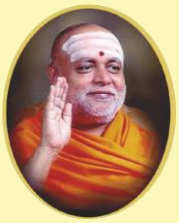

|| Jai Sri Gurudev ||

BGSKH Education Trust(R.) - A unit of Sri Adichunchanagiri Shikshana Trust(R.)

BGS College Of Engineering and Technology

VTU – Dec.2024 / Jan. 2025 – V Sem Question Papers

2022 - Scheme

V Semester Question Papers Dec.2024/Jan - 2025

Sl.No	Name of the Subject	Subject Code
1	Software Engineering and Project Management	BCS501
2	Computer Networks	BCS502
3	Theory of Computation	BCS503
4	Computer vision	BA1515A
5	Data Warehousing	BAD515B
6	Artificial Intelligence	BCS515B
7	Research Methodology and IPR	BRMK557

CBCS SCHEME

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

BCS501

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
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 software process and software engineering practices.	10	L2	CO1
	b.	Explain the waterfall model and incremental model, with diagram.	10	L2	CO1
		OR			
Q.2	a.	Explain Boehm Spiral process model with a neat diagram. Mention its advantages and disadvantages.	10	L2	CO1
	b.	Explain the five activities of a generic process framework for software engineering.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the distinct tasks of requirement engineering.	10	L2	CO2
	b.	Illustrate the UML use case diagram for safe home system.	10	L2	CO2
		OR			
Q.4	a.	Explain Class-Responsibility-Collaborator(CRC) modeling and data modeling with an example.	10	L2	CO2
	b.	Explain the elements of analysis model in requirement modeling.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the principles of agile process development.	10	L2	CO3
	b.	Explain the following : i) Adaptive software development ii) SCRUM	10	L2	CO3
		OR			
Q.6	a.	Explain the concepts of extremes programming with a neat diagram.	10	L2	CO3
	b.	Explain design modeling principles that guide the respective framework activity.	10	L2	CO3
		Module – 4			
Q.7	a.	Illustrate the project management life cycle with a neat diagram.	10	L2	CO4
	b.	Explain : i) Different ways of categorizing software projects ii) Smart objectives	10	L2	CO4
		OR			
Q.8	a.	Explain the difference between traditional versus modern project management practices along with the role of management.	10	L3	CO4
	b.	Explain software development life cycle (ISO 12207) with a neat diagram.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain Quality Management System with principles of BS EN ISO-9001-2000.	10	L2	CO5
	b.	Explain the following : i) McCall model ii) Garvin's Quality Dimensions.	10	L2	CO5
		OR			
Q.10	a.	Describe six generic functions allowed in automated estimation techniques of software projects.	10	L3	CO5
	b.	Explain COCOMO II model.	10	L2	CO5

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CBCS SCHEME

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BCS502

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
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.**	What is data communication? List and explain characteristics and components of communication model.	**06**	**L1**	**CO1**
	b.	Define switching. Explain Circuit Switched Network and Packet Switched Network.	**06**	**L2**	**CO1**
	c.	With neat sketch, explain different layers of TCP/IP protocol suite.	**08**	**L2**	**CO1**
		OR			
Q.2	**a.**	What are guided transmission media? Explain twisted pair cable in detail.	**06**	**L1**	**CO1**
	b.	What is Virtual Circuit Network (VCN)? With neat diagram, explain three phases involved in VCN.	**08**	**L1**	**CO1**
	c.	Write a note on Encapsulation and decapsulation at Source Host for TCP/IP protocol suite.	**06**	**L2**	**CO1**
		Module – 2			
Q.3	**a.**	Define Redundancy. Explain CRC encoder and CRC decoder operation with block diagram.	**08**	**L2**	**CO2**
	b.	Distinguish between Flow Control and Error Control. Explain Stop and Wait Protocol.	**08**	**L2**	**CO2**
	c.	List and explain Control Fields of I-frames, S-frames and U-frames.	**04**	**L2**	**CO2**
		OR			
Q.4	**a.**	What is Hamming distance? With example, explain Parity Check Code.	**06**	**L1**	**CO2**
	b.	Define Framing. Explain character oriented framing and bit-oriented framing.	**06**	**L1**	**CO2**
	c.	With flow diagram, explain CSMA/CA.	**08**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	Explain virtual-circuit approach to route the packets in packet-switched network.	**10**	**L2**	**CO3**
	b.	Illustrate the working of OSPF and BGP.	**10**	**L3**	**CO3**
		OR			
Q.6	**a.**	Explain IPv6 datagram format.	**10**	**L2**	**CO3**
	b.	Write an Dijikstra's algorithm to compute shortest path through graph.	**06**	**L1**	**CO3**
	c.	Write a note on Routing Information Protocol (RIP) algorithm.	**04**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain Go-Back-N protocol working.	**10**	**L2**	**CO4**
	b.	With neat sketch, explain three-way handshaking of TCP connection establishment.	**10**	**L2**	**CO4**

