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21CS33

Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Analog and Digital Electronics

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Explain voltage divider bias circuit with a neat diagram and necessary derivations. **(08 Marks)**

b. Explain inverting Schmitt Trigger with a neat diagram and waveform. **(06 Marks)**

c. The base bias circuit shown in the Fig Q1(c), for the values indicated calculate I_B, I_C and V_{CE}.

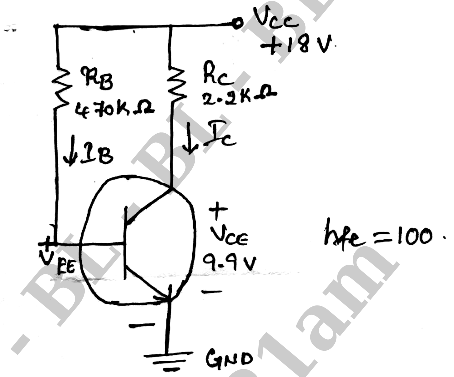

Fig Q1(c) **(06 Marks)**

OR

2 a. Explain the operation adjustable voltage Regulator? List the advantages of adjustable voltage Regulator over fixed voltage regulator. **(08 Marks)**

b. Difference between Active filter and Passive filter. **(06 Marks)**

c. Sketch the 2-bit Flash ADC? The digital i/p for a 4-bit DAC is D = 0111. Calculate its o/p voltage. Take V_{OFS} = 15 V. **(06 Marks)**

Module-2

3 a. Prove De Morgan's theorem. **(04 Marks)**

b. Simplify the following Boolean function using K-map method.
F(A, B, C, D) = Σm (0, 1, 2, 3, 5, 8, 9, 10, 11, 13, 14, 15) **(06 Marks)**

c. Find all the prime implicates of the function using Q-M method.
f(a, b, c, d) = Σm(0, 2, 3, 4, 8, 10, 12, 13, 14) **(10 Marks)**

OR

4 a. For the following function given use Q-M method and obtain essential prime implicates chart. F(A, B, C, D) = Σm (2, 3, 7, 9, 11, 13) + Σd (1, 10, 15). **(08 Marks)**

b. With an example, explain Petrick's method. **(06 Marks)**

c. Explain Map –Entered variables method. **(06 Marks)**

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Module-3

5 a. Realize f(a, b, c, d) = Σm(0, 3, 4, 5, 8, 9, 10, 14, 15), using three input NOR gates. **(06 Marks)**

b. Discuss different types of hazards in combinational circuits. **(08 Marks)**

c. With a neat diagram, explain 8 to 3 priority encoder. **(06 Marks)**

OR

6 a. Explain the programmable logic arrays (PLA).
Realize the following functions using PLA

$f_1 = a'bd + abd + ab'c' + b'c$

$f_2 = a'bd + c$

$f_3 = abd + ab'c' + bc$ **(10 Marks)**

b. Explain with the help of a logic diagram and truth table a 3 to 8 line decoder. **(10 Marks)**

Module-4

7 a. With a neat diagram, explain the VHDL program structure. **(06 Marks)**

b. Discuss the switch debouncing with an SR latch. **(06 Marks)**

c. Write the following Flip-flops characteristics equation and truth table.
i) SR flip-flop ii) J-K flip-flop iii) D-Flip-flop iv) T-Flip-flop. **(08 Marks)**

OR

8 a. What is T Flip-Flop? Show how to convert JK Flip-Flop into T Flip-Flop. **(08 Marks)**

b. Discuss the NAND-gate version of gated S-R latch. **(06 Marks)**

c. Difference between Flip-Flop and Latch. **(06 Marks)**

Module-5

9 a. Define Counter. Describe the working of parallel adder with accumulator. **(08 Marks)**

b. Discuss the working of a 3-bit shift register. **(06 Marks)**

c. Difference between Synchronous and Asynchronous counters. **(06 Marks)**

OR

10 a. Explain the working of a 3-bit Binary Ripple Counter, waveforms and truth table. **(06 Marks)**

b. What is the clock frequency of a 3 – bit ripple counter, if the period of the MSB waveform is 24μs? **(04 Marks)**

c. Design with a neat sketch and relevant expressions, explain a 3-bit binary up-down counter using D-Flip-Flop. **(10 Marks)**

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21CS34

Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Computer Organization and Architecture

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. With a neat diagram, analyze the basic operational concepts of a computer. Give the operating steps. **(06 Marks)**

b. Explain the basic instruction types with examples. **(04 Marks)**

c. Explain: (i) Processor clock
(ii) Clock rate
(iii) Basic performance equation
(iv) Performance measurement **(10 Marks)**

OR

2 a. Define addressing mode, explain any three addressing modes with examples. **(10 Marks)**

b. Write an assembly program that reads a line of characters and displays it. **(06 Marks)**

c. Explain Big-Endian and Little-Endian addressability. **(04 Marks)**

Module-2

3 a. Define Interrupt. Explain various ways of enabling and disabling interrupts. **(08 Marks)**

b. With a neat diagram, explain any three methods for handling multiple interrupt requests raised by multiple devices. **(12 Marks)**

OR

4 a. With a neat diagram, explain DMA. Briefly explain centralized bus arbitration technique. **(10 Marks)**

b. Explain synchronous and Asynchronous bus with timing diagrams. **(10 Marks)**

Module-3

5 a. With a neat diagram, explain the internal organization of 128×8 memory chip. **(10 Marks)**

b. What is cache memory? Explain the direct and associative mapping techniques. **(10 Marks)**

OR

6 a. What is memory interleaving? Explain with an example. **(10 Marks)**

b. Define Virtual memory. Explain the address translation. **(10 Marks)**

Module-4

7 a. Draw 4-bit carry-look-ahead adder and explain. **(10 Marks)**

b. Perform multiplication for +13 and -6 using Booth's algorithm. Explain Booth's algorithm. **(10 Marks)**

OR

8 a. Explain three-bus organization of data path with a neat diagram. **(06 Marks)**

b. Explain Hard wired control unit organization in a processing unit. **(06 Marks)**

c. Write actions required and control sequence for execution of instruction ADD (R3), R1. **(08 Marks)**

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Module-5

9	a.	Define Parallel Processing. Explain processor with multiple functional units.	**(10 Marks)**
	b.	Define Pipelining. Explain five stage instruction pipeline with timing diagram.	**(10 Marks)**

OR

10	a.	Explain arithmetic pipeline with suitable example.	**(10 Marks)**
	b.	Explain instruction pipeline with suitable example.	**(10 Marks)**

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21CS51

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.

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.

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
$L = \{ w \mid n_a(w) \bmod 2 = 0 \text{ and } n_b(w) \bmod 3 = 0 \ \& \ w \in \{a, b\}^+ \}$ **(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) $L = \{ vuv \mid u, v \in \{a, b\}^* \text{ and } |v| = 2 \}$ **(07 Marks)**

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) $L = \{a^n b^m c^k \mid n + 2m = k\}$ **(06 Marks)**

b. Consider the following grammar :

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

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:

$L_p = n_0 \mid \theta_p L_s$

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

$L_s = L_s L_p \mid L_p$ **(06 Marks)**

OR

6 a. Explain error recovery in predictive parsing. **(05 Marks)**

b. Consider the following grammar and find the left factoring

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

$E \rightarrow b$ **(05 Marks)**

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

$E \rightarrow TE'$

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

$T \rightarrow FT'$

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

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

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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".

