

# CBCS SCHEME

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22MCA11

## First Semester MCA Degree Examination, Dec.2025/Jan.2026 Mathematical Foundation for Computer Applications

Time: 3 hrs.

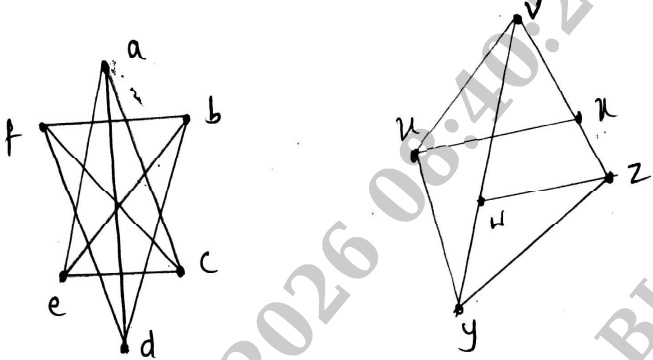
Max. Marks: 100

*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
<b>Q.1</b>	<b>a.</b>	For any two sets A and B prove that i) $\overline{A \cup B} = \overline{A} \cap \overline{B}$ ii) $\overline{A \cap B} = \overline{A} \cup \overline{B}$	6	L1	CO1
	<b>b.</b>	State Pigeonhole principle. Let T be an equilateral triangle where sides are of length one unit. Show that if any five points are chosen lying on or inside the triangle then two of them must be not more than $\frac{1}{2}$ unit apart.	7	L1	CO1
	<b>c.</b>	Find all the eigen values and eigen vector of the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$	7	L2	CO1
<b>OR</b>					
<b>Q.2</b>	<b>a.</b>	Define the following with an example : i) subset ii) powerset iii) cardinality of a set.	6	L1	CO1
	<b>b.</b>	In a hostel of strength 70, 40 in matrix knew Kannada, 35 knew Hindi and 15 of them knew both the languages. Find out the following : i) How many inmates know at least one of the languages ii) How many know neither Kannada nor Hindi?	7	L2	CO1
	<b>c.</b>	Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = \begin{cases} 3x - 5 & \text{if } x > 0 \\ -3x + 1 & \text{if } x \leq 0 \end{cases}$ i) Determine $f(1)$ , $f(-1)$ , $f(5/3)$ and $f(-5/3)$ ii) Find $f^{-1}(1)$ and $f^{-1}(3)$	7	L3	CO1
<b>Module – 2</b>					
<b>Q.3</b>	<b>a.</b>	Define Tautology and prove that $[p \rightarrow (q \rightarrow r)] \rightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$ is a tautology.	6	L1	CO2
	<b>b.</b>	Test the validity of the argument If I study, then I will not fail in the examination If I don't watch TV in the evening I will study I failed in the examination ----- $\therefore$ I must watch TV in the evening	7	L2	CO2
	<b>c.</b>	Give i) A direct proof ii) An indirect proof iii) A proof by contraction for the following statement "If n is an even integer then n + 3 is an odd integer"	7	L2	CO2