		OR			
Q.8	**a.**	With an outline, explain selective repeat protocol.	**10**	**L2**	**CO4**
	b.	List and explain various services provided by User Datagram Protocol (UDP).	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Briefly explain Secure Shell (SSH).	**10**	**L2**	**CO4**
	b.	Write a note on Request message and response message formats of HTTP.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	With neat diagram, explain the basic model of FTP.	**04**	**L2**	**CO4**
	b.	Describe the architecture of electronic mail (e-mail).	**06**	**L3**	**CO4**
	c.	Briefly explain Recursive Resolution and Iterative Resolution in DNS.	**10**	**L2**	**CO4**

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CBCS SCHEME

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BCS503

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Theory of Computation

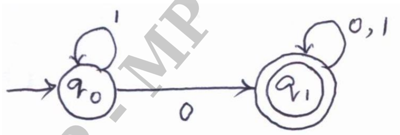
Time: 3 hrs. Max. Marks: 100

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 example : i) Language ii) String iii) Power of an alphabet.	**3**	**L1**	**CO1**
	b.	Define DFA. Draw a DFA to accepts. i) The set of all strings that contain a substring aba. ii) To accept the stings of a's and b's that contain not more than there b's. iii) $L = \{w \in \{a, b\}^* :$ No 2 consecutive characters are same in w$\}$.	**10**	**L3**	**CO1**
	c.	Convert the following NFA to DFA. (see table below)	**7**	**L2**	**CO1**

	0	1
→ p	{p, q}	{p}
q	{r}	{r}
r	{s}	ϕ
* s	{s}	{s}

		OR			
Q.2	**a.**	Define the following with example : i) Alphabet ii) Reversal of string iii) Concatenation of Languages.	**3**	**L1**	**CO1**
	b.	Design a DFA for the Language : $L = \{w \in \{0, 1\}^* :$ w is a string divisible by 5$\}$.	**7**	**L3**	**CO1**
	c.	Define NFA. Obtain an ε - NFA which accepts strings consisting of 0 or more a's , followed by 0 or more b's followed by 0 or more C's. Also convert it to DFA.	**10**	**L2**	**CO1**
		Module – 2			
Q.3	**a.**	Define Regular expression. Write the regular expression for the following languages : i) Strings of a's and b's starting with a and ending with b. ii) Set of strings that consists of alternating 0's and 1's. iii) $L = \{a^n bm , (n + m)$ is even$\}$. iv) $L = \{w : / w / \bmod 3 = 0 ,$ where $w \in \{a, b\}^*\}$.	**10**	**L2**	**CO2**