$S \rightarrow S + E$
$S \rightarrow E$
$E \rightarrow num$

(10 Marks)

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

$E \rightarrow (E) \mid id$

(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 :

$S \rightarrow EN$
$E \rightarrow E + T \mid E - T \mid T$
$T \rightarrow T * F \mid T/F \mid F$
$F \rightarrow (E) \mid digit$
$N \rightarrow ;$

(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.***

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.

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)**

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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.

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.

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) Vaccum 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. **(08Marks)**

b. Explain the following and also list their advantages and disadvantages.
i) Breadth First search
ii) Depth First search **(12 Marks)**

Module-2

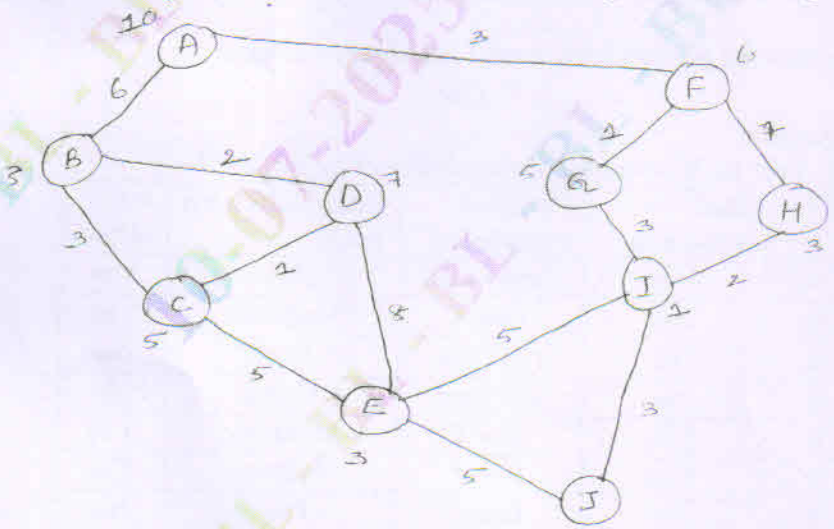
3 a. Explain greedy Best First Search with a suitable example. **(10 Marks)**

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 ID_3 algorithm. **(06 Marks)**

b. Construct ID_3 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)

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Module-5

9 Write short notes on :
i) Mean – Shift clustering
ii) Proximity Measures
iii) Applications of ANN
iv) Grid – Bared 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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BCI515D

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) Guassian 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

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		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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BCS501

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.

			M	L	C
		Module – 1			
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 aand 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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BRMK557

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

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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	M	L	C
Q.1	a.	What is Artificial Intelligence? Explain the four approaches of Artificial Intelligence in detail	10	L2	CO1
	b.	What Artificial Intelligence can do today? Explain various application domains of Artificial Intelligence.	10	L2	CO1
		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			
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			
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			
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
	b.	Explain different methods of deriving heuristics.	10	L2	CO3
		OR			
Q.6	a.	Using PEAS description, represent the Wumpus World problem.	06	L3	CO3
	b.	Briefly explain Knowledge Based Agents.	04	L2	CO3
	c.	Explain in detail, syntax and semantics of propositional logic.	10	L3	CO3

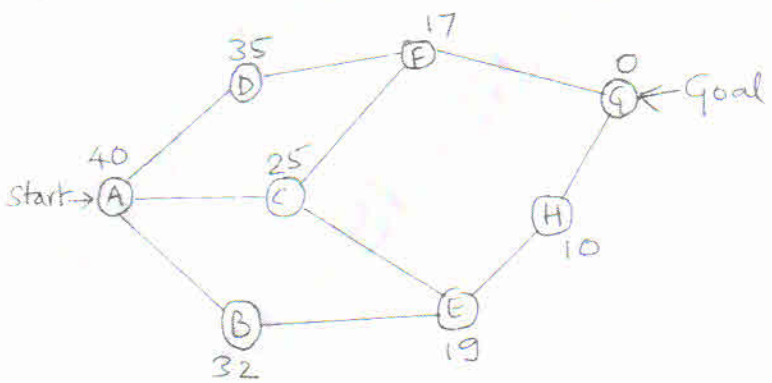

Fig. Q.5 (a)

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		Module – 4			
Q.7	a.	Explain in detail, syntax of first order logic.	10	L2	CO4
	b.	Explain various steps in the knowledge engineering process.	10	L2	CO4
		OR			
Q.8	a.	Write Unification algorithm. Explain with suitable example.	10	L2	CO4
	b.	Explain simple forward – chaining algorithm with an example.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain Backward – chaining algorithm with an example.	10	L2	CO5
	b.	Illustrate the procedure to convert a sentence of first order logic to Conjunctive Normal Form (CNF)	10	L2	CO5
		OR			
Q.10	a.	Illustrate categories and objects with suitable examples.	10	L2	CO5
	b.	Explain the following with respect to events: i) Time ii) Fluents and objects	10	L2	CO5

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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.

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.

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)**

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)**

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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.***

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.

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 :
i) Super key
ii) Candidate key
iii) Primary key. **(06 Marks)**

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 relateional 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.
$F = \{A \rightarrow B\,C, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$. **(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)**

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21CS61

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Software Engineering and Project Management

Time: 3 hrs. Max. Marks: 100

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

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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Module-1

1 a. What is a software? What are the characteristics of software that is different from hardware? **(08 Marks)**

b. Demonstrate the role of each activity in a generic process framework for software engineering. **(08 Marks)**

c. Software engineering is a layered technology. Justify with necessary diagram and explanation. **(04 Marks)**

OR

2 a. Explain waterfall model along with its variation with neat diagram. **(08 Marks)**

b. Interpret the seven general principles that focus on software engineering. **(08 Marks)**

c. Justify that prototyping serves as the better mechanism for identifying software requirements. **(04 Marks)**

Module-2

3 a. Describe the distinct tasks of requirement engineering. **(08 Marks)**

b. Sketch an activity diagram for access camera surveillance via the internet–display camera views function. **(08 Marks)**

c. Show how the requirements can be validated. **(04 Marks)**

OR

4 a. Discuss the concepts of data modeling with examples. **(08 Marks)**

b. Demonstrate the use of CRC modelling in system requirements with an example. **(08 Marks)**

c. Distinguish among association, multiplicity and dependencies. **(04 Marks)**

Module-3

5 a. What is Agility? Explain agility principles to be followed to achieve agility. **(10 Marks)**

b. Demonstrate extreme programming with diagram and give its values. **(10 Marks)**

OR

6 a. Describe adaptive software development and scrum agile process models. **(10 Marks)**

b. Interpret the principles of framework activity “communication”. **(10 Marks)**

Module-4

7 a. What are activities covered by software project management? **(06 Marks)**

b. Analyze the software development life cycle with reference to ISO 12207. **(10 Marks)**

c. Discuss W5HH principle. **(04 Marks)**

OR

8 a. Discuss the process of setting objectives for project. **(06 Marks)**

b. Examine the activities involved in software project management and functioning of the project control cycle. **(10 Marks)**

c. Differentiate between software development and project management life cycles. **(04 Marks)**

Module-5

9 a. Demonstrate the place of software quality in stepwise framework with neat diagram. **(10 Marks)**

b. Distinguish between Dromey's quality model and Boehm's quality model. **(10 Marks)**

OR

10 a. Give an insight on ISO 9126 with reference to software quality. **(10 Marks)**

b. Analyze the role of Capability Maturity Model (CMM) to improve quality of software development. **(10 Marks)**