<b>OR</b>					
<b>Q.4</b>	<b>a.</b>	Using Laws of logic prove the following : i) $(p \rightarrow q) \wedge (\neg q \wedge (r \vee \neg q)) \Leftrightarrow \neg (q \vee p)$ ii) $(\neg p \wedge (\neg q \wedge r)) \vee [(q \wedge r) \vee (p \wedge r)] \Leftrightarrow r$	<b>6</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Text the validity of the argument $\forall x. [p(x) \vee q(x)]$ $\exists x, \neg p(x)$ $\forall x. [\neg q(x) \vee r(x)]$ <u><math>\forall x, (s(x) \rightarrow \neg r(x))</math></u> $\therefore \exists x, \neg s(x)$	<b>7</b>	<b>L3</b>	<b>CO2</b>
	<b>c.</b>	Write down the following proposition in symbolic form and find the negation. “For all integer n, if n is not divisible by 2 then n is odd”	<b>7</b>	<b>L2</b>	<b>CO2</b>
<b>Module – 3</b>					
<b>Q.5</b>	<b>a.</b>	Prove that the sets A, B, C are i) $A \times (B \cup C) = (A \times B) \cup (A \times C)$ ii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$	<b>6</b>	<b>L1</b>	<b>CO3</b>
	<b>b.</b>	Let $A = \{1, 2, 3, 4, 6\}$ and let R be the relation on A defined by $aRb$ if and only if a is a multiple of b. i) Write down R as a set of ordered pairs ii) Draw the digraph of R iii) Determine the in-degree and out-degree of the vertices in the digraph.	<b>7</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	If R is a relation on $A = \{1, 2, 3, 4\}$ defined by $xRy$ if x divides y. Prove that $(A, R)$ is a poset. Draw its Hasse diagram.	<b>7</b>	<b>L3</b>	<b>CO3</b>
<b>OR</b>					
<b>Q.6</b>	<b>a.</b>	If $A = \{1, 2, 3, 4\}$ and R, S are relations on A defined by $R = \{(1, 2) (1, 3) (2, 4) (4, 4)\}$ $S = \{(1, 1) (1, 2) (1, 3) (1, 4) (2, 3) (2, 4)\}$ Find ROS, SOR, $R^2$ and $S^2$ . Also write down the matrix representation of $R^2$ and $S^2$ .	<b>6</b>	<b>L1</b>	<b>CO3</b>
	<b>b.</b>	The matrix of a relation R is given is R an equivalence relation? Also write digraph of R $M(R) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}$	<b>7</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Let $A = \{1, 2, 3, 4, 6, 12\}$ and on A define the relation R by $aRb$ if “a divider b”. Prove that R is a poset and draw the Hasse diagram of this relation.	<b>7</b>	<b>L3</b>	<b>CO3</b>

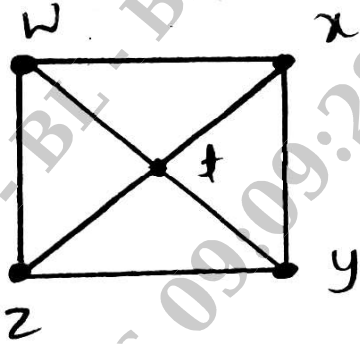
<b>Module – 4</b>																							
<b>Q.7</b>	<b>a.</b>	<p>A random variable X has the following probability function for various values of X.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">7</td> </tr> <tr> <td style="text-align: center;">P(X)</td> <td style="text-align: center;">0</td> <td style="text-align: center;">K</td> <td style="text-align: center;">2K</td> <td style="text-align: center;">2K</td> <td style="text-align: center;">3K</td> <td style="text-align: center;">K<sup>2</sup></td> <td style="text-align: center;">2K<sup>2</sup></td> <td style="text-align: center;">7K<sup>2</sup> + K</td> </tr> </table> <p>i) Find K ii) Evaluate P(X&lt;6), P(X≥6), and P(3 &lt; X ≤ 6).</p>	X	0	1	2	3	4	5	6	7	P(X)	0	K	2K	2K	3K	K <sup>2</sup>	2K <sup>2</sup>	7K <sup>2</sup> + K	<b>6</b>	<b>L1</b>	<b>CO4</b>
X	0	1	2	3	4	5	6	7															
P(X)	0	K	2K	2K	3K	K <sup>2</sup>	2K <sup>2</sup>	7K <sup>2</sup> + K															
	<b>b.</b>	<p>The probability that a pen manufactured by a factory be defective is 1/10. If 12 such pens are manufactured. What is the probability that</p> <p>i) Exactly 2 are defective ii) Atleast 2 are defective iii) None of them are defective.</p>	<b>7</b>	<b>L2</b>	<b>CO4</b>																		
	<b>c.</b>	<p>In a certain town the duration of a shower is exponentially distributed with mean 5 minutes. What is the probability that a shower will last for</p> <p>i) 10 minutes or more ii) Less than 10 minutes iii) Between 10 and 12 minutes</p>	<b>7</b>	<b>L3</b>	<b>CO4</b>																		
<b>OR</b>																							
<b>Q.8</b>	<b>a.</b>	<p>Find the constant K such that</p> $f(x) = \begin{cases} Kx^2 & , 0 < x < 3 \\ 0 & , \text{otherwise} \end{cases} \text{ is a pdf.}$ <p>Also compute</p> <p>(i) P(1 &lt; x &lt; 2) (ii) P(x ≤ 1) (iii) P(x &gt; 1)</p>	<b>6</b>	<b>L1</b>	<b>CO4</b>																		
	<b>b.</b>	<p>2% of the fuses manufactured by a firm are found to be defective. Find the probability that a box containing 200 fuses contains</p> <p>i) no defective fuses ii) 3 or more defective fuses</p>	<b>7</b>	<b>L2</b>	<b>CO4</b>																		
	<b>c.</b>	<p>In a normal distribution 31% of the items are under 45 and 8% of the items are over 64. Find the mean and S.D of the distribution.</p>	<b>7</b>	<b>L2</b>	<b>CO4</b>																		
<b>Module – 5</b>																							
<b>Q.9</b>	<b>a.</b>	<p>Define the following with suitable example</p> <p>i) Complete graph ii) Complete bipartite graph iii) Simple graph</p>	<b>6</b>	<b>L1</b>	<b>CO5</b>																		

