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Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Automata Theory and Compiler Design

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define the following terms with an example :
 (i) Alphabet (ii) Power of an alphabet (iii) String
 (iv) String concatenation (v) Language (05 Marks)
- b. Construct a DFA to recognize the language
 $L = \{ w \mid n_a(w) \bmod 2 = 0 \text{ and } n_b(w) \bmod 3 = 0 \text{ \& } w \in \{a, b\}^+ \}$ (05 Marks)
- c. Convert the following NFA to its equivalent DFA. [Refer Fig.Q1(c)]



Fig.Q1(c)

(10 Marks)

OR

- 2 a. What are distinguishable and indistinguishable states? Consider the DFA given below with accepting state "C" and compute the following using table filling method.
 (i) Distinguishable and Indistinguishable states
 (ii) Minimization of DFA

δ	a	b
→ A	B	F
B	G	C
* C	A	C
D	C	G
E	H	F
F	C	G
G	G	E
H	G	C

(10 Marks)

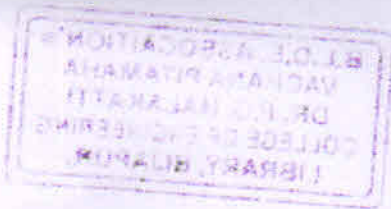
- b. Explain the structure of a compiler with neat diagram and also show the output of each phase for the expression $a = b + c * 25$. Assume variables a, b and c are float data types.

(10 Marks)

Module-2

- 3 a. Define Regular expression. Write regular expression for the following:
 (i) Strings of a's and b's containing not more than three a's
 (ii) $L = \{ a^n b^m \mid n \geq 4, m \leq 3 \}$
 (iii) $L = \{ uvu \mid u, v \in \{a, b\}^* \text{ and } |v| = 2 \}$

(07 Marks)



21CS51

- b. Prove that there exists a finite automaton to accept the language $L(R)$ corresponding to the regular expression R . (06 Marks)
- c. State and prove pumping lemma theorem for regular language. (07 Marks)

OR

- 4 a. Explain the concept of input buffering in the lexical analysis and write a program for lookahead code with sentinels. (10 Marks)
- b. Construct a transition diagram for recognizing relational operators. Sketch the program to implement it. (10 Marks)

Module-3

- 5 a. Obtain the grammar for the language:
- (i) $L = \{a^{2n}b^m \mid n \geq 0, m \geq 0\}$
 - (ii) $L = \{a^i b^j c^k \mid j = i + k, i \geq 0, k \geq 0\}$
 - (iii) $L = \{a^n b^m c^k \mid n + 2m = k\}$
- b. Consider the following grammar : (06 Marks)

$$S \rightarrow aS \mid aSbS \mid E$$

Is the above grammar ambiguous? Show that the string "aab" has two

- (i) Parse tree (ii) Leftmost derivation (iii) Right most derivation. (08 Marks)

- c. Eliminate left recursion for the following grammar:

$$L_p = n_0 \mid \theta_p L_s$$

$$\theta_p \rightarrow + \mid - \mid *$$

$$L_s = L_s L_p \mid L_p$$

- 6 a. Explain error recovery in predictive parsing. (06 Marks)
- b. Consider the following grammar and find the left factoring (05 Marks)

$$S \rightarrow iEtS \mid iEtSeS \mid a$$

$$E \rightarrow b$$

- c. Consider the grammar and construct LL(1) parsing table and shows the moves made by the predictive parser on the input $id + id * id$ (05 Marks)

$$E \rightarrow TE'$$

$$E' \rightarrow +TE' \mid E$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' \mid E$$

$$F \rightarrow (E) \mid id$$

(10 Marks)

Module-4

- 7 a. Obtain a PDA to accept the language $L(M) = \{w C w^R \mid w \in (a + b)^*\}$ where w^R is reverse of w by a final state. Also show the ID configuration to accept a string and to reject a string. (10 Marks)
- b. How handle pruning are used in the STACK implementation of shift reduce parser? Explain with the grammar $E \rightarrow E + E \mid E * E \mid id$ on the input string $w = id_1 * id_2$. (10 Marks)

OR

- 8 a. Construct the SLR parse table for the given grammar and show the actions of the parser for the input string "num+num".

$S \rightarrow S + E$

$S \rightarrow E$

$E \rightarrow \text{num}$

(10 Marks)

- b. Find LR(1) items for the following grammar and construct the parsing table.