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21CS62

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Full Stack Development

Time: 3 hrs. Max. Marks: 100

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

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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Module-1

1 a. Explain how to configure urls in urls.py. Develop a program to display current data and five, and 4 days ahead. **(10 Marks)**

b. What is a web framework? List and explain features of django framework. Explain MVC framework/architecture with a diagram. **(10 Marks)**

OR

2 a. What is loose coupling? Demonstrate the concept of URL confs and loose coupling by taking an example. **(10 Marks)**

b. Develop a python CGI script to display ten most recently published books from the database table. **(10 Marks)**

Module-2

3 a. Develop a program to demonstrate the following concepts :
i) Selecting objects
ii) Filtering data
iii) Retrieving single objects
iv) Slicing data. **(10 Marks)**

b. Develop a program to display
i) Unordered list of fruits
ii) List of students from a database table. **(10 Marks)**

OR

4 a. Develop a program to demonstrate the concept of :
i) Ordering data
ii) Reverse ordering data
iii) Updating objects
iv) Deleting objects. **(10 Marks)**

b. What is template inheritance? Develop program to demonstrate template inheritance. **(10 Marks)**

Module-3

5 a. In URL conf, demonstrate with code, the concept of streamlining function imports. **(10 Marks)**

b. Develop a program to demonstrate the Concept of Form and Model Form. **(10 Marks)**

OR

6 a. Develop contact form and show how to tie the form to a view. **(10 Marks)**

b. List and explain all the steps to be followed up to migration. Write a sample model class. **(10 Marks)**

Module-4

7 a. Develop a program to download the contents of a students table to excel (CSV) file. **(10 Marks)**

b. Develop program for registering student and displaying a list of students. When a student is selected, display more details about student using django ListView and DetailView. **(10 Marks)**

OR

8 a. Develop a program to download the contents of students table to PDF file. **(10 Marks)**

b. What is Syndication feed? Develop a program to display latest file blogs using a Simple feed. **(10 Marks)**

Module-5

9 a. What is XMLHttpRequest? List and briefly explain the properties and methods of XMLHttpRequest. **(10 Marks)**

b. Design and develop a program to demonstrate Ajax calls in jQuery. **(10 Marks)**

OR

10 a. List the technologies on which ajax is overlaid, briefly explain HTML/XHTML, XML, JSON. **(10 Marks)**

b. Develop a registration page for student enrolment without page refresh using AJAX. **(10 Marks)**

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21CS63

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Computer Graphics and Fundamentals of Image Processing

Time: 3 hrs. Max. Marks: 100

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

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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Module-1

1 a. What is Computer Graphics? Explain the applications of computer graphics. **(10 Marks)**

b. Develop the code of the Bresenham's line drawing algorithm for $m < 1.0$. Also digitize a line (20, 10) and (30, 18). **(10 Marks)**

OR

2 a. Explain Raster scan and Random scan display system. **(10 Marks)**

b. Explain OpenGL point functions, line functions and line attribute functions with examples. **(10 Marks)**

Module-2

3 a. Explain 2 Dimensional shear and reflection transformations. **(08 Marks)**

b. Show that two successive translations and also two successive rotations are additive. **(08 Marks)**

c. Rotate a polygon which has a co-ordinate positions (1, 1) (3, 1) and (2, 3) by 90° (Counter clockwise) about a fixed (2, 2). Determine co-ordinates after rotation. Draw original and rotated polygon. **(04 Marks)**

OR

4 a. With the help of suitable diagram show the basic 3D geometric transformation techniques and give the transformation matrix. **(10 Marks)**

b. Explain OpenGL Raster transformations and OpenGL geometric transformation functions. **(10 Marks)**

Module-3

5 a. Explain the following :
i) Logical input devices
ii) Input modes. **(10 Marks)**

b. Explain the interactive picture construction techniques with neat diagram. **(10 Marks)**

OR

6 a. Explain development stages for designing of animation sequence. **(08 Marks)**

b. Write a note on motion specification. **(06 Marks)**

c. Explain OpenGL menu functions. **(06 Marks)**

Module-4

7 a. Define image processing and describe its related fields. **(07 Marks)**

b. Explain the 2D geometrical operations used in image processing. **(13 Marks)**

OR

8 a. Explain the types of images based on different criteria. **(12 Marks)**

b. Explain the arithmetic operation on an image. **(08 Marks)**

Module-5

9 a. Define image segmentation. Explain the classification of the image segmentation algorithms. **(10 Marks)**

b. Explain the Roberts, Prewitt and Sobel Edge detection operators and write the generic gradient based algorithm. **(10 Marks)**

OR

10 a. Define Edge. Explain the stages in edge detection. **(10 Marks)**

b. Derive the equation for Laplacian of Gaussian operater and difference of Gaussian filter. **(10 Marks)**

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21CS642

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Advanced Java Programming

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is autoboxing? Write a Java program to demonstrate auto boxing/unboxing occurs inside the expression. **(06 Marks)**

b. Demonstrate with a Java program values( ) and valueOf( ) methods? **(08 Marks)**

c. Define annotations. Demonstrate Maker annotation. **(06 Marks)**

OR

2 a. Demonstrate with a Java program, wrapper class. **(06 Marks)**

b. Explain with an example how annotation can be send at runtime. **(08 Marks)**

c. Explain ordinal values. Compare and contrast with equal enumeration with example. **(06 Marks)**

Module-2

3 a. What is generics? Demonstrate two type parameter generic class. **(08 Marks)**

b. Write a Java program to demonstrate bounded types. **(06 Marks)**

c. Explain Generic Class Hierarchies with example. **(06 Marks)**

OR

4 a. Explain Generic Interfaces with an example. **(06 Marks)**

b. Write a Java program to demonstrate wild card arguments in Java generics. **(07 Marks)**

c. Explain Bridge methods in Java generics. **(07 Marks)**

Module-3

5 a. Define String. Write a Java program to demonstrate constructor of string class. **(05 Marks)**

b. Explain string handling methods to modify a string. **(10 Marks)**

c. Develop a Java program to count the occurrence of character in given string. **(05 Marks)**

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OR

6 a. Explain the following character extraction methods:
(i) CharAt( ) (ii) toCharArry( ) **(06 Marks)**

b. Explain any 5 string buffer methods with an example. **(10 Marks)**

c. Explain any two string comparison method. **(04 Marks)**

Module-4

7 a. Explain the life cycle of a servlet with a neat diagram. **(04 Marks)**

b. Write a Java program to display sum of two numbers on browser. **(10 Marks)**

c. Write a Java program to create a cookie. **(06 Marks)**

OR

8 a. What is JSP? Explain the various types of JSP tags with examples. **(10 Marks)**

b. Explain the concept of reading servlet parameter with an example. **(10 Marks)**

Module-5

9 a. Explain 4 types of JDBC drivers. **(08 Marks)**

b. Describe the following concepts :
i) Scrollable result set
ii) Callable statement
iii) Transaction processing
iv) Updateable result set **(12 Marks)**

OR

10 a. Describe the various steps involved in JDBC process with a code snippet. **(10 Marks)**

b. List and explain the three kinds of exceptions occurred in JDBC with an example. **(10 Marks)**

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21CS644

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Data Science and Visualization

Time: 3 hrs. Max. Marks: 100

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

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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Module-1

1 a. What is data science? Explain relationship between data science and big data. **(10 Marks)**

b. Define model. Explain the how you can build a statistical model. **(10 Marks)**

OR

2 a. Explain the Venn diagram of data science. **(10 Marks)**

b. Explain the probability distribution. **(05 Marks)**

c. Differentiate population and sample, explain the notion of population and sample in the context of Big Data. **(05 Marks)**

Module-2

3 a. Explain data science process with neat diagram. **(10 Marks)**

b. Consider the following dataset given in table cluster, it using K-means algorithm with the initial value of objects 2 and 5 with the co-ordinate values (4, 6) and (12, 4) as initial seeds.