<table>
<tr><td></td><td>b.</td><td>Minimize the following finite automata using Table filling algorithm :
<table>
<tr><th></th><th>δ</th><th>a</th><th>b</th></tr>
<tr><td>→</td><td>A</td><td>B</td><td>A</td></tr>
<tr><td></td><td>B</td><td>A</td><td>C</td></tr>
<tr><td></td><td>C</td><td>D</td><td>B</td></tr>
<tr><td>*</td><td>D</td><td>D</td><td>A</td></tr>
<tr><td></td><td>E</td><td>D</td><td>F</td></tr>
<tr><td></td><td>F</td><td>G</td><td>E</td></tr>
<tr><td></td><td>G</td><td>F</td><td>G</td></tr>
<tr><td></td><td>H</td><td>G</td><td>D</td></tr>
</table></td><td>10</td><td>L2</td><td>CO2</td></tr>
<tr><td colspan="6" align="center">OR</td></tr>
<tr><td>Q.4</td><td>a.</td><td>Construct ε - NFA for the following Regular expression :
i) (0 + 1) 0 1(1 + 0)   ii) $1(0+1)^* 0$ iii) $(0+1)^* 0 1 1^*$</td><td>6</td><td>L1</td><td>CO2</td></tr>
<tr><td></td><td>b.</td><td>Obtain the Regular expression that denotes the language accepted by Fig. Q4(b).
Fig. Q4(b)
 

Using Kleene's theorem.</td><td>6</td><td>L3</td><td>CO2</td></tr>
<tr><td></td><td>c.</td><td>State the Pumping Lemma for the Regular Languages. And also prove that the following languages are note regular.
i) $L = \{0^n 1^m \mid n \le m\}$ ii) $L = \{0^n 1^m 2^n \mid n, m \ge 1\}$.</td><td>8</td><td>L1</td><td>CO2</td></tr>
<tr><td colspan="6" align="center">Module – 3</td></tr>
<tr><td>Q.5</td><td>a.</td><td>Design CFG for the following languages :
i) $L = \{a^n b^{n+3}, n \ge 0\}$
ii) $L = \{a^i b^j c^k, j = i + k, i \ge 0, k \ge 0\}$
iii) $L = \{w \,/\, |w| \bmod 3 > 0 \text{ where } w \in \{a\}^*\}$
iv) $L = \{a^m b^n \,/\, m \ne n\}$
v) Palinderomes over 0 and 1.</td><td>10</td><td>L3</td><td>CO3</td></tr>
<tr><td></td><td>b.</td><td>Consider the grammar G with productions.
S → A b B / A / B   ;   A → aA / ε   ;   B → a B / b B / ε.
Obtain LMD , RMD and parse tree for the string aaabab.
Is the given grammar ambiguous?</td><td>10</td><td>L2</td><td>CO3</td></tr>
<tr><td colspan="6" align="center">OR</td></tr>
<tr><td>Q.6</td><td>a.</td><td>Define the following with example :
i) Context free grammar   ii) Left most Derivation
iii) Parse tree   iv) Ambiguous grammar.</td><td>4</td><td>L1</td><td>CO3</td></tr>
<tr><td></td><td>b.</td><td>Design PDA for the language :
$L = \{a^i b^j c^k \,/\, i + k = j, i \ge 0, k \ge 0\}$ and show the moves made by the PDA for the string aabbbc.</td><td>10</td><td>L3</td><td>CO3</td></tr>
</table>