$E \rightarrow (E) \mid \text{id}$

(10 Marks)

Module-5

- 9 a. Define Turing Machine. Explain the working of turing machine with neat block diagram.

(08 Marks)

- b. Obtain a Turing machine to accept the language

$L = \{0^n 1^n \mid n \geq 1\}$

And also shows the ID configuration for the string $w = 00001111$.

(12 Marks)

OR

- 10 a. For the CFG given below :

$S \rightarrow EN$

$E \rightarrow E + T \mid E - T \mid T$

$T \rightarrow T * F \mid T / F \mid F$

$F \rightarrow (E) \mid \text{digit}$

$N \rightarrow ;$

(i) Obtain SDD

(ii) Construct parse tree and syntax tree

(iii) Construct annotated parse tree for the input string $5 * 6 + 7$

(10 Marks)

- b. Translate the arithmetic expression $a = b * - c + b * - c$ into three address code quadruples, triples and indirect triples.

(10 Marks)

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21CS52

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025 Computer Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain : i) Personal area networks ii) Wide area networks. (10 Marks)
b. Explain services and functions of each layer of OSI model along with neat sketch of OSI reference model. (10 Marks)

OR

- 2 a. Explain twisted pair cable with neat diagram. (10 Marks)
b. Explain : i) Microwave transmission ii) Radio transmission. (10 Marks)

Module-2

- 3 a. Explain sliding window protocol using Go-Back-N along with example. (10 Marks)
b. Explain : i) Error control ii) Flow control. (10 Marks)

OR

- 4 a. Explain any 2 framing methods along with example. (10 Marks)
b. Explain CRC along with an example. (10 Marks)

Module-3

- 5 a. Explain distance vector routing algorithm with example. (10 Marks)
b. Explain : i) Store and forward packet switching
ii) Implementation of connectionless service. (10 Marks)

OR

- 6 a. i) Differentiate between datagram network and virtual circuit network
ii) Explain packet switching. (10 Marks)
b. Explain shortest path algorithm, with an example. (10 Marks)

Module-4

- 7 a. Explain : i) Transport service primitives
ii) Nesting of segments, packets and frames. (10 Marks)
b. Explain remote procedure call and steps involved in it. (10 Marks)

OR

- 8 a. Explain connection for three way handshake protocol (10 Marks)
b. i) Explain state diagram for simple connection management scheme
ii) Explain UDP header. (10 Marks)

Module-5

- 9 a. Explain MIME. (10 Marks)
b. i) Explain name servers ii) Explain E-mail. (10 Marks)

OR

- 10 a. Explain architecture of e-mail system with neat diagram. (10 Marks)
b. Explain architecture of web with neat diagram. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8=50, will be treated as malpractice.

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21CS54

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Provide state space representation showing states, initial state, actions, Transition model and Goal test for the following problems.
 i) 8 - Puzzle problem
 ii) 8 - Queens problem
 iii) Vacuum World. (12 Marks)

- b. Define Artificial Intelligence. Discuss the four approaches for Artificial Intelligence. (08 Marks)

OR

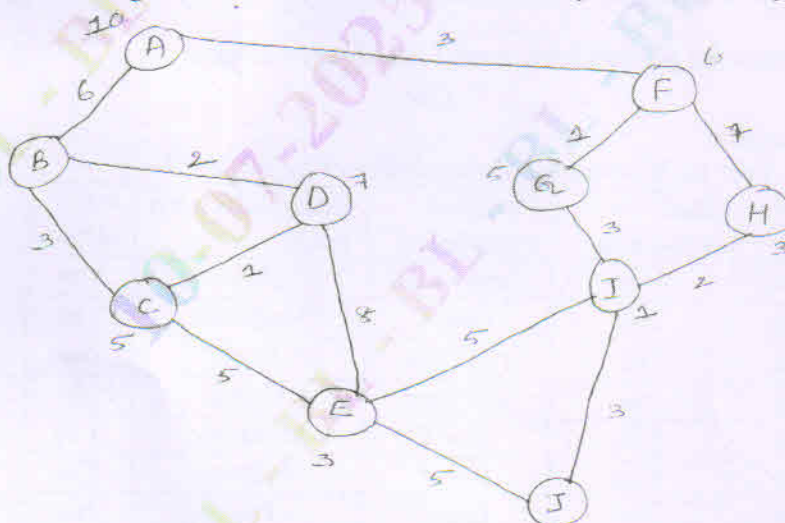
- 2 a. Differentiate Informed (Heuristic) and uninformed search techniques. Give examples. (08 Marks)
 b. Explain the following and also list their advantages and disadvantages.
 i) Breadth First search
 ii) Depth First search (12 Marks)