Objects	x-co-ordinate	y-co-ordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

(05 Marks)

c. Explain the linear regression algorithm with R implementation with example. **(05 Marks)**

OR

4 a. Explain EDA with suitable example. **(10 Marks)**

b. Explain the K-NN algorithm in detail with example. **(10 Marks)**

Module-3

5 a. Assume a student performance during his course of study and predict whether the student will get a Job-offer or not in his final year of the course.

Sl. No.	CGPA	Interactiveness	Practical knowledge	Communication skills	Job-offer
1	≥ 9	Yes	V. good	Good	Yes
2	≥ 8	No	Good	Medium	Yes
3	≥ 9	No	Average	Poor	No
4	< 8	No	Average	Good	No
5	≥ 8	Yes	Good	Medium	Yes
6	≥ 9	Yes	Good	Medium	Yes
7	< 8	Yes	Good	Poor	No
8	≥ 9	No	V. Good	Poor	Yes
9	≥ 8	Yes	Good	Good	Yes
10	≥ 8	Yes	Average	Good	Yes

Draw decision tree using CART algorithm with Gini index technique. **(10 Marks)**

b. Explain random forest algorithm with example and advantages and disadvantages. **(10 Marks)**

OR

6 a. Explain singular value decomposition. **(10 Marks)**

b. Define feature extracting, how to do extracting of features and explain its applications. **(05 Marks)**

c. Briefly explain the attribute selection measure technique with example. **(05 Marks)**

Module-4

7 a. Define data visualization, Explain the importance of it. **(10 Marks)**

b. Define Data Wrangling. Explain with suitable example. **(10 Marks)**

OR

8 a. Explain the any three relation plots with implementation of example dataset. **(10 Marks)**

b. Explain any two composition plot and distribution plot with neat diagram. **(10 Marks)**

Module-5

9 a. How to plot a graph using R – implementation. Explain with proper example. **(10 Marks)**

b. Define scatter plots. Explain types of scatter plots in detail. **(05 Marks)**

c. What is Histogram? How we use Histograms in data science? **(05 Marks)**

OR

10 a. Write image operations and explain with example. **(05 Marks)**

b. Explain the following:

i) Labels
ii) Titles
iii) Annotations
iv) Legends **(05 Marks)**

c. How to create, display and closing figures and format strings? Explain with proper implementation. **(10 Marks)**

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21CS653

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to Cyber Security

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1	a.	Define Cybercrime. Categorize the cyber criminals.		**(08 Marks)**
	b.	Write a note on following :		
		i) Cyberdefamation	ii) Computer sabotage	iii) Credit card frauds
		iv) Salami attack	v) Spamming	vi) Identity theft. **(12 Marks)**

OR

2	a.	Briefly explain Legal perspective and Indian perspective of cybercrime.	**(06 Marks)**
	b.	Write a note on Indian ITA 2000.	**(04 Marks)**
	c.	Classify the Cybercrimes with examples for each.	**(10 Marks)**

Module-2

3	a.	Explain the phases involved in planning cybercrime.	**(10 Marks)**
	b.	With a case study, explain cyber stalking.	**(05 Marks)**
	c.	Classify and explain any five human - based social engineering.	**(05 Marks)**

OR

4	a.	What are the safety and security measures to be considered while using a computer in a cyber café?	**(08 Marks)**
	b.	Define botnet. How one can secure the system from botnet attack.	**(08 Marks)**
	c.	Write a note on attack vector.	**(04 Marks)**

Module-3

5	a.	What are the differences between prony server and anonymizer?	**(05 Marks)**
	b.	What is phishing? Explain how phishing works.	**(07 Marks)**
	c.	Define virus. Explain different types of viruses.	**(08 Marks)**

OR

6	a.	What are DoS and DDoS attacks? Explain the types of DoS attack.	**(10 Marks)**
	b.	Explain traditional techniques of attacks on wireless networks.	**(10 Marks)**

Module-4

7	a.	Define criminal profiling. Explain different profiling methods.	**(06 Marks)**
	b.	Discuss any five common misconceptions regarding cybercriminals.	**(10 Marks)**
	c.	List the common motives for committing cybercrime.	**(04 Marks)**

OR

8	a.	Explain the ten characteristics of good cyber investigator.	**(10 Marks)**
	b.	What is Encryption? List different encryption algorithms.	**(05 Marks)**
	c.	Write a note on Steganography.	**(05 Marks)**

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Module-5

9	a.	Discuss how Firewall logs , Reports , Alarms and Alerts can be used to detect cybercrime attack.	**(08 Marks)**
	b.	With the key commands, describe how Domain Name or ID address is traced?	**(06 Marks)**
	c.	Define Evidence. Brief on its categories.	**(06 Marks)**

OR

10	a.	Explain collection and preserving of digital evidence.	**(06 Marks)**
	b.	Briefly explain evidence tagging and marking. Also brief on evidence logs.	**(06 Marks)**
	c.	What are the different types of data that should be examined for evidence in case of cyber crime?	**(08 Marks)**

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Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Programming in Java

Time: 3 hrs. Max. Marks: 100

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

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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Module-1

1 a. What are the three fundamental principles of Object Oriented Programming (OOP)? **(10 Marks)**

b. Illustrate the difference between type conversion and type casting with examples. **(10 Marks)**

OR

2 a. What is meant by scope of a variable? Explain the importance of scope operator with example. **(10 Marks)**

b. Write a java code to read two numbers and display their sum, product and difference. **(10 Marks)**

Module-2

3 a. Explain two looping statements available in Java with examples. **(10 Marks)**

b. Explain where ladder if-else statements would be more appropriate than switch statement with an example. **(10 Marks)**

OR

4 a. Demonstrate with an example the use of 'continue' and 'break' statements in while loop. **(10 Marks)**

b. Explain the use of switch statement with an example. Also emphasise on the significance of 'default' case in switch statement. **(10 Marks)**

Module-3

5 a. Explain the concept of reference passing when using objects as parameters, with an example. **(10 Marks)**

b. What is the use of static keyword in Java explain with an example. **(10 Marks)**

OR

6 a. What is method over loading? Explain with example. **(10 Marks)**

b. What is a stack? Implement a stack in Java with push, pop and peep methods. **(10 Marks)**

Module-4

7 a. How do you create a user defined package in Java? Explain with an example. **(10 Marks)**

b. What is the purpose of 'try' block in exception handling? Also explain the role of finally block in exception handling. **(10 Marks)**

OR

8 a. What is an Interface? How do you define an interface in Java? Explain with example. **(10 Marks)**

b. What is exception hierarchy in Java? Explain with an example. **(10 Marks)**

Module-5

9 a. Explain the following :
(i) Enumeration
(ii) Type wrappers **(10 Marks)**

b. What is string literal and how is it treated in Java? Why does Java automatically create string objects from string literals? **(10 Marks)**

OR

10 a. What is the difference between string buffer and string builder? Explain with an example. **(10 Marks)**

b. List and explain any four string method which can be used to modify a given string. **(10 Marks)**

