine a & b.	7	L3	CO3
		OR			
Q.6	a.	Let $f : R \to R$ be defined by $f(x) = \begin{cases} 3x - 5, \text{if } x > 0 \\ 1 - 3x, \text{if } x \leq 0 \end{cases}$ Find $f^1(-5, 5)$ and $f^1(-6, 5)$.	6	L2	CO3
	b.	Let N be the set of Natural numbers. Let a relation R be defined by $R = \{(a, b) / a \in N, b \in N, a - b \text{ is divisible by } 5\}$. Prove that R is an equivalence relation.	7	L2	CO3
	c.	For A = { a, b, c, d, e}, the Hasse diagram for the poset(A, R) is as shown below : i) Determine the relation matrix for R ii) Construct the diagraph for R. 	7	L3	CO3
		Module – 4			
Q.7	a.	Determine the number of integers between 1 and 250 that are divisible by 3 and not divisible by 5 and 7.	6	L3	CO4
	b.	Solve the recurrence relation $F_{n+2} = F_{n+1} + F_n$, where $n \geq 0$ and $F_0 = 0$, $F_1 = 1$.	7	L2	CO4
	c.	Define Derangement. Find the number of derangement of 1, 2, 3, and 4.	7	L3	CO4
		OR			

Q.8	**a.**	Find the Rook polynomial for the chess board contain 4 squares as shown in the Fig.Q8(a).  Fig.Q8(a)	**6**	**L3**	**CO4**
	b.	Solve the recurrence relation $a_n = 5a_{n-1} + 6a_{n-2}, n \geq 2, a_0 = 1, a_1 = 3$.	**7**	**L2**	**CO4**
	c.	Find the distinct numbers which are multiples of at least one of 15, 40 and 35 not exceeding 1000.	**7**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Define group and subgroup with example each.	**6**	**L1**	**CO5**
	b.	State and prove Lagrange's theorem.	**7**	**L2**	**CO5**
	c.	Define Klein 4 group. Verify A = {e, a, b, c} is a Klein 4 group.	**7**	**L2**	**CO5**
		OR			
Q.10	**a.**	Prove that the intersection of two subgroup of a group is a subgroup of the group.	**6**	**L2**	**CO5**
	b.	Prove that the cube roots of unity form a group under the multiplication.	**7**	**L2**	**CO5**
	c.	Let G = S_4, the symmetric group of order 4, for $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix}$, find the subgroup H = < a >, determine the number of left cosets of H in G.	**7**	**L3**	**CO5**

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CBCS SCHEME - Make-Up Exam

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

BBOC407

Fourth Semester B.E/B.Tech. Degree Examination, June/July 2025
Biology for Engineers(CSE)

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1			
1	a.	With a neat labelled diagram explain the structure of functions and an animal cell.	10	L1	CO2
	b.	List the differences between Prokaryotic and Eukaryotic cells.	10	L1	CO2
		OR			
2	a.	What are stem cells? Explain the applications of stem cells in treating real time health issues.	10	L1	CO2
	b.	Discuss the properties and functions of Enzymes.	10	L1	CO2
		Module – 2			
3	a.	Explain the properties of cellulose? What are the steps to the design cellulosed based water filter.	10	L2	CO1
	b.	Explain the working of Glucose oxidase (GO_x) in biosensors.	10	L2	CO1
		OR			
4	a.	What are the Bioplastics? Compare the properties of PHA and PLA.	10	L1	CO1
	b.	With a neat diagram, explain the steps in preparation of COVID vaccine.	10	L1	CO1
		Module – 3			
5	a.	What are the applications of EEG.	10	L1	CO1
	b.	What are the Engineering solutions for Parkinson's disease?	10	L1	CO1
		OR			
6	a.	Explain the gas exchange mechanism in lungs.	10	L1	CO1
	b.	Explain the architecture of rod and cone cells.	10	L1	CO1
		Module – 4			
7	a.	What is echolocation? Explain SONAR.	10	L1	CO2
	b.	Write a note on importance of GPS Technology in aircrafts.	10	L1	CO2
		OR			
8	a.	List the applications of Bionic Leaf Technology.	10	L1	CO2
	b.	Discuss the design structure of bullet train inspired from kingfisher's beak.	10	L1	CO2
		Module – 5			
9	a.	Write short notes on : i) Electronic nose ii) Self healing Bio concrete	10	L1	CO2
	b.	Explain the different types Bioremediation techniques.	10	L1	CO2
		OR			
10	a.	Explain the use of artificial intelligence in diagnosis of diseases.	10	L2	CO1
	b.	Discuss the bio – engineering solutions for muscular dystrophy.	10	L2	CO1

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CBCS SCHEME - Make-Up Exam

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BBOC407

Fourth Semester B.E/B.Tech. Degree Examination, June/July 2025
Biology for Engineers(CSE)

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level, C: Course outcomes.