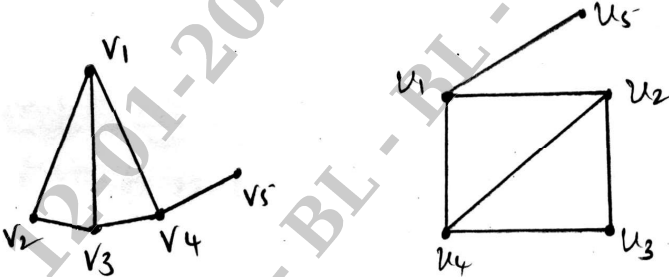
	<p><b>b.</b> Define Graph isomorphism. Show that the following graph are isomorphic</p>  <p style="text-align: center;">Fig Q9(b)</p>	7	L3	CO5
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	<p><b>c.</b> Explain the Konigsberg-Bridge problem.</p>	7	L3	CO5
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**OR**

<p><b>Q.10 a.</b></p>	<p>Prove that complete Graph with 5 vertices are non planar.</p>	6	L3	CO5
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	<p><b>b.</b> Find the chromatic polynomial and chromatic number for the following graph G.</p> 	7	L2	CO5
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	<p><b>c.</b> Show that the following graphs are isomorphic</p> 	7	L3	CO6
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22MCA22

## Second Semester MCA Degree Examination, Dec.2025/Jan.2026 Object Oriented Programming using Java

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.	List and explain the Java's primitive datatype.	8	L2	CO1
	b.	Explain the key attributes of OOPs in Java.	8	L2	CO1
	c.	Write short notes about this keyword with example.	4	L1	CO1
OR					
Q.2	a.	What are the different types of iteration statements and jump statement? Give example.	10	L2	CO1
	b.	Write a short notes on following : i) Garbage collection ii) Bitwise operator.	10	L2	CO1
Module – 2					
Q.3	a.	What is Inheritance? Explain types of inheritance with example.	10	L2	CO4
	b.	Explain access modifier with example.	10	L2	CO2
OR					
Q.4	a.	Describe the concept of method overriding with help of an example.	8	L2	CO1
	b.	Explain multiple usages of final keyword with example.	6	L2	CO1
	c.	Explain abstract class with example.	6	L2	CO3
Module – 3					
Q.5	a.	What is interface? Mention the different between interface and abstract class.	8	L2	CO3
	b.	What is multiple inheritances? How multiple inheritance achieved in Java?	4	L2	CO4
	c.	Write a program to calculate the area of rectangle and triangle by implementing multiple inheritances.	8	L3	CO4
OR					
Q.6	a.	Define Packages? Explain creating and accessing a package.	10	L2	CO1
	b.	List out and explain the access specifiers in Java and give a table for visibility of these access specifiers members with in the package and outside the package.	10	L2	CO2