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BCS601

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Cloud Computing

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 critical cluster design issues and feasible implementation.	8	L2	CO2
	b.	Describe VM primitive operations.	6	L2	CO2
	c.	Explain virtual machine with architectures of compared with traditional physical machine.	6	L2	CO1
		OR			
Q.2	a.	Explain the following: i) Internet of thing ii) Cyber physical systems iii) Memory storage and wide area networking	 2 2 6	L1	CO1
	b.	Explain computing paradigm distinctions.	5	L2	CO2
	c.	Describe the classification of parallel and distributed computing systems.	5	L2	CO2
		Module – 2			
Q.3	a.	Explain implementation levels of virtualization.	5	L2	CO2
	b.	Draw architecture of computer before and after virtualization.	5	L3	CO2
	c.	Explain how virtualization support at OS level.	10	L3	CO2
		OR			
Q.4	a.	Explain virtualization of CPU/memory and I/O devices.	10	L2	CO3
	b.	Describe virtualization for data center automation.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain cloud service models with the diagram.	5	L2	CO2
	b.	Explain cloud deployment models.	5	L2	CO2
	c.	Write a note on public cloud platforms, GAE, AWS and Azure.	10	L2	CO3

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		OR			
Q.6	**a.**	Define cloud computing and list the characteristics.	**5**	**L1**	**CO1**
	b.	Write benefits and challenges of each service.	**5**	**L1**	**CO1**
	c.	Write a note on Inter cloud resource management.	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Summarize cloud data encryption and challenges in data encryption.	**8**	**L2**	**CO1**
	b.	Write a note on cloud security define strategies.	**6**	**L2**	**CO1**
	c.	Explain anomaly detection techniques in cloud.	**6**	**L3**	**CO3**
		OR			
Q.8	**a.**	Describe data and software protection techniques.	**8**	**L2**	**CO2**
	b.	Briefly explain reputation-guided protection of data centers.	**6**	**L2**	**CO1**
	c.	Explain access control and identity access management.	**6**	**L1**	**CO2**
		Module – 5			
Q.9	**a.**	Write difference between cloud and grid computing.	**6**	**L1**	**CO2**
	b.	Explain the following : i) Server keys computing ii) Edge computing iii) AI/ML in cloud iv) Containerization with Docker and Kubernetes v) Quantum computing in cloud	**10**	**L2**	**CO2**
	c.	Explain AWS services.	**4**	**L2**	**CO2**
		OR			
Q.10	**a.**	Explain the features of cloud and grid computing.	**10**	**L1**	**CO2**
	b.	Distinguish between AWS, Azure, GCP, IBM cloud.	**6**	**L3**	**CO3**
	c.	List out best practices for cloud software development.	**4**	**L3**	**CO3**

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Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Machine Learning

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.**	State Tom Mitchell's definition of machine learning. List and explain the challenges of machine learning.	**7**	**L1**	**CO1**
	b.	List and explain the visualization aids available for univariate data analysis with example for each.	**7**	**L2**	**CO1**
	c.	For the patients age list {12, 14, 19, 22, 24, 26, 28, 31, 34}. Find the IQR.	**6**	**L3**	**CO1**
		OR			
Q.2	**a.**	Explain in detail the machine learning process with a neat diagram.	**7**	**L2**	**CO1**
	b.	Explain data preprocessing with measures to solve the problem of missing data.	**7**	**L2**	**CO1**
	c.	Find the 5-point summary of the list {13, 11, 2, 3, 4, 8, 9} and plot the box plot for the same.	**6**	**L3**	**CO1**
		Module – 2			
Q.3	**a.**	Let the data points be $\begin{pmatrix}2\\6\end{pmatrix}$ and $\begin{pmatrix}1\\7\end{pmatrix}$. Apply Principal Component Analysis (PCA) and find the transformed data.	**10**	**L3**	**CO1**
	b.	Apply candidate elimination algorithm on the dataset given in Table Q.3(b) to obtain the complete version space. (Table Q.3(b) below)	**10**	**L3**	**CO2**

Table Q.3(b)

CGPA	Interactiveness	Practical knowledge	Communication skills	Logical thinking	Job offer
≥ 9	Yes	Excellent	Good	Fast	YES
≥ 9	Yes	Good	Good	Fast	YES
≥ 8	No	Good	Good	Fast	NO
≥ 9	Yes	Good	Good	Slow	YES

		OR	M	L	C
Q.4	**a.**	Find Singular Value Decomposition (SVD) of the matrix $A = \begin{pmatrix}1 & 2\\4 & 9\end{pmatrix}$.	**10**	**L3**	**CO2**

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			Marks	Level	CO
	b.	Write Find-S algorithm. Apply the algorithm to obtain the hypothesis for the dataset given in the Table Q.4(b).	10	L3	CO2

Table Q.4(b)

Sky	Air temp	Humidity	Wind	Water	Forecast	Enjoy sport
Sunny	Warm	Normal	Strong	Warm	Same	YES
Sunny	Warm	High	Strong	Warm	Same	YES
Rainy	Cold	High	Strong	Warm	Change	NO
Sunny	Warm	High	Strong	Cool	Change	YES

Module – 3

Q.5	a.	Apply K-nearest neighbor algorithm, for the dataset given in Table Q.5(a). Given a test instance (6.1, 40, 5), use the training set to classify the test instance. Choose K = 3.	6	L3	CO3

Table Q.5(a)

CGPA	Assessment	Project submitted	Result
9.2	85	8	PASS
8	80	7	PASS
8.5	81	8	PASS
6	45	5	FAIL
6.5	50	4	FAIL
5.8	38	5	FAIL

	b.	Explain types of regression methods and limitations of regression methods.	7	L2	CO3
	c.	Explain the structure of a decision tree and write the procedure to construct a decision the using ID3 algorithm.	7	L2	CO3

OR

Q.6	a.	Write the nearest-centroid classifier algorithm. Apply the same to predict the class for the given test instance (6, 5) using the training dataset given in Table Q.6(a).	7	L3	CO3

X	Y	Class
3	1	A
5	2	A
4	3	A
7	6	B
6	7	B
8	5	B

Table Q.6(a)

	b.	Distinguish between i) Regression and correlation ii) Regression and causation iii) Linearity and non-linearity relationships.	6	L2	CO3
	c.	Explain the advantages and disadvantages of decision tree. Write the general algorithm for decision tree.	7	L2	CO3

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Module – 4

Q.7 **a.** Using Naïve bayes classifier classify the new data (Red, SUV, Domestic) using the training dataset given in Table Q.7(a). **10** **L3** **CO4**

Table Q.7(a)

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

b. Explain the simple model of an artificial neuron along with the artificial neural network structure. **10** **L2** **CO4**

OR

Q.8 **a.** Explain Bayes theorem, Maximum A Posteriori (MAP) hypothesis and Maximum Likelihood (ML) hypothesis in detail. **10** **L2** **CO4**

b. Explain different activation functions used in artificial neural network. **10** **L2** **CO4**

Module – 5

Q.9 **a.** Consider the following set of data given in Table Q.9(a). Cluster it using K-means algorithm with initial value of objects 2 and 5 with the coordinate values (4, 6) and (12, 4) as initial seeds. **10** **L3** **CO5**

Table Q.9(a)

Objects	X-coordinate	Y-coordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

b. Explain the various components of reinforcement learning. **10** **L2** **CO5**

OR

Q.10 **a.** Find the Manhattan and Chebyshev distance if the coordinates of the objects are (0, 3) and (5, 8). **4** **L3** **CO5**

b. Explain the mean shift clustering algorithm. **6** **L2** **CO5**

c. List and explain the **10** **L3** **CO5**

i) Characteristics of reinforcement learning
ii) Challenges of reinforcement learning
iii) Applications of reinforcement learning

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21RAI63

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Machine Learning

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. List and explain the step's to design a learning system in detail. **(08 Marks)**

b. List the different challenges of Machine Learning. **(04Marks)**

c. Explain version space and consider the Enjoyspot concept and Instance give below. Identify the specific hypo thesis using "Find – s" Algorithm.