		Module – 1	M	L	C
1	a.	With a neat labelled diagram explain the structure of functions and an animal cell.	10	L1	CO2
	b.	List the differences between Prokaryotic and Eukaryotic cells.	10	L1	CO2
		OR			
2	a.	What are stem cells? Explain the applications of stem cells in treating real time health issues.	10	L1	CO2
	b.	Discuss the properties and functions of Enzymes.	10	L1	CO2
		Module – 2			
3	a.	Explain the properties of cellulose? What are the steps to the design cellulosed based water filter.	10	L2	CO1
	b.	Explain the working of Glucose oxidase (GO_x) in biosensors.	10	L2	CO1
		OR			
4	a.	What are the Bioplastics? Compare the properties of PHA and PLA.	10	L1	CO1
	b.	With a neat diagram, explain the steps in preparation of COVID vaccine.	10	L1	CO1
		Module – 3			
5	a.	What are the applications of EEG.	10	L1	CO1
	b.	What are the Engineering solutions for Parkinson's disease?	10	L1	CO1
		OR			
6	a.	Explain the gas exchange mechanism in lungs.	10	L1	CO1
	b.	Explain the architecture of rod and cone cells.	10	L1	CO1
		Module – 4			
7	a.	What is echolocation? Explain SONAR.	10	L1	CO2
	b.	Write a note on importance of GPS Technology in aircrafts.	10	L1	CO2
		OR			
8	a.	List the applications of Bionic Leaf Technology.	10	L1	CO2
	b.	Discuss the design structure of bullet train inspired from kingfisher's beak.	10	L1	CO2
		Module – 5			
9	a.	Write short notes on : i) Electronic nose ii) Self healing Bio concrete	10	L1	CO2
	b.	Explain the different types Bioremediation techniques.	10	L1	CO2
		OR			
10	a.	Explain the use of artificial intelligence in diagnosis of diseases.	10	L2	CO1
	b.	Discuss the bio – engineering solutions for muscular dystrophy.	10	L2	CO1

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CBCS SCHEME

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BBOK407

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Biology for Engineers

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What are Nucleic acids? Mention its properties and functions.	10	L2	CO1
	b.	Write a short note on all the four types of stem cells.	10	L2	CO1
		OR			
Q.2	a.	Explain the similarities and differences between plant and animal cell.	10	L2	CO1
	b.	Explain the properties and functions of hormones.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the application of carbohydrates as cellulose based water filters, mention its advantages.	10	L2	CO2
	b.	Write short note on Meat analogue and Plant protein as food.	10	L2	CO2
		OR			
Q.4	a.	Explain the DNA vaccine for rabies.	10	L2	CO2
	b.	Write short note on PLA as bioplastic.	10	L2	CO1
		Module – 3			
Q.5	a.	Explain eye as a camera system.	10	L3	CO2
	b.	Describe the architecture of Lungs and gas exchange mechanism.	10	L2	CO2
		OR			
Q.6	a.	Explain the Kidney as filtration system.	10	L3	CO2
	b.	Write a short note on Chronic Obstructive Pulmonary Disease (COPD).	10	L2	CO2
		Module – 4			
Q.7	a.	Write a short note on : (i) Lotus Leaf effect (ii) Shark skin	10	L1	CO3
	b.	Illustrate the HBO's and PFC's as human blood substituents.	10	L3	CO3
		OR			
Q.8	a.	Write a short note on : (i) Photovoltaic cells (ii) Bionic leaf	10	L1	CO3
	b.	Describe the engineering applications of GPS and Velcro technology.	10	L3	CO3
		Module – 5			
Q.9	a.	Analyze the bio-engineering solutions for muscular dystrophy and osteoporosis.	10	L4	CO4
	b.	Write a short note on self healing bio-concrete.	10	L2	CO4
		OR			
Q.10	a.	Examine the bioimaging and artificial intelligence for disease diagnosis.	10	L4	CO4
	b.	Explain the process of biomining via microbial surface adsorption.	10	L2	CO4

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