Module-2

- 3 a. Explain greedy Best First Search with a suitable example. (10 Marks)
 b. What are the applications of machine learning in different domains? (10 Marks)

OR

- 4 a. Explain A* Algorithm. (06 Marks)
 b. Apply the A* Algorithm to the following graph and obtain the optional path from starting node 'A' to goal node 'J'. Heuristic values are provided corresponding the respective node.



(14 Marks)

Module-3

- 5 a. Explain K-NN algorithm. (06 Marks)
- b. Consider the student performance training data set of 8 data instances shown in Table 5.1. given Test instance (6.1, 40, 5) and a set of categories (Pass, Fail) also called as classes consider Assign $k = 3$ as task of classification. Calculate Euclidean distance and weighted k - Nearest - Neighbour Algorithm. (14 Marks)

Sl.No.	CGPA	Assessment	Project submitted	Result
1	9.2	85	8	Pass
2	8	80	7	Pass
3	8.5	81	8	Pass
4	6	45	5	Fail
5	6.5	50	4	Fail
6	8.2	72	7	Pass
7	5.8	38	5	Fail
8	8.9	91	9	Pass

Table 5.1

OR

- 6 a. Distinguish between the terms: Classifications, Regression and Estimations. (08 Marks)
- b. What are the metrics are used to validate the results of regression. Consider the following Training item set Table 6.1 and apply the validation metrics.

Items X_i	Actual sales (in Thousands) Y_i
I_1	80
I_2	90
I_3	100
I_4	110
I_5	120

Table 6.1

Note: Consider the actual values of sales for fresh two items I_6, I_7 and validate. (12 Marks)

Module-4

- 7 a. How does a C4.5 algorithm perform better than ID3? What metric is used in the Algorithm? (10 Marks)
- b. Differentiate between probabilistic model and deterministic model. (10 Marks)

OR

- 8 a. Write ID₃ algorithm. (06 Marks)
- b. Construct ID₃ Tree for the training Data set shown in Table 8.1

Sl. No.	CGPA	Inter activeness	Practical knowledge	Communication skills	Job offer
1	≥ 9	Yes	Very Good	Good	Yes
2	≥ 8	No	Good	Moderate	Yes
3	≥ 9	No	Average	Poor	No
4	< 8	No	Average	Good	No
5	≥ 8	Yes	Good	Moderate	Yes
6	≥ 9	Yes	Good	Moderate	Yes
7	< 8	Yes	Good	Poor	No
8	≥ 9	No	Very Good	Good	Yes
9	≥ 8	Yes	Good	Good	Yes
10	≥ 8	Yes	Average	Good	Yes

(14 Marks)

- 9 Write short notes on :
- i) Mean – Shift clustering
 - ii) Proximity Measures
 - iii) Applications of ANN
 - iv) Grid – Based approach.

(20 Marks)

OR

- 10 a. Explain Fuzzy C – means Algorithm.

(10 Marks)

- b. What is Fuzzy logic ? How does FCM Algorithm helps in cluster formation?

(10 Marks)

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

Image and Video Processing

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 an Image, with block diagram. Explain the fundamental steps in digital image processing.	10	L2	CO1
	b.	What is Image sensing and acquisition? With appropriate equations, explain the image sampling and quantization.	10	L3	CO1
OR					
Q.2	a.	Discuss any four applications of digital image processing in detail with examples.	10	L3	CO1
	b.	Explain 4-connectivity, 8-connectivity and m-connectivity with suitable example.	10	L3	CO1
Module – 2					
Q.3	a.	Define histogram equalization. Develop an algorithm to enhance image quality using this method.	10	L3	CO1
	b.	Explain the following: i) Image negatives ii) Power law transformation iii) Log transformation.	10	L2	CO1
OR					
Q.4	a.	Explain the smoothing of images in frequency domain using: i) Butterworth lowpass filter ii) Gaussian low pass filter iii) Ideal lowpass filter.	10	L2	CO2
	b.	With a neat block diagram and equations explain homomorphic filtering.	10	L3	CO2
Module – 3					
Q.5	a.	Briefly explain the point, line and edge detection with respect to image segmentation.	10	L3	CO3
	b.	Explain periodic noise reduction on images by frequency domain filtering.	10	L2	CO3