Example	Sky	Air temp	Humidity	Wind	Water	Forecast	Enjoyspots
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Cold	High	Strong	Warm	Change	No
3	Rainy	Cold	High	Strong	Cool	Same	Yes
4	Sunny	Warm	High	Strong	Warm	Change	Yes

(08 Marks)

OR

2 a. Define machine learning and Explain main types of Machine learning. **(10 Marks)**

b. Consider the "Japanese Economy car" concept and Instance given below, Identify the hypotheses using candidate – Elimination Learning algorithm. **(10 Marks)**

ORIGIN	MANUFACTURER	COLOR	YEAR	TYPE	CLASS
Japan	Honda	Blue	1980	Economy	Yes
Japan	Toyota	Green	1970	Sports	No
Japan	Toyota	Blue	1990	Economy	Yes
Germany	Wolk's Wagn	Red	1980	Sports	No
Japan	Honda	White	1980	Economy	Yes
Japan	Toyota	Green	1980	Economy	Yes
Japan	Honda	Red	1980	Economy	Yes

Module-2

3 a. Explain the different steps to get data in data-preprocessing, with code. **(10 Marks)**

b. Using code snippet, Explain the concepts involved in

i) Data cleaning

ii) Select and train the model

iii) Discover and Visualize the data **(10 Marks)**

OR

4 a. Explain. I) MNIST ii) Performance measure iii) Multi Label classification. **(10 Marks)**

b. Using code snippet, outline the concepts involved in,

i) Measuring accuracy using cross validation.

ii) Confusion Matrix

iii) Precision, F_1 – score and recall **(10 Marks)**

Module-3

5 a. Explain Linear Regression with code snippet. **(10 Marks)**

b. Explain the three different Regularized Linear Models. **(10 Marks)**

OR

6 a. Explain Logistic Regression with code snippet. **(10 Marks)**

b. Explain support vector Machine regression. **(10 Marks)**

Module-4

7 a. Explain the concept of :
i) Bagging and Pasting
ii) Random Forests. **(10 Marks)**

b. Define Boosting. Explain the different variant's of Boosting. **(10 Marks)**

OR

8 a. Explain CART Training Algorithm and regularization Hyper parameters. **(10Marks)**

b. Write a short not on "
i) Entropy
ii) Voting classifier
iii) GINI impurity **(10 Marks)**

Module-5

9 a. Explain Naïve Bayes classifier and Apply the dataset given below.

No.	Color	Legs	Height	Smelly	Species
1	White	3	Short	Yes	M
2	Green	2	Tall	No	M
3	Green	3	Short	Yes	M
4	White	3	Short	Yes	M
5	Green	2	Short	No	H
6	White	2	Tall	No	H
7	White	2	Tall	No	H
8	White	2	Short	Yes	H

(12 Marks)

b. Derive the EM Algorithm in detail. **(08 Marks)**

OR

10 a. Explain Bayesian Belief Network with Example. **(10 Marks)**

b. Explain Gibbs Algorithm. **(10 Marks)**

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21AI641

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Business Intelligence

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. List out the components and explain business pressures and responses support model. **(10 Marks)**

b. Describe three major managerial roles and list some of the specific activities in each. **(10 Marks)**

OR

2 a. Define data analytics. Explain different types of analytics. **(10 Marks)**

b. Define Business Intelligence. Explain the architecture of BI model with neat diagram. **(10 Marks)**

Module-2

3 a. List out and explain different phases of decision making process. **(10 Marks)**

b. Explain various types of activities involved in intelligence phase. **(10 Marks)**

OR

4 a. Briefly explain how can sensitivity analysis helps in choice phase. **(10 Marks)**

b. Define goal seeking in business intelligence. Explain tools and technologies of goal seeking in BI. **(10 Marks)**

Module-3

5 a. How does a data warehouse differ from a database? Differentiate among data mart, ODS and an EDW. **(10 Marks)**

b. Describe data ware housing process and its major components. **(10 Marks)**

OR

6 a. Explain key similarities and differences between a two-tiered architecture and a three-tired architecture. **(10 Marks)**

b. Describe three steps of ETL process. Explain why ETL process is important for data warehousing efforts. **(10 Marks)**

Module-4

7 a. Define knowledge management system. Explain the relationship between data information and knowledge with neat diagram. **(10 Marks)**

b. Write a note on different types of approaches in knowledge management. **(10 Marks)**

OR

8 a. Define KMS and describe the components of KMS cycle. **(10 Marks)**

b. Write a note on key technologies that support knowledge management. **(10 Marks)**

Module-5

9	a.	Briefly explain the applications of expert systems.	(10 Marks)
	b.	List out and explain major features of expert systems.	(10 Marks)

OR

10	a.	Explain the process of knowledge engineering.	(10 Marks)
	b.	List out and explain problem are as suitable for expert systems.	(10 Marks)

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21CS61

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Software Engineering and Project Management

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is a software? What are the characteristics of software that is different from hardware? **(08 Marks)**

b. Demonstrate the role of each activity in a generic process framework for software engineering. **(08 Marks)**

c. Software engineering is a layered technology. Justify with necessary diagram and explanation. **(04 Marks)**

OR

2 a. Explain waterfall model along with its variation with neat diagram. **(08 Marks)**

b. Interpret the seven general principles that focus on software engineering. **(08 Marks)**

c. Justify that prototyping serves as the better mechanism for identifying software requirements. **(04 Marks)**

Module-2

3 a. Describe the distinct tasks of requirement engineering. **(08 Marks)**

b. Sketch an activity diagram for access camera surveillance via the internet–display camera views function. **(08 Marks)**

c. Show how the requirements can be validated. **(04 Marks)**

OR

4 a. Discuss the concepts of data modeling with examples. **(08 Marks)**

b. Demonstrate the use of CRC modelling in system requirements with an example. **(08 Marks)**

c. Distinguish among association, multiplicity and dependencies. **(04 Marks)**

Module-3

5 a. What is Agility? Explain agility principles to be followed to achieve agility. **(10 Marks)**

b. Demonstrate extreme programming with diagram and give its values. **(10 Marks)**

OR

6 a. Describe adaptive software development and scrum agile process models. **(10 Marks)**

b. Interpret the principles of framework activity "communication". **(10 Marks)**

Module-4

7 a. What are activities covered by software project management? **(06 Marks)**

b. Analyze the software development life cycle with reference to ISO 12207. **(10 Marks)**

c. Discuss W5HH principle. **(04 Marks)**

OR

8 a. Discuss the process of setting objectives for project. (06 Marks)

b. Examine the activities involved in software project management and functioning of the project control cycle. (10 Marks)

c. Differentiate between software development and project management life cycles. (04 Marks)

Module-5

9 a. Demonstrate the place of software quality in stepwise framework with neat diagram. (10 Marks)

b. Distinguish between Dromey's quality model and Boehm's quality model. (10 Marks)