	c.	Convert the following CFG's to PDA : $S \rightarrow aA$; $A \rightarrow aABC / bB / a$; $B \rightarrow b$; $C \rightarrow c$.	6	L2	CO3
Module – 4					
Q.7	a.	Define CNF. Convert the following CFG to CNF $E \rightarrow E + T / T$ $T \rightarrow T * F / F$ $F \rightarrow (E) / I$ $I \rightarrow Ia / Ib / a / b$.	10	L2	CO4
	b.	Show that $L = \{0^n 1^n 2n / n \geq 1\}$ is no context free.	4	L2	CO4
	c.	Prove that the family of context free languages is closed under union and concatenation.	6	L1	CO4
OR					
Q.8	a.	Define Greibach Normal Form. Convert the following CFG to GNF. $S \rightarrow AB$; $A \rightarrow aA / bB / b$; $B \rightarrow b$.	6	L2	CO4
	b.	Consider the following CFG : $S \rightarrow ABC / BaB$ $A \rightarrow aA / BaC / aaa$ $B \rightarrow bBb / a / D$ $C \rightarrow CA / AC$ $D \rightarrow \varepsilon$ i) What are useless symbols? ii) Eliminate ε - productions , Unit productions and useless symbols from the grammar.	10	L3	CO4
	c.	Prove that the following languages are not context free. i) $L = \{ai / i \text{ is prime}\}$ ii) $L = \{a^{n^2} / n \geq 1\}$.	4	L2	CO3
Module – 5					
Q.9	a.	Define a turing machine and explain with neat diagram, the working of a basic turing machine.	6	L1	CO4
	b.	Design a Turing machine to accept the language, $L = \{a^n b^n c^n / n \geq 1\}$. Draw the transition diagram and show the moves for the string aabbcc.	14	L4	CO4
OR					
Q.10	a.	Design a Turing machine to accept palindrome over {a, b} and draw the transition diagram.	12	L4	CO5
	b.	Write a short notes on : i) Recursively Enumerable Language. ii) Multitape Turing Machine.	8	L1	CO5

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CBCS SCHEME

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BAI515A

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Computer Vision

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 Compute Vision? Why is vision so difficult? Discuss the real – world examples of computer vision.	**10**	**L1**	**CO1**
	b.	Explain the behavior of pinhole camera under different effects using a clear illustration to show the real–world example.	**10**	**L2**	**CO1**
		OR			
Q.2	**a.**	Explain the phong shading model.	**8**	**L2**	**CO1**
	b.	Explain the Di-chromatic reflectance model.	**5**	**L2**	**CO1**
	c.	What is meant by image filtering? Clearly discuss types of filter.	**7**	**L1**	**CO1**
		Module – 2			
Q.3	**a.**	Differentiate between a linear spatial filter and a non-linear spatial filter. Explain why bilateral filtering is quite show compared to regular separable filtering.	**10**	**L2**	**CO2**
	b.	Explain the binary image processing. Obtain the distance transform D(i, j) of a binary image B(i, j).	**10**	**L2**	**CO2**
		OR			
Q.4	**a.**	Explain the derivation of Discrete Fourier Transform (DFT) form the continuous transform of the sampled function.	**10**	**L2**	**CO2**
	b.	What are the geometric transformation? Explain the forward warping algorithm for transforming an image.	**10**	**L1**	**CO3**
		Module – 3			
Q.5	**a.**	Give the probability density functions for Gaussion noise model and Rayleigh noise models.	**10**	**L1**	**CO3**
	b.	Discuss the noise reduction capabilities of the following spatial filters : i) Arithmetic mean filter ii) Geometric mean filter.	**10**	**L1**	**CO3**
		OR			
Q.6	**a.**	Explain the image gradient and its properties.	**10**	**L2**	**CO3**
	b.	Explain the following gradient operators : i) Roberts cross –gradient operators ii) Sobel operator iii) Prewitt operator iv) Laplacian operator.	**10**	**L2**	**CO3**

		Module – 4			
Q.7	**a.**	Define the pseudocolor processing of digital images. Explain the graphical interpretation of the intensity slicing technique.	**10**	**L2**	**CO4**
	b.	Discuss the procedure for conversion from RGB color model to HIS color model.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Illustrate how full-color images are handled for a variety of image processing tasks.	**10**	**L2**	**CO4**
	b.	Explain the color image smoothing and sharpening procedure.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain how morphological operations are performed between images and structuring elements.	**10**	**L2**	**CO5**
	b.	Write short notes on the following : i) Erosin ii) Dialation.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the procedures in the "boundary following" algorithm that traces the boundary in binary image.	**10**	**L2**	**CO5**
	b.	What is Pattern Classification? Explain the minimum distance classifier.	**10**	**L2**	**CO5**