Module – 4					
Q.7	a.	What is Exception? Explain the exception handling fundamentals with syntax example.	10	L3	CO5
	b.	Explain multiple catch clauses with syntax and example program.	10	L3	CO5
OR					
Q.8	a.	Explain how to create your own exceptions give an example.	10	L3	CO5
	b.	Explain throw, throws and finally with example program and syntax.	10	L3	CO5
Module – 5					
Q.9	a.	Write down the difference between AWT and Swing.	5	L2	CO6
	b.	Explain about Two ways to create a frame in Java swing.	10	L2	CO6
	c.	Draw the Hierarchy of Java swing Class.	5	L2	CO6
OR					
Q.10	a.	Explain following with example i) JButton ii) JTextField iii) JTextArea iv) Jtable v) Jpassword field	10	L2	CO6
	b.	Explain the following with an example : i) JMenuBar ii) Jmenu iii) JMenuItem iv) JprogrammBar v) JTree.	10	L2	CO6

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22MCA23

## Second Semester MCA Degree Examination, Dec.2025/Jan.2026 Software Engineering

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 is the importance of Software Engineering? What are the attributes of a good software?	10	L2	CO1
	b.	Apply Boehm's spiral model for software life cycle to discuss the various activities in each phase.	10	L2	CO1
<b>OR</b>					
Q.2	a.	Apply software design process to describe the main activities and output in the software design and also show possible relationships between the output of these activities.	10	L2	CO1
	b.	Discuss the various phases and static workflows in Rational Unified Process.	10	L2	CO1
<b>Module – 2</b>					
Q.3	a.	What is Extreme Programming? Explain the extreme programming release cycle with a neat diagram.	10	L1	CO2
	b.	Using your knowledge how an ATM is used, develop a set of use cases that could serve as a basis for understanding the requirements for an ATM system.	10	L1	CO2
<b>OR</b>					
Q.4	a.	Explain the requirements engineering process with a neat block diagram.	10	L1	CO2
	b.	Explain non functional requirement with a neat diagram. Illustrate the non functional requirement for MHC-PMS.	10	L1	CO2
<b>Module – 3</b>					
Q.5	a.	Illustrate class diagram development by considering an example of ATM.	10	L2	CO1
	b.	Build a class model for managing credit card accounts.	10	L2	CO1
<b>OR</b>					
Q.6	a.	Illustrate Aggregation and Association by taking an example of student database.	10	L2	CO1
	b.	Use the notations of aggregation, composition association to develop a library information system.	10	L2	CO1

**Module – 4**

<b>Q.7</b>	<b>a.</b>	What is System Modeling? Explain different perspectives that the system model is developed.	<b>10</b>	<b>L2</b>	<b>CO4</b>
	<b>b.</b>	Draw and explain context model for patient information system.	<b>10</b>	<b>L2</b>	<b>CO4</b>

**OR**

<b>Q.8</b>	<b>a.</b>	What is Model Driven Engineering? State the types of abstract system model produced with a neat diagram.	<b>10</b>	<b>L2</b>	<b>CO4</b>
	<b>b.</b>	What is Open Source Development? Explain general models of open source licensing.	<b>10</b>	<b>L2</b>	<b>CO4</b>

**Module – 5**

<b>Q.9</b>	<b>a.</b>	With a neat diagram, explain the different stages of acceptance testing process.	<b>10</b>	<b>L1</b>	<b>CO3</b>
	<b>b.</b>	Explain software evolution process with a neat diagram.	<b>10</b>	<b>L1</b>	<b>CO3</b>

**OR**

<b>Q.10</b>	<b>a.</b>	Discuss Test Driven Development (TDD) with its process and list its benefits.	<b>10</b>	<b>L1</b>	<b>CO3</b>
	<b>b.</b>	Briefly describe the 3 main types of software maintainance. Why is it sometimes difficult to distinguish between them?	<b>10</b>	<b>L1</b>	<b>CO3</b>