OR

10 a. Give an insight on ISO 9126 with reference to software quality. (10 Marks)

b. Analyze the role of Capability Maturity Model (CMM) to improve quality of software development. (10 Marks)

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21CS62

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Full Stack Development

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Explain how to configure urls in urls.py. Develop a program to display current data and five, and 4 days ahead. **(10 Marks)**

b. What is a web framework? List and explain features of django framework. Explain MVC framework/architecture with a diagram. **(10 Marks)**

OR

2 a. What is loose coupling? Demonstrate the concept of URL confs and loose coupling by taking an example. **(10 Marks)**

b. Develop a python CGI script to display ten most recently published books from the database table. **(10 Marks)**

Module-2

3 a. Develop a program to demonstrate the following concepts :
i) Selecting objects
ii) Filtering data
iii) Retrieving single objects
iv) Slicing data. **(10 Marks)**

b. Develop a program to display
i) Unordered list of fruits
ii) List of students from a database table. **(10 Marks)**

OR

4 a. Develop a program to demonstrate the concept of :
i) Ordering data
ii) Reverse ordering data
iii) Updating objects
iv) Deleting objects. **(10 Marks)**

b. What is template inheritance? Develop program to demonstrate template inheritance. **(10 Marks)**

Module-3

5 a. In URL conf, demonstrate with code, the concept of streamlining function imports. **(10 Marks)**

b. Develop a program to demonstrate the Concept of Form and Model Form. **(10 Marks)**

OR

6 a. Develop contact form and show how to tie the form to a view. **(10 Marks)**

b. List and explain all the steps to be followed up to migration. Write a sample model class. **(10 Marks)**

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Module-4

7 a. Develop a program to download the contents of a students table to excel (CSV) file. **(10 Marks)**

b. Develop program for registering student and displaying a list of students. When a student is selected, display more details about student using django ListView and DetailView. **(10 Marks)**

OR

8 a. Develop a program to download the contents of students table to PDF file. **(10 Marks)**

b. What is Syndication feed? Develop a program to display latest file blogs using a Simple feed. **(10 Marks)**

Module-5

9 a. What is XMLHttpRequest? List and briefly explain the properties and methods of XMLHttpRequest. **(10 Marks)**

b. Design and develop a program to demonstrate Ajax calls in jQuery. **(10 Marks)**

OR

10 a. List the technologies on which ajax is overlaid, briefly explain HTML/XHTML, XML, JSON. **(10 Marks)**

b. Develop a registration page for student enrolment without page refresh using AJAX. **(10 Marks)**

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21CS63

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Computer Graphics and Fundamentals of Image Processing

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is Computer Graphics? Explain the applications of computer graphics. **(10 Marks)**

b. Develop the code of the Bresenham's line drawing algorithm for m < 1.0. Also digitize a line (20, 10) and (30, 18). **(10 Marks)**

OR

2 a. Explain Raster scan and Random scan display system. **(10 Marks)**

b. Explain OpenGL point functions, line functions and line attribute functions with examples. **(10 Marks)**

Module-2

3 a. Explain 2 Dimensional shear and reflection transformations. **(08 Marks)**

b. Show that two successive translations and also two successive rotations are additive. **(08 Marks)**

c. Rotate a polygon which has a co-ordinate positions (1, 1) (3, 1) and (2, 3) by 90° (Counter clockwise) about a fixed (2, 2). Determine co-ordinates after rotation. Draw original and rotated polygon. **(04 Marks)**

OR

4 a. With the help of suitable diagram show the basic 3D geometric transformation techniques and give the transformation matrix. **(10 Marks)**

b. Explain OpenGL Raster transformations and OpenGL geometric transformation functions. **(10 Marks)**

Module-3

5 a. Explain the following :
i) Logical input devices
ii) Input modes. **(10 Marks)**

b. Explain the interactive picture construction techniques with neat diagram. **(10 Marks)**

OR

6 a. Explain development stages for designing of animation sequence. **(08 Marks)**

b. Write a note on motion specification. **(06 Marks)**

c. Explain OpenGL menu functions. **(06 Marks)**

Module-4

7 a. Define image processing and describe its related fields. **(07 Marks)**

b. Explain the 2D geometrical operations used in image processing. **(13 Marks)**

OR

8 a. Explain the types of images based on different criteria. **(12 Marks)**

b. Explain the arithmetic operation on an image. **(08 Marks)**

Module-5

9 a. Define image segmentation. Explain the classification of the image segmentation algorithms. **(10 Marks)**

b. Explain the Roberts, Prewitt and Sobel Edge detection operators and write the generic gradient based algorithm. **(10 Marks)**

OR

10 a. Define Edge. Explain the stages in edge detection. **(10 Marks)**

b. Derive the equation for Laplacian of Gaussian operater and difference of Gaussian filter. **(10 Marks)**

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21CS642

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Advanced Java Programming

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is autoboxing? Write a Java program to demonstrate auto boxing/unboxing occurs inside the expression. **(06 Marks)**

b. Demonstrate with a Java program values( ) and valueOf( ) methods? **(08 Marks)**

c. Define annotations. Demonstrate Maker annotation. **(06 Marks)**

OR

2 a. Demonstrate with a Java program, wrapper class. **(06 Marks)**

b. Explain with an example how annotation can be send at runtime. **(08 Marks)**

c. Explain ordinal values. Compare and contrast with equal enumeration with example. **(06 Marks)**

Module-2

3 a. What is generics? Demonstrate two type parameter generic class. **(08 Marks)**

b. Write a Java program to demonstrate bounded types. **(06 Marks)**

c. Explain Generic Class Hierarchies with example. **(06 Marks)**

OR

4 a. Explain Generic Interfaces with an example. **(06 Marks)**

b. Write a Java program to demonstrate wild card arguments in Java generics. **(07 Marks)**

c. Explain Bridge methods in Java generics. **(07 Marks)**

Module-3

5 a. Define String. Write a Java program to demonstrate constructor of string class. **(05 Marks)**

b. Explain string handling methods to modify a string. **(10 Marks)**

c. Develop a Java program to count the occurrence of character in given string. **(05 Marks)**

OR

6 a. Explain the following character extraction methods:
(i) CharAt( ) (ii) toCharArry( ) **(06 Marks)**

b. Explain any 5 string buffer methods with an example. **(10 Marks)**

c. Explain any two string comparison method. **(04 Marks)**

Module-4

7 a. Explain the life cycle of a servlet with a neat diagram. **(04 Marks)**

b. Write a Java program to display sum of two numbers on browser. **(10 Marks)**

c. Write a Java program to create a cookie. **(06 Marks)**

OR

8 a. What is JSP? Explain the various types of JSP tags with examples. **(10 Marks)**

b. Explain the concept of reading servlet parameter with an example. **(10 Marks)**

Module-5

9 a. Explain 4 types of JDBC drivers. **(08 Marks)**

b. Describe the following concepts :
i) Scrollable result set
ii) Callable statement
iii) Transaction processing
iv) Updateable result set **(12 Marks)**

OR

10 a. Describe the various steps involved in JDBC process with a code snippet. **(10 Marks)**

b. List and explain the three kinds of exceptions occurred in JDBC with an example. **(10 Marks)**

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21CS644

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Data Science and Visualization

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is data science? Explain relationship between data science and big data. **(10 Marks)**

b. Define model. Explain the how you can build a statistical model. **(10 Marks)**

OR

2 a. Explain the Venn diagram of data science. **(10 Marks)**

b. Explain the probability distribution. **(05 Marks)**

c. Differentiate population and sample, explain the notion of population and sample in the context of Big Data. **(05 Marks)**

Module-2

3 a. Explain data science process with neat diagram. **(10 Marks)**

b. Consider the following dataset given in table cluster, it using K-means algorithm with the initial value of objects 2 and 5 with the co-ordinate values (4, 6) and (12, 4) as initial seeds.