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CBCS SCHEME

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BAD515B

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Data Warehousing

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.**	Discuss the escalating need for strategic information in modern business. How does this need impact decision making processes?	**10**	**L2**	**CO2**
	b.	Bring out the differences between operational systems and decision support systems in detail.	**10**	**L3**	**CO2**
		OR			
Q.2	**a.**	How do you justify "Data warehousing the only viable solution?	**10**	**L2**	**CO1**
	b.	Compare data warehouses and data marts. Discuss when and why an organization might choose one over the other.	**10**	**L3**	**CO1**
		Module – 2			
Q.3	**a.**	Discuss on any four key issues to be considered while planning for data warehouse.	**10**	**L2**	**CO2**
	b.	Illustrate the process of data transformation and its significance in data warehousing	**10**	**L2**	**CO2**
		OR			
Q.4	**a.**	How are data warehouse projects different from OLTP system projects? Describe any four such differences.	**10**	**L2**	**CO2**
	b.	With a neat diagram, explain the architectural components driven by the requirements.	**10**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Define the architectural framework and how do they interact to support data warehousing explain with a neat diagram.	**10**	**L3**	**CO3**
	b.	Analyze the significance of metadata in data warehousing. How does it improve data accessibly and management within the warehouse.	**10**	**L4**	**CO3**
		OR			
Q.6	**a.**	List out the guidelines for selecting appropriate hardware and operating system for the data warehouse.	**10**	**L3**	**CO3**
	b.	With a neat diagram, discuss on the tools required for a data warehouse.	**10**	**L4**	**CO3**
		Module – 4			
Q.7	**a.**	What are star schema keys, and what role do they play in a star schema. Describe how they contribute to data organization and retrieval.	**10**	**L3**	**CO4**
	b.	Describe the ETL tools used in data warehousing. How do these tools improve ETL process?	**10**	**L4**	**CO4**
		OR			
Q.8	**a.**	Discuss the methods for handling updates to dimension tables in a data warehouse. What strategies exist for managing slowly changing dimensions?	**10**	**L3**	**CO4**
	b.	Outline the essential steps and requirements in the ETL process.	**10**	**L4**	**CO4**

		Module – 5			
Q.9	**a.**	Identify the key challenges of maintaining data quality in a data warehouse.	**10**	**L3**	**CO5**
	b.	List and explain the major features and functions of OLAP in data warehouse.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	List and explain five criteria for selecting information delivery tools for your data warehouse.	**10**	**L3**	**CO5**
	b.	Describe briefly two major features of the web –enabled data warehouse.	**10**	**L3**	**CO5**

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CBCS SCHEME

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BCS515B

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.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
Q.1	**a.**	Define the following : i) Intelligence ii) Artificial Intelligence iii) Agent iv) Rationality v) Logical reasoning.	**5**	**L2**	**CO1**
	b.	Examine the AI literature to discover whether the following tasks can currently be solved by computers. i) Playing a decent game of table tennis (ping-pong) ii) Discovering and proving new mathematical theorems iii) Giving competent legal advice in a specialized area of law iv) Performing a complex a surgical operation.	**8**	**L2**	**CO1**
	c.	Implement a simple reflex agent for the vacuum environment. Run the environment with this agent for all possible initial dirt configurations and agent locations. Record the performance score for each configuration and the overall score.	**7**	**L3**	**CO1**
		OR			
Q.2	**a.**	Is AI a science, or is it engineering or neither or both? Explain.	**5**	**L2**	**CO1**
	b.	Write pseudocode agent programs for the goal based and utility based agents.	**8**	**L1**	**CO1**
	c.	For each the following activities give a PEAS description. i) Playing a tennis match ii) Performing a high jump iii) Bidding on an item in an auction.	**7**	**L1**	**CO1**
		Module – 2			
Q.3	**a.**	Explain why problem formulation must follow goal transformation.	**5**	**L1**	**CO1**
	b.	Give complete problem formulation for each of the following choose a formulation that is precise enough to be implemented. i) Using only four colors, you have to color a planar graph in such a way that no two adjacent regions have the same color. ii) A 3 – foot – tall monkey is in a room where some bananas are suspended from the 8-foot ceiling. He would like to get the bananas. The room contains two stackable, moveable, climbable 3-foot high crates.	**8**	**L2**	**CO2**
	c.	Prove each of the following statements or given counter example : i) Breadth – first search is a special case of uniform – cost search. ii) Uniform – cost search is a special case of A^* search.	**7**	**L2**	**CO2**