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# CBCS SCHEME

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22MCA262

## Second Semester MCA Degree Examination, Dec.2025/Jan.2026 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																																												
Q.1	a.	What is Artificial Intelligence? Explain the task domain of AI.	10	L2	CO1																																												
	b.	Elaborate the steps of solving travelling salesman problem.	10	L2	CO1																																												
<b>OR</b>																																																	
Q.2	a.	State and explain best first search algorithm with example.	10	L2	CO1																																												
	b.	Explain what is production system. Explain the requirement for good control strategies.	10	L2	CO1																																												
<b>Module – 2</b>																																																	
Q.3	a.	State and explain Alpha – Beta pruning with example.	10	L2	CO2																																												
	b.	Describe the issues of knowledge representation.	10	L2	CO2																																												
<b>OR</b>																																																	
Q.4	a.	Explain steps to convert wff into clause form.	10	L2	CO2																																												
	b.	Explain the algorithm of Propositional Resolution with an example.	10	L2	CO2																																												
<b>Module – 3</b>																																																	
Q.5	a.	Explain in detail about production system and frame based system.	10	L2	CO3																																												
	b.	The following table gives data set about stolen vehicle. Using Naïve Bayes classifier classify new data (colour = Red, Type = SUV, Origin = Domestic)	10	L3	CO3																																												
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Color</th> <th>Type</th> <th>Origin</th> <th>Stolen</th> </tr> </thead> <tbody> <tr><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr> <tr><td>Red</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>Red</td><td>Sports</td><td>Domestic</td><td>Yes</td></tr> <tr><td>Yellow</td><td>Sports</td><td>Domestic</td><td>No</td></tr> <tr><td>Yellow</td><td>Sports</td><td>Imported</td><td>Yes</td></tr> <tr><td>Yellow</td><td>SUV</td><td>Imported</td><td>No</td></tr> <tr><td>Yellow</td><td>SUV</td><td>Imported</td><td>Yes</td></tr> <tr><td>Yellow</td><td>SUV</td><td>Domestic</td><td>No</td></tr> <tr><td>Red</td><td>SUV</td><td>Imported</td><td>No</td></tr> <tr><td>Red</td><td>Sports</td><td>Imported</td><td>Yes</td></tr> </tbody> </table>	Color	Type	Origin	Stolen	Red	Sports	Domestic	Yes	Red	Sports	Domestic	No	Red	Sports	Domestic	Yes	Yellow	Sports	Domestic	No	Yellow	Sports	Imported	Yes	Yellow	SUV	Imported	No	Yellow	SUV	Imported	Yes	Yellow	SUV	Domestic	No	Red	SUV	Imported	No	Red	Sports	Imported	Yes			
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<b>OR</b>					
<b>Q.6</b>	<b>a.</b>	Explain the need of fuzzy set and fuzzy logic with example. Explain in brief how reasoning is done using fuzzy logic.	<b>14</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Write a short note on Dempster Shafer theory.	<b>6</b>	<b>L2</b>	<b>CO3</b>
<b>Module – 4</b>					
<b>Q.7</b>	<b>a.</b>	Explain adaptive learning with an example.	<b>10</b>	<b>L2</b>	<b>CO4</b>
	<b>b.</b>	Elaborate STRIP mechanism and discuss the list used in STRIP operating.	<b>10</b>	<b>L2</b>	<b>CO4</b>
<b>OR</b>					
<b>Q.8</b>	<b>a.</b>	Explain the steps in designing a learning system.	<b>10</b>	<b>L2</b>	<b>CO4</b>
	<b>b.</b>	Explain in detail about planning. Explain the various components of planning.	<b>10</b>	<b>L2</b>	<b>CO4</b>
<b>Module – 5</b>					
<b>Q.9</b>	<b>a.</b>	Define Expert system and discuss the architecture of expert system.	<b>10</b>	<b>L2</b>	<b>CO5</b>
	<b>b.</b>	Explain in detail about XCON.	<b>10</b>	<b>L2</b>	<b>CO5</b>
<b>OR</b>					
<b>Q.10</b>	<b>a.</b>	Discuss in detail the advantages and limitation of expert system.	<b>10</b>	<b>L2</b>	<b>CO5</b>
	<b>b.</b>	Write a note on : i) MYCIN      ii) DART.	<b>10</b>	<b>L2</b>	<b>CO5</b>