OR

Q.6	a.	Explain any five noise models using their probability density functions.	10	L2	CO3
	b.	Illustrate how is restoration is performed in the presence of noise only. Give restoration details.	10	L3	CO3
Module – 4					
Q.7	a.	Briefly explain the different techniques used in the process of motion detection in video processing.	10	L2	CO4
	b.	Briefly explain the process of video sampling using progressive scanning vs interlaced scanning.	5	L2	CO4
	c.	Discuss binary hypothesis testing and Markov Random Fields (MRFs) in the context of digital video processing.	5	L3	CO4
OR					
Q.8	a.	Explain in detail the spatio-temporal sampling structures. Explain its types.	10	L2	CO4
	b.	Briefly explain the process of analog to digital conversion in digital videos.	5	L2	CO4
	c.	How are sampling structure conversion aids to maintain its accuracy and better clarity to display. Discuss in detail.	5	L3	CO4
Module – 5					
Q.9	a.	Explain vinegar syndrome removal process with a neat diagram.	10	L2	CO5
	b.	How blatch detection and removal process of video enhancement done to gain video clarity. Explain the components involved in the process.	10	L3	CO5
OR					
Q.10	a.	Explain kinescope moiré removal with an algorithm.	10	L2	CO5
	b.	What is coding artifact reduction? Explain briefly the different types of methods through which the video quality can be improved.	10	L2	CO5

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Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Software Engineering & 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 software process in software engineering highlighting the importance of software engineering.	10	L2	CO1
	b.	Explain the five activities that a generic process framework for software engineering encompasses.	10	L2	CO1
OR					
Q.2	a.	Explain software myths with examples.	10	L2	CO1
	b.	Explain Incremental process models and evolutionary process models with a neat diagram.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the different tasks which requirements engineering encompasses.	10	L2	CO2
	b.	Explain the nature and characteristics of software system.	10	L2	CO2
OR					
Q.4	a.	Explain requirements elicitation and various techniques used in requirements elicitation along with its importance.	10	L2	CO2
	b.	Illustrate an UML use case diagram for home security function.	10	L2	CO2
Module – 3					
Q.5	a.	Explain Agile process and agility principles.	10	L2	CO3
	b.	Explain Extreme Programming (XP) with a neat diagram.	10	L2	CO3
OR					
Q.6	a.	Explain SCRUM process with a neat diagram.	10	L2	CO3
	b.	Explain Agility with the cost of change with diagram. Explain the principles of Agile software development.	10	L2	CO3
Module – 4					
Q.7	a.	Explain different categories of software projects with example.	10	L2	CO4
	b.	Compare between Project Management Life Cycle And Software Development Life Cycle and its phases.	10	L2	CO4
OR					
Q.8	a.	Explain the difference between traditional and modern project management.	10	L2	CO4
	b.	Explain the concepts in activity planning in software project management.	10	L2	CO4
Module – 5					
Q.9	a.	Explain place of software quality in project management.	10	L2	CO5
	b.	Explain in detail the techniques to enhance software quality.	10	L1	CO5
OR					
Q.10	a.	Explain Quality Management Systems. With principles of BSENISO9001 : 2000.	10	L2	CO5
	b.	Explain the techniques to enhance software quality and software reliability. Explain SEICMM levels.	10	L2	CO5