		OR			
Q.4	**a.**	Define the following terms with example. i) State space ii) Search node iii) Transition model iv) Branching factor.	**8**	**L2**	**CO2**
	b.	Show that the 8-puzzle states are divided in to two disjoint sets, such that any state is reachable from any other state in the same set, while no state is reachable from any state in the other set. Devise a procedure to decide which set a given state is in and explain why this is useful for generating random state.	**7**	**L2**	**CO2**
	c.	Describe a state space in which iterative deepening search performs much worse than depth first search for example, $O(n^2)$Vs O(n)).	**5**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	Devise a state space in which A^* using GRAPH-SEARCH returns a suboptimal solution with h(n) function that is admissible but inconsistent.	**7**	**L2**	**CO3**
	b.	Which of the following are correct? i) $(A \vee B) \wedge (\neg C \vee \neg D \vee E) F (A \vee B)$ ii) $(A \vee B) \wedge (\neg C \vee \neg D \vee E) F (A \vee B) \wedge (\neg D \vee E)$ iii) $(A \vee B) \wedge \neg (A \Rightarrow B)$ is satistiable iv) $(A \Leftrightarrow B) \Leftrightarrow C$ has the same number of models as $(A \Leftrightarrow B)$	**8**	**L1**	**CO3**
	c.	Consider a vocabulary with only four propositions, A, B, C and D. How many models are there for the following sentences? i) $B \vee C$ ii) $\neg A \vee \neg B \vee \neg C \vee \neg D$ iii) $(A \Rightarrow B) \wedge A \wedge \neg B \wedge C \wedge D$.	**5**	**L1**	**CO3**
		OR			
Q.6	**a.**	Prove that if a heuristic is consistent, it must be admissible. Construct an admissible heuristic that is not consistent.	**8**	**L1**	**CO3**
	b.	Prove each of the following assertions : i) $\alpha \equiv \beta$ if and only if the sentence $(\alpha \Leftrightarrow \beta)$ is valid ii) $\alpha \neq \beta$ if and only if the sentence $\alpha \wedge \neg \beta)$ is unsatisfiable.	**7**	**L1**	**CO3**
	c.	Prove, or find a counter example to each of the following assertions. i) If $\alpha \neq (\beta \wedge \gamma)$ then $\alpha \neq \beta$ and $\alpha \neq \gamma$ ii) If $\alpha \neq (\beta \vee \gamma)$ then $\alpha \neq \beta$ and $\alpha \neq \gamma$ (or) both	**5**	**L1**	**CO3**
		Module – 4			
Q.7	**a.**	Which of the following are valid necessary true sentences? i) $(\exists x\, x = x) \Rightarrow (\forall y \exists z\, y = z)$ ii) $\forall x\, P(x) \vee \neg p(x)$ iii) $\forall x$ smart$(x) \vee (x = x)$	**7**	**L1**	**CO4**
	b.	Prove that universal Instantiation is sound that existential instanticition produces an inferentially equivalent knowledge base.	**5**	**L1**	**CO4**