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# CBCS SCHEME

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MMCC311A

## Third Semester MCA Degree Examination, Dec.2025/Jan.2026 Computer Networks

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 a computer network. Explain the key components of a computer network.	6	L2	CO1
	b.	Describe the different types of computer networks with neat diagram.	8	L2	CO1
	c.	Define communication modes and explain its types.	6	L2	CO1
<b>OR</b>					
Q.2	a.	List and explain networking devices and describe their functions in detail.	5	L2	CO1
	b.	Explain the topologies used in networks. List advantages and disadvantages of each of them.	10	L2	CO1
	c.	Explain client-server and Peer-to-Peer architecture.	5	L2	CO1
<b>Module – 2</b>					
Q.3	a.	Explain the functionalities of each layer in the OSI reference model.	10	L2	CO1
	b.	Explain connection-oriented and connectionless communication in detail, and illustrate each with suitable real-world examples.	5	L2	CO1
	c.	Explain the various terminologies used in computer networks.	5	L2	CO1
<b>OR</b>					
Q.4	a.	Compare the TCP/IP and OSI models. Why does the OSI model fail?	5	L2	CO1
	b.	What is meant by logical connection in TCP/IP. Explain TCP/IP reference model with diagram?	10	L2	CO1
	c.	Describe the protocol hierarchy and its importance in computer networks.	5	L2	CO1
<b>Module – 3</b>					
Q.5	a.	What are guided transmission media? Explain twisted pair cable in detail.	6	L2	CO2
	b.	Explain how data transmission takes place using radio waves, microwaves, and infrared.	8	L2	CO2
	c.	Explain circuit switched network and packet switched network with neat diagram.	6	L2	CO2

OR

<b>Q.6</b>	<b>a.</b>	Distinguish between unguided and guided media. Give example.	<b>6</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Describe the structure and working of a coaxial cable. What are its advantages and disadvantages?	<b>8</b>	<b>L2</b>	<b>CO2</b>
	<b>c.</b>	Explain the importance and applications of satellite communication in data transmission.	<b>6</b>	<b>L2</b>	<b>CO2</b>

**Module – 4**

<b>Q.7</b>	<b>a.</b>	Define error and types of error. Describe any one Error Detection with example.	<b>5</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Solve using Hamming code method. Data word: 1101.	<b>5</b>	<b>L3</b>	<b>CO3</b>
	<b>c.</b>	Describe Sliding Window Protocols. Explain the working of Go-Back-N ARQ or Selective Repeat ARQ with neat diagram.	<b>10</b>	<b>L2</b>	<b>CO3</b>

OR

<b>Q.8</b>	<b>a.</b>	Explain the Stop-and-Wait protocol for error free channel with a neat diagram.	<b>7</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	A bit stream 10011001 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$ .	<b>6</b>	<b>L3</b>	<b>CO3</b>
	<b>c.</b>	What is congestion control? Explain any two Congestion Control algorithms	<b>7</b>	<b>L2</b>	<b>CO3</b>

**Module – 5**

<b>Q.9</b>	<b>a.</b>	List the services and applications of TCP.	<b>6</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Explain the header format of IPV4 with neat diagram.	<b>8</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Explain the architecture and working of the Email system.	<b>6</b>	<b>L2</b>	<b>CO3</b>

OR

<b>Q.10</b>	<b>a.</b>	What is difference between TCP and UDP?	<b>6</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Discuss the DNS in detail and explain its hierarchical structure with an example.	<b>7</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Explain the HTTP protocol in detail. Discuss HTTP request/response messages with neat diagram.	<b>7</b>	<b>L2</b>	<b>CO3</b>

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MMCC311D

## Third Semester MCA Degree Examination, Dec.2025/Jan.2026 Unix Shell Programming

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 UNIX architecture. Describe the main components like Kernel, Shell, and File system in simple terms.	10	L1	CO1
	b.	Explain any five features of UNIX with examples.	10	L1	CO1
OR					
Q.2	a.	Explain the general structure of UNIX commands. What are command arguments and options? Give simple examples.	10	L1	CO1
	b.	Explain directory commands: pwd, cd, mkdir, and rmdir with examples.	10	L1	CO1
Module – 2					
Q.3	a.	Describe the methods to change file permissions using absolute and relative methods.	10	L2	CO2
	b.	What are regular expressions? Differentiate between basic and extended regular expressions with examples.	10	L2	CO2
OR					
Q.4	a.	Explain file attributes in Unix. How do you use the ls command with options to view them?	10	L2	CO2
	b.	Explain the redirection of standard files with suitable examples.	10	L2	CO2
Module – 3					
Q.5	a.	With a neat diagram, explain the UNIX System Implementation showing kernel, system calls, libraries, and user applications.	10	L2	CO3
	b.	Define a file descriptor. Explain how open( ), read( ), write( ), and close( ) system calls work with simple examples.	10	L2	CO3
OR					
Q.6	a.	Explain directory-related functions: mkdir( ), rmdir( ), and chdir( ). Give suitable examples.	10	L2	CO3
	b.	Draw and explain the Memory Layout of a C program (text, data, bss, heap, stack).	10	L2	CO3