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BCS502

Fifth Semester B.E./B.Tech. Degree Examination, June/July 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.	Define Data Communications. Explain the characteristics and components of Data communication with neat diagram.	10	L2	CO1
	b.	With neat diagram explain the Layers in the TCP /IP protocol suite.	10	L2	CO1
OR					
Q.2	a.	Explain in detail the guided and unguided Media transmission with suitable diagram.	12	L2	CO1
	b.	Describe the working of Datagram network with suitable sketches	08	L2	CO1
Module – 2					
Q.3	a.	With a neat sketch describe the working of simple protocol of Data Link Layer. Develop a program to implement a sliding window protocol in the data link layer.	12	L2	CO2
	b.	Illustrate the stop and wait protocol of DLL with an example.	08	L2	CO2
OR					
Q.4	a.	Solve : i) In parity check if the dataword is 1011. What is the code word? What happens at receiver, if the receive word is a) 10011 b) 10110 c)01011 ii) Generate CRC for the dataword $x^3 + 1$ and the generator $x^3 + x + 1$. What happens if the received word is 1000110. iii) Generate checksum of list of five 4-bit number (7,11,12,0,6) and verify the same at receiver.	12	L3	CO2
	b.	Illustrate the working of CSMA/CA with a flow diagram	08	L2	CO2
Module – 3					
Q.5	a.	Summarize the packet format of IPV6 datagram with suitable diagram.	10	L2	CO2
	b.	Develop an algorithm for Distance Vector Routing and explain the same.	10	L2	CO4
OR					
Q.6	a.	Explain MOSPF with an example and suitable diagram.	10	L3	CO4
	b.	Develop algorithm for Link state Routing and explain the same.	10	L2	CO4
Module – 4					
Q.7	a.	Illustrate the working of Go-back-N protocol with an example	12	L2	CO4
	b.	Explain connectionless and connection oriented services in Transport layer.	08	L2	CO2
OR					
Q.8	a.	Illustrate the connection establishment and termination in TCP/IP with suitable sketches.	12	L2	CO3
	b.	With sketch of TCP segment format, describe its field.	08	L2	CO3
Module – 5					
Q.9	a.	Explain FTP and its two connections.	10	L2	CO3
	b.	Explain SMTP with diagram and the mail transfer phases.	10	L2	CO3
OR					
Q.10	a.	Explain MIME and its header.	10	L2	CO3
	b.	Explain SSH and its components with neat diagram.	10	L2	CO3

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Fifth Semester B.E./B.Tech. Degree Examination, June/July 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.	Define the term research and explain the research flow cycle with a relevant diagram.	10	L1	CO1
	b.	What are the key ethical issues related to authorship? Explain any one.	10	L2	CO1
OR					
Q.2	a.	Define Engineering research and list its aims and objectives.	10	L1	CO1
	b.	Write a note on the following research misconduct : i) Plagiarism ii) Other types of research bias.	10	L2	CO1
Module – 2					
Q.3	a.	What are the primary goals of conducting a literature review in academic research?	10	L2	CO2
	b.	Explain various steps involved in critical and creative reading.	10	L2	CO2
OR					
Q.4	a.	How does new and existing knowledge can contribute to the research process? Explain relevant points.	10	L3	CO2
	b.	Explain Knowledge flow through citation.	10	L2	CO2
Module – 3					
Q.5	a.	What inventions are eligible for patenting and which matters are considered non – patentable?	10	L2	CO3
	b.	Explain classes of copyrights.	10	L1	CO3
OR					
Q.6	a.	Define the term patent and what conditions must be met for obtaining patent protection.	10	L2	CO3
	b.	Explain the following major steps involved in the process of patent registration : i) Prior Art search ii) Choice of application to be filed iii) Pre-grant opposition.	10	L2	CO3
Module – 4					
Q.7	a.	Using flow chart, explain the important steps involved in the process of copyrights registration.	10	L2	CO4

	b.	What are the different categories trademarks recognized under Indian law and tabulate the famous trademark types with examples.	10	L3	CO4
OR					
Q.8	a.	What are the roles and functions of the copyright board and copyright society in administering copyright law and regulations?	10	L3	CO4
	b.	Using a flow chart, explain the steps involved in the process of trademarks registration.	10	L2	CO4
Module – 5					
Q.9	a.	Discuss the design registration procedure using a flow chart.	10	L2	CO5
	b.	Define Geographical Indications (GI) with an example. What are the rights granted to GI holders.	10	L2	CO5
OR					
Q.10	a.	Using a flowchart, explain the process of GI registration.	10	L2	CO5
	b.	Explain the classification of Industrial Designs and design registration , trends in India.	10	L2	CO5

CBCS SCHEME

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BCS515B

Fifth 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

Q.1	a.	What is Artificial Intelligence? Explain the four approaches of Artificial Intelligence in detail	M	L	C
			10	L2	CO1
	b.	What Artificial Intelligence can do today? Explain various application domains of Artificial Intelligence.	10	L2	CO1