	c.	Write down logical representations for the following sentences, suitable for use with generalized modulus ponens : i) Horses, cows and pigs are mammals ii) Bluebeard is Charlie's parent iii) Offspring and parent are inverse relations	**8**	**L1**	**CO4**
		OR			
Q.8	**a.**	Consider a knowledge base containing just two sentence ; P(a) and P(b) does this knowledge base entail $\forall x\, P(x)$? Explain your answer interms of models.	**5**	**L2**	**CO4**
	b.	Suppose a knowledge base contains just one sentence, $\exists x AsHighAs(x, Everest)$ which of the following are legitimate results of applying existential instantiation? i) AsHighAs(Kilimanjaro, Everest) ii) AsHighAs(Kilimanjaro, Everest) $\wedge$ AsHighAs (Benvevis, Everest)	**8**	**L2**	**CO4**
	c.	Explain how to write any 3-SAT problem of arbitrary size using a single first order definite clause and no more than 30 ground facts.	**7**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	i) Give a backward chaining proof of the sentence $7 \le 3 + 9$. Show only the steps that leads to success ii) Give a forward chaining proof of the sentence $7 \le 3 + 9$. Show only the steps that leads to success.	**8**	**L1**	**CO5**
	b.	Describe the differences and similarities between problem solving and planning.	**5**	**L2**	**CO5**
	c.	Prove that backward search with PDDL problems is complete.	**7**	**L1**	**CO5**
		OR			
Q.10	**a.**	The following prolog code defines a predicate P P(x, [x|y]), P(x, [y|z]) :- P(x, z) i) Show proof trees and solutions for the queries P(A, [2, 1, 3]) and P(z,[1, A, 3]) ii) What standard list operation does P represent?	**8**	**L1**	**CO5**
	b.	Explain why dropping negative effects from every action schema in a planning problem results in a relaxed problems.	**5**	**L2**	**CO5**
	c.	Prove the following assertions about planning graphs : i) A literal that does not appear in the final level of the graph connot be achieved. ii) The level cost of a literal in a serial graph is no greater than the actual cost of an optimal plan for achieving it.	**7**	**L1**	**CO5**

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CBCS SCHEME

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BRMK557

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Research Methodology and IPR

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.	Identify the meaning of Research and brief out the objective and motivation in engineering research.	10	L1	CO1
	b.	Explain brief about research cycle and verify with the research flow diagram.	10	L1	CO1
		OR			
Q.2	a.	Identify the types of engineering research and briefly explain them.	10	L1	CO1
	b.	Explain about the different types of research misconduct.	10	L1	CO1
		Module – 2			
Q.3	a.	Explain about the importance of literature review and technical reading.	10	L2	CO2
	b.	Mention the various benefits of bibliographic databases.	10	L1	CO2
		OR			
Q.4	a.	Indentify the impact of technical reaction and brief about it.	10	L1	CO2
	b.	Enumerate the impact of title and keywords on citation with example.	10	L2	CO2
		Module – 3			
Q.5	a.	Define Intellectual properties and explain about its types.	10	L1	CO3
	b.	Explain about the key aspect of patent law.	10	L2	CO3
		OR			
Q.6	a.	Explain about the assessment of novelty.	10	L1	CO3
	b.	Brief about the patent procedure in India.	10	L1	CO4
		Module – 4			
Q.7	a.	Mention and brief about the justification for copyright law.	10	L2	CO4
	b.	Explain about the basic concepts of under lying copyright law.	10	L1	CO4
		OR			
Q.8	a.	Brief about the various representations of sound recordings.	10	L2	CO5
	b.	Explain about TRIPS agreement in detail.	10	L1	CO5

Module – 5					
Q.9	**a.**	Explain about the justification of protection designs.	**10**	**L2**	**CO5**
	b.	Brief about the excluded subjected matter in the context of design protection.	**10**	**L1**	**CO5**
OR					
Q.10	**a.**	What are the rights of the owner of designs? Explain.	**10**	**L1**	**CO5**
	b.	Brief about the Assignment of Design Rights.	**10**	**L1**	**CO5**

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