

# CBCS SCHEME

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BCS501

## Fifth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Software Engineering and Project Management

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 domains of software applications.	08	L2	CO1
	b.	Outline the unique nature of WebApps.	08	L2	CO1
	c.	Explain various software myths. Discuss.	04	L2	CO1
OR					
Q.2	a.	Explain the activities performed in a software process framework?	06	L2	CO1
	b.	Explain the waterfall model along with its pros and cons.	08	L2	CO1
	c.	Explain specialized process models.	06	L2	CO1
Module - 2					
Q.3	a.	Explain how groundwork parameters are established in requirements engineering.	08	L2	CO2
	b.	What is the importance of quality function deployment in eliciting requirements?	06	L1	CO2
	c.	How can we validate requirements?	06	L1	CO2
OR					
Q.4	a.	Explain about scenario based modelling.	10	L2	CO2
	b.	Illustrate regarding how can we create a Behavioral Model.	10	L2	CO2
Module - 3					
Q.5	a.	Explain Agility along with the principles of Agility.	10	L2	CO3
	b.	Explain the Extreme Programming Process.	06	L2	CO3
	c.	Explain about the critics of XP.	04	L2	CO3
OR					
Q.6	a.	Explain the scrum flow process.	08	L2	CO3
	b.	Explain the communication principles guiding framework activity.	08	L2	CO3
	c.	How can we validate and test principles in coding?	04	L1	CO3
Module - 4					
Q.7	a.	Define Project. Show the contrast of software projects with other types of projects.	06	L2	CO4
	b.	Explain the ISO 12207 software development life cycle with a neat diagram.	10	L2	CO4
	c.	What are outsourced projects?	04	L1	CO4
OR					
Q.8	a.	Illustrate the cost benefit evaluation techniques.	10	L2	CO4
	b.	Illustrate the concept of Risk evaluation.	10	L2	CO4
Module - 5					
Q.9	a.	Explain the details to be drafted for achieving quality in software.	06	L2	CO5
	b.	Explain the software quality characteristics of ISO 9126.	08	L2	CO5
	c.	Explain process requirements for the process quality management.	06	L2	CO5
OR					
Q.10	a.	Explain about the decomposition techniques.	10	L2	CO5
	b.	Explain the COCOMO II model.	10	L2	CO5

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## Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025 Theory of Computation

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 the following with an example: i) Alphabet. ii) Power of an alphabet iii) String iv) String concatenation v) Language	5	L1	CO1
	b.	Define Deterministic Finite Automata (DFA) and the language accepted by it.	5	L1	CO1
	c.	Design DFA to accept the following languages: i) $L = \{W \in \{0, 1\}^* : W \text{ has } 001 \text{ as a substring}\}$ ii) $L = \{W \in \{0, 1\}^* :  W  \bmod 3 = 0\}$	10	L3	CO1
<b>OR</b>					
Q.2	a.	Convert the following NFA to DFA  <div style="text-align: center;"> <pre> graph LR     q0((q0)) -- "0,1" --&gt; q0     q0 -- "0" --&gt; q1((q1))     q1 -- "1" --&gt; q2((q2))     q2 -- "0,1" --&gt; q2             </pre> <p style="text-align: center;">Fig.Q.2(a)</p> </div>	8	L2	CO1
	b.	Convert the following $\epsilon$ - NFA to DFA  <div style="text-align: center;"> <pre> graph LR     q0((q0)) -- "a" --&gt; q0     q0 -- "epsilon" --&gt; q1((q1))     q1 -- "b" --&gt; q1     q1 -- "epsilon" --&gt; q2((q2))     q2 -- "c" --&gt; q2             </pre> <p style="text-align: center;">Fig.Q.2(b)</p> <p>and define <math>\epsilon</math> - NFA</p> </div>	12	L2	CO1
<b>Module – 2</b>					
Q.3	a.	Define regular expression. Write the regular expression for the following languages: i) Representing for strings of a and b's having odd length. ii) To accept 10 as substring over an alphabet $\Sigma = \{0, 1\}$	10	L2	CO2
	b.	State and prove pumping Lemma for regular languages.	10	L2	CO2

## OR

Q.4	a.	Prove that regular languages are closed under complementation and intersection.	10	L2	CO2
	b.	i) Obtain NFA (Non deterministic finite automata) for the regular expression $(a + b)^* abb$ . ii) Obtain NFA for the regular expression $(a^* + ab)(a + b)^*$	6	L2	CO2
	c.	Write the applications of regular expression.	4	L2	CO2

## Module – 3

Q.5	a.	Define context free grammar. Write the CFG for the following languages: i) $L = \{a^n b^n c^m : n \geq 0, m \geq 0\}$ ii) $L = \{w \in \{a, b\}^* : n_a(w) = n_b(w)\}$	10	L2	CO2
	b.	i) Define ambiguous grammar with suitable example. ii) Consider the grammar $E \rightarrow + EE / * EE / - EE / x / y$ Find the left most derivation, right most derivation and parse tree for the string "+* -xyxy".	10	L2	CO2

## OR

Q.6	a.	Define PDA (Push Down Automata). Design a PDA to accept the following language: $L = \{a^n b^n : n \geq 0\}$ . Draw the transition diagram and show that instantaneous description for the string aaabbb.	10	L3	CO3
	b.	Convert the following CFG to PDA: i) $E \rightarrow E + E \mid E * E \mid id$ ii) $E \rightarrow I \mid E * E \mid (E)$ $I \rightarrow id$	6	L2	CO3
	c.	Discuss the language accepted by PDA.	4	L1	CO3

## Module – 4

Q.7	a.	Convert the following grammar to CNF (Chomsky Normal Form) $S \rightarrow ASB / \epsilon$ $A \rightarrow aAS / a$ $B \rightarrow SbS \mid A \mid bb$ and define CNF	10	L2	CO3
	b.	State and prove pumping Lemma for context free languages.	10	L2	CO3

OR

<b>Q.8</b>	<b>a.</b>	What are useless and $\epsilon$ productions? Eliminate $\epsilon$ , unit and useless productions from the following grammar: $A \rightarrow bA/Bba/aa$ $B \rightarrow aBa/b/D$ $C \rightarrow CA/AC/B$ $D \rightarrow a/\epsilon$	<b>10</b>	<b>L3</b>	<b>CO3</b>
	<b>b.</b>	Prove that the family of context free languages is closed under union concatenation and star closure.	<b>10</b>	<b>L2</b>	<b>CO3</b>

Module – 5

<b>Q.9</b>	<b>a.</b>	Define a Turing Machine. Explain the working and variants of Turing machine.	<b>10</b>	<b>L1</b>	<b>CO4</b>
	<b>b.</b>	Design a Turing machine to accept $L = \{a^n b^n c^n \mid n \geq 0\}$ . Draw the transition diagram. Show the moves made for string aabbcc.	<b>10</b>	<b>L3</b>	<b>CO4</b>

OR

<b>Q.10</b>	<b>a.</b>	Explain language acceptability and design of Turing Machines (Steps).	<b>10</b>	<b>L2</b>	<b>CO5</b>
	<b>b.</b>	Explain the following: i) Programming techniques for turing machines ii) Undecidability problem.	<b>10</b>	<b>L2</b>	<b>CO5</b>

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