OR

OR					
Q.2	a.	With the help of a block diagram, explain how agents interact with task environments.	05	L2	CO1
	b.	Briefly explain the properties of task environments.	07	L2	CO1
	c.	With a neat diagram explain the following : i) Utility based agents ii) Learning agents	08	L2	CO1

Module - 2

Module – 2					
Q.3	a.	List and define the four phases of problem – solving process.	05	L3	CO2
	b.	Explain how a search problem can be formally defined. Illustrate the same for the Vacuum world problem.	10	L2	CO2
	c.	Write the state-space graph for the two-cell vacuum world problem.	05	L3	CO2

OR

		OR			
Q.4	a.	Illustrate Breadth-first search and Depth-first search strategies with suitable example.	10	L3	CO2
	b.	Explain the different metrics used to evaluate an algorithms performance.	06	L2	CO2
	c.	List and explain the three kind of queues used in Best -first search method.	04	L2	CO2
Module - 3					

Module - 3

Q.5	a.	Apply Greedy best-first search algorithm to the following graph and show the various stages in computing the solution tree.	10	L3	CO3
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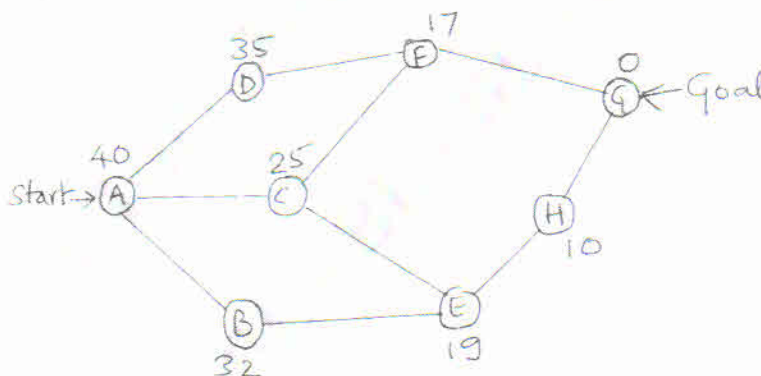


Fig. Q.5 (a)



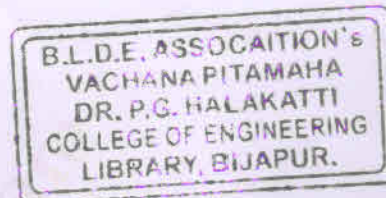
	b.	Explain different methods of deriving heuristics.	10	L2	CO3
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OR

OR			10	L2	CO3
Q.6	a.	Using PEAS description, represent the Wumpus World problem.			
	b.	Briefly explain Knowledge Based Agents.	06	L3	CO3
	c.	Explain in detail, syntax and semantics of propositional logic.	04	L2	CO3
			10	L3	CO3

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21AI54

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025 Principles of Artificial Intelligence

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Summarize the history of Artificial Intelligence. (10 Marks)
- b. Define Artificial Intelligence. Explain the two dimensions of defining Artificial Intelligence [Thought process and Reasoning]. (10 Marks)

OR

- 2 a. Explain briefly on the foundations of artificial intelligence. (10 Marks)
- b. Explain the working of Goal-based agent and Utility-based agent with the help of a neat diagram. (10 Marks)

Module-2

- 3 a. Explain the working and properties of Depth-first search and Iterative deepening depth-first search strategies. (10 Marks)
- b. Outline the steps performed by problem-solving agent and interpret the problem formulation with regard to the problem in vacuum world and 8 puzzle. (10 Marks)

OR

- 4 a. Summarize on the evaluation of a search strategy that is used in problem-solving. Also give a brief description on uninformed search strategy. (10 Marks)
- b. Explain the problem formulation of 8-Queens problem with state transitions. (10 Marks)

Module-3

- 5 a. Explain the working and algorithm of Best-first search with a suitable example. (10 Marks)
- b. Demonstrate the knowledge used in solving wumpus world problem with the help of PEAS description. (10 Marks)

OR

- 6 a. Explain the working and algorithm of A* search with a suitable example. (10 Marks)
- b. Explain the syntax and semantics of propositional logic along with reasoning patterns in propositional logic. (10 Marks)

Module-4

- 7 a. Explain the syntax and semantics of first order logic with an example. (10 Marks)
- b. Extend the use of first order logic by giving suitable examples related to the kinship domain and the wumpus world. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 8 a. Outline the working of forward chaining in first order logic by using some examples. (10 Marks)
- b. Summarize the concept of resolution used in first order logic. (10 Marks)