**Module – 4**

<b>Q.7</b>	<b>a.</b>	Explain the fork( ) system call. How does a child process differ from a parent process? Give an example.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Explain process termination. Describe the use of exit( ), wait( ), and waitpid( ) system calls with examples.	<b>10</b>	<b>L2</b>	<b>CO3</b>

**OR**

<b>Q.8</b>	<b>a.</b>	Explain the exec family of functions. How does exec( ) replace a program image? Provide a simple illustration.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Describe Interprocess Communication (IPC) methods in UNIX.	<b>10</b>	<b>L2</b>	<b>CO3</b>

**Module – 5**

<b>Q.9</b>	<b>a.</b>	Explain the concept of signals in UNIX. Describe different types of signals and their typical uses.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Discuss signal handling functions in UNIX. Explain signal( ), sigaction( ), and sigprocmask( ) with examples.	<b>10</b>	<b>L3</b>	<b>CO3</b>

**OR**

<b>Q.10</b>	<b>a.</b>	Explain the use of the following functions with examples: kill( ), raise( ), alarm( ), and pause( ).	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	What is a daemon process? Explain daemon characteristics.	<b>10</b>	<b>L3</b>	<b>CO3</b>

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MMCC311F

## Third Semester MCA Degree Examination, Dec.2025/Jan.2026 Introduction to ERP and SAP Basis Administration

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.*

<b>Module – 1</b>			<b>M</b>	<b>L</b>	<b>C</b>
<b>Q.1</b>	<b>a.</b>	Describe the process view of a supply chain and explain how different stages coordinate activities and information flow.	<b>10</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Explain any 3 supply chain drivers with examples.	<b>10</b>	<b>L2</b>	<b>CO1</b>
<b>OR</b>					
<b>Q.2</b>	<b>a.</b>	Discuss the decision phases in supply chain management and explain how they support effective business operations.	<b>10</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Define supply chain. Explain the objectives and importance of supply chain management with suitable examples from real-world industries.	<b>10</b>	<b>L2</b>	<b>CO1</b>
<b>Module – 2</b>					
<b>Q.3</b>	<b>a.</b>	Explain the ERP implementation life cycle and discuss the key stages involved.	<b>10</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Explain the roles of vendors, consultants, and users in ERP implementation success.	<b>10</b>	<b>L2</b>	<b>CO2</b>
<b>OR</b>					
<b>Q.4</b>	<b>a.</b>	Discuss the importance of project management and monitoring in ERP implementation projects.	<b>10</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Explain the process of organizing ERP implementation teams for successful project execution.	<b>10</b>	<b>L3</b>	<b>CO2</b>
<b>Module – 3</b>					
<b>Q.5</b>	<b>a.</b>	Describe the ERP marketplace and explain major trends influencing ERP adoption globally.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Write a detailed note on SAP AG — evolution, products, and market contribution.	<b>05</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Explain the market role and product offerings of Oracle Corporation.	<b>05</b>	<b>L2</b>	<b>CO3</b>

OR

<b>Q.6</b>	<b>a.</b>	Explain the market role and product offerings of QAD and System Software Associates (SSA).	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Discuss the features and strengths of PeopleSoft ERP in the enterprise application market.	<b>05</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Discuss the different product offering of JD Edwards World Solutions.	<b>05</b>	<b>L2</b>	<b>CO2</b>

Module – 4

<b>Q.7</b>	<b>a.</b>	Explain SAP R/3 architecture and describe the functions of each major component.	<b>10</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Discuss the role and working of the Transport Management System (TMS) in SAP environments.	<b>10</b>	<b>L3</b>	<b>CO2</b>