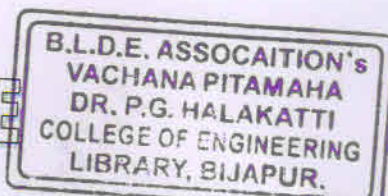
Module-5

- 9 a. Interpret on the Basic Probability notations used in representing a formal logic. (10 Marks)
- b. Infer about using full joint distributions based on the probabilistic inference, with the help of examples. (10 Marks)

OR

- 10 a. Explain Baye's rule and its use with the help of suitable examples. (10 Marks)
- b. Explain the techniques that can be adopted to solve probabilistic reasoning problems in the wumpus world. (10 Marks)

CBCS SCHEME



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21CS53

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

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1
 - a. Discuss the advantages of database management approach over file processing system. (04 Marks)
 - b. Describe the characteristics of database approach. (08 Marks)
 - c. Explain three schema architecture and reason for need of mapping among schema level. (08 Marks)

OR

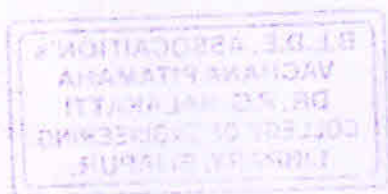
- 2
 - a. With a neat diagram, explain the component modules of DBMS and their interactions. (08 Marks)
 - b. Define the following terms with examples : (06 Marks)
 - i) Super key
 - ii) Candidate key
 - iii) Primary key.
 - c. Construct an ER diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. (06 Marks)

Module-2

- 3
 - a. Describe the three main categories of constraints on database. Explain with example. (10 Marks)
 - b. Given the schema :
 - Passenger (pid, pname, pgender, pcity)
 - Agency (aid, aname, acity)
 - Flight (fid, fdate, time, src, dest)
 - Booking (pid, aid, fid, fdate)
 Give relation algebra expression for the following :
 - i) Retrieve the complete details of all flights to New Delhi
 - ii) Find only flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020
 - iii) Find the passengers names for those who do not have any bookings in any flights
 - iv) Get the details of flights that are scheduled on both dates 01/12/2023 and 02/12/2023 at 16 : 00 hours
 - v) Find the details of all male passengers who are associated with jet agency. (10 Marks)

OR

- 4
 - a. Give the ER to relational mapping algorithm. Discuss each step with an example. (10 Marks)
 - b. Describe the characteristics of relations with examples. (10 Marks)



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Module-3

- 5 a. Determine the six clauses in the syntax of an SQL retrieval query. (06 Marks)
b. What is a view? Explain how views are created and dropped with example. (06 Marks)
c. Consider the following schemes :
SAILOR (SID, SNAME, RATING, AGE)
BOAT (BID, BNAME, COLOR)
RESERVE (SID, BID, DAY)
Specify the following queries in SQL :
i) Retrieve the sailor names that have reserved red and green boats
ii) Retrieve the colors of boats reserved by RAJ
iii) Retrieve the SID's of sailors with age over 20, who have not reserved a red boat
iv) Retrieve the names of sailors who have reserved all boats. (08 Marks)

OR

- 6 a. Define stored procedures. Explain the creating and calling of stored procedure with suitable example. (10 Marks)
b. What is a CURSOR? Explain with an example, retrieving multiple tuples with embedded SQL. (10 Marks)

Module-4

- 7 a. Explain the informal design guidelines used as measure to determine the quality of relation schema design. (08 Marks)
b. Explain 1NF, 2NF and 3NF with an example for each. (12 Marks)

OR

- 8 a. Define multivalued dependency. Explain 4NF with an example. (10 Marks)
b. What is functional dependency? Write an algorithm to find the minimal cover for set of functional dependency. Find canonical cover of F the FD.
 $F = \{A \rightarrow B, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$. (10 Marks)

Module-5

- 9 a. Why concurrency control and recovery are needed in DBMS? Explain types of problems that may occur when two simple transactions run concurrently. (10 Marks)
b. Discuss the ACID properties of database transaction. (05 Marks)
c. Explain transaction support in SQL. (05 Marks)

OR

- 10 a. Briefly discuss the two phases locking technique for concurrency control. (10 Marks)
b. With a neat diagram, explain the typical states that a transaction goes through during execution. (10 Marks)