OR

<b>Q.8</b>	<b>a.</b>	Write a detailed note on job scheduling and spool management in SAP Basis.	<b>10</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Explain any four work processes & their functions in SAP Basis administration.	<b>10</b>	<b>L3</b>	<b>CO3</b>

Module – 5

<b>Q.9</b>	<b>a.</b>	Explain the process of SAP patch management with suitable examples.	<b>10</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Explain different backup mechanisms in SAP systems.	<b>10</b>	<b>L3</b>	<b>CO2</b>

OR

<b>Q.10</b>	<b>a.</b>	Discuss different disaster recovery strategies in SAP systems.	<b>10</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Discuss the different techniques involved in user management & security in SAP environment.	<b>10</b>	<b>L3</b>	<b>CO2</b>

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MMCC311F

## Third Semester MCA Degree Examination, Dec.2025/Jan.2026 Introduction to ERP and SAP Basis Administration

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.*

<b>Module – 1</b>			<b>M</b>	<b>L</b>	<b>C</b>
<b>Q.1</b>	<b>a.</b>	Describe the process view of a supply chain and explain how different stages coordinate activities and information flow.	<b>10</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Explain any 3 supply chain drivers with examples.	<b>10</b>	<b>L2</b>	<b>CO1</b>
<b>OR</b>					
<b>Q.2</b>	<b>a.</b>	Discuss the decision phases in supply chain management and explain how they support effective business operations.	<b>10</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Define supply chain. Explain the objectives and importance of supply chain management with suitable examples from real-world industries.	<b>10</b>	<b>L2</b>	<b>CO1</b>
<b>Module – 2</b>					
<b>Q.3</b>	<b>a.</b>	Explain the ERP implementation life cycle and discuss the key stages involved.	<b>10</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Explain the roles of vendors, consultants, and users in ERP implementation success.	<b>10</b>	<b>L2</b>	<b>CO2</b>
<b>OR</b>					
<b>Q.4</b>	<b>a.</b>	Discuss the importance of project management and monitoring in ERP implementation projects.	<b>10</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Explain the process of organizing ERP implementation teams for successful project execution.	<b>10</b>	<b>L3</b>	<b>CO2</b>
<b>Module – 3</b>					
<b>Q.5</b>	<b>a.</b>	Describe the ERP marketplace and explain major trends influencing ERP adoption globally.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Write a detailed note on SAP AG — evolution, products, and market contribution.	<b>05</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Explain the market role and product offerings of Oracle Corporation.	<b>05</b>	<b>L2</b>	<b>CO3</b>

OR

<b>Q.6</b>	<b>a.</b>	Explain the market role and product offerings of QAD and System Software Associates (SSA).	<b>10</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Discuss the features and strengths of PeopleSoft ERP in the enterprise application market.	<b>05</b>	<b>L2</b>	<b>CO3</b>
	<b>c.</b>	Discuss the different product offering of JD Edwards World Solutions.	<b>05</b>	<b>L2</b>	<b>CO2</b>

Module – 4

<b>Q.7</b>	<b>a.</b>	Explain SAP R/3 architecture and describe the functions of each major component.	<b>10</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Discuss the role and working of the Transport Management System (TMS) in SAP environments.	<b>10</b>	<b>L3</b>	<b>CO2</b>

OR

<b>Q.8</b>	<b>a.</b>	Write a detailed note on job scheduling and spool management in SAP Basis.	<b>10</b>	<b>L2</b>	<b>CO2</b>
	<b>b.</b>	Explain any four work processes & their functions in SAP Basis administration.	<b>10</b>	<b>L3</b>	<b>CO3</b>

Module – 5

<b>Q.9</b>	<b>a.</b>	Explain the process of SAP patch management with suitable examples.	<b>10</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Explain different backup mechanisms in SAP systems.	<b>10</b>	<b>L3</b>	<b>CO2</b>

OR

<b>Q.10</b>	<b>a.</b>	Discuss different disaster recovery strategies in SAP systems.	<b>10</b>	<b>L3</b>	<b>CO2</b>
	<b>b.</b>	Discuss the different techniques involved in user management & security in SAP environment.	<b>10</b>	<b>L3</b>	<b>CO2</b>

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