Objects	x-co-ordinate	y-co-ordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

(05 Marks)

c. Explain the linear regression algorithm with R implementation with example. **(05 Marks)**

OR

4 a. Explain EDA with suitable example. **(10 Marks)**

b. Explain the K-NN algorithm in detail with example. **(10 Marks)**

Module-3

5 a. Assume a student performance during his course of study and predict whether the student will get a Job-offer or not in his final year of the course.

Sl. No.	CGPA	Interactiveness	Practical knowledge	Communication skills	Job-offer
1	≥ 9	Yes	V. good	Good	Yes
2	≥ 8	No	Good	Medium	Yes
3	≥ 9	No	Average	Poor	No
4	< 8	No	Average	Good	No
5	≥ 8	Yes	Good	Medium	Yes
6	≥ 9	Yes	Good	Medium	Yes
7	< 8	Yes	Good	Poor	No
8	≥ 9	No	V. Good	Poor	Yes
9	≥ 8	Yes	Good	Good	Yes
10	≥ 8	Yes	Average	Good	Yes

Draw decision tree using CART algorithm with Gini index technique. **(10 Marks)**

b. Explain random forest algorithm with example and advantages and disadvantages. **(10 Marks)**

OR

6 a. Explain singular value decomposition. **(10 Marks)**

b. Define feature extracting, how to do extracting of features and explain its applications. **(05 Marks)**

c. Briefly explain the attribute selection measure technique with example. **(05 Marks)**

Module-4

7 a. Define data visualization, Explain the importance of it. **(10 Marks)**

b. Define Data Wrangling. Explain with suitable example. **(10 Marks)**

OR

8 a. Explain the any three relation plots with implementation of example dataset. **(10 Marks)**

b. Explain any two composition plot and distribution plot with neat diagram. **(10 Marks)**

Module-5

9 a. How to plot a graph using R – implementation. Explain with proper example. **(10 Marks)**

b. Define scatter plots. Explain types of scatter plots in detail. **(05 Marks)**

c. What is Histogram? How we use Histograms in data science? **(05 Marks)**

OR

10 a. Write image operations and explain with example. **(05 Marks)**

b. Explain the following:

i) Labels
ii) Titles
iii) Annotations
iv) Legends **(05 Marks)**

c. How to create, display and closing figures and format strings? Explain with proper implementation. **(10 Marks)**

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21CS65

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to Cyber Security

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Define Cybercrime. Categorize the cyber criminals. **(08 Marks)**

b. Write a note on following :

i) Cyberdefamation ii) Computer sabotage iii) Credit card frauds **(12 Marks)**

c. Classify the Cybercrimes with examples for each. **(08 Marks)**

Module-2

3 a. Explain the phases involved in planning cybercrime. **(10 Marks)**

b. With a case study, explain cyber stalking. **(10 Marks)**

c. Classify and explain any five human-based social engineering. **(10 Marks)**

OR

4 a. What are the safety and security measures to be considered while using a computer in a cyber café? **(08 Marks)**

b. Define botnet. How one can secure the system from botnet attack. **(08 Marks)**

c. Write a note on attack vector. **(04 Marks)**

Module-3

5 a. What are the differences between prony server and anonymizer? **(05 Marks)**

b. What is phishing? Explain how phishing works. **(07 Marks)**

c. Define virus. Explain different types of viruses. **(08 Marks)**

OR

6 a. What are DoS and DDoS attacks? Explain the types of DoS attack. **(10 Marks)**

b. Explain traditional techniques of attacks on wireless networks. **(10 Marks)**

Module-4

7 a. Define criminal profiling. Explain different profiling methods. **(06 Marks)**

b. Discuss any five common misconceptions regarding cybercriminals. **(10 Marks)**

c. List the common motives for committing cybercrime. **(04 Marks)**

OR

8 a. Explain the ten characteristics of good cyber investigator. **(10 Marks)**

b. What is Encryption? List different encryption algorithms. **(05 Marks)**

c. Write a note on Steganography. **(05 Marks)**

Module-5

9 a. Discuss how Firewall logs , Reports , Alarms and Alerts can be used to detect cybercrime attack. **(08 Marks)**

b. With the key commands, describe how Domain Name or ID address is traced? **(06 Marks)**

c. Define Evidence. Brief on its categories. **(06 Marks)**

OR

10 a. Explain collection and preserving of digital evidence. **(06 Marks)**

b. Briefly explain evidence tagging and marking. Also brief on evidence logs. **(06 Marks)**

c. What are the different types of data that should be examined for evidence in case of cyber crime? **(08 Marks)**

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21IS63

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Software Testing

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Why do we test software? Discuss what typical test cases information should include. **(07 Marks)**

b. Define software quality. Discuss different types of quality attributed with example. **(07 Marks)**

c. Explain the 2 fundamental approaches used to identify test cases. **(06 Marks)**

OR

2 a. State the triangle problem with all conditions along with flowchart for traditional implementation of triangle problem. **(10 Marks)**

b. Define testing and debugging with neat diagram explain test and debug cycle. **(10 Marks)**

Module-2

3 a. What is Boundary Value Analysis (BVA)? Interpret the usage of BVA for a function of 2 variables and highlight the limitation of BVA. **(06 Marks)**

b. Highlight the guidelines and observations used in equivalence class testing. **(06 Marks)**

c. Elaborate in detail about the various classes in equivalence class testing with relevant diagram. **(08 Marks)**

OR

4 a. What is equivalence class testing? Demonstrate weak robust and strong robust equivalence class testing for commission problem. **(08 Marks)**

b. Formulate decision table along with test cases for next date function. **(08 Marks)**

c. Write guidelines and observations for decision table based testing. **(04 Marks)**

Module-3

5 a. Briefly describe various metric based testing methods used in path testing. **(07 Marks)**

b. Define cyclomatic complexity. Explain in detail Mccabe's basis path method with an suitable example. **(07 Marks)**

c. Draw and explain different types of structural programming constructs used in path testing. **(06 Marks)**

OR

6 a. What is the use of dataflow testing? List and define various terms used in define-use testing. **(07 Marks)**

b. Explain slice based testing for commission problem using relevant lattice. **(07 Marks)**

c. With neat diagram, discuss Rapps-Weyukes hierarchy of dataflow coverage metrics. **(06 Marks)**

Module-4

7 a. With neat diagram, discuss 3 types of waterfall spin-offs models. **(10 Marks)**

b. With suitable example, classify different types of decomposition based integration testing. **(10 Marks)**

OR

8 a. Draw and explain decomposition tree and context diagram for SATM machine. **(10 Marks)**

b. Discuss different types of path integration testing with a suitable example. **(10 Marks)**

Module-5

9 a. Explain the basic set of requirement specification constructs used in system testing with suitable example. **(10 Marks)**

b. Discuss briefly the different methods of functional strategies used for thread testing. **(10 Marks)**

OR

10 a. List different types of interactions used in interaction testing. Explain any 2 in detail. **(10 Marks)**

b. With neat diagram, explain the use of client/server testing in interaction testing. **(10 Marks)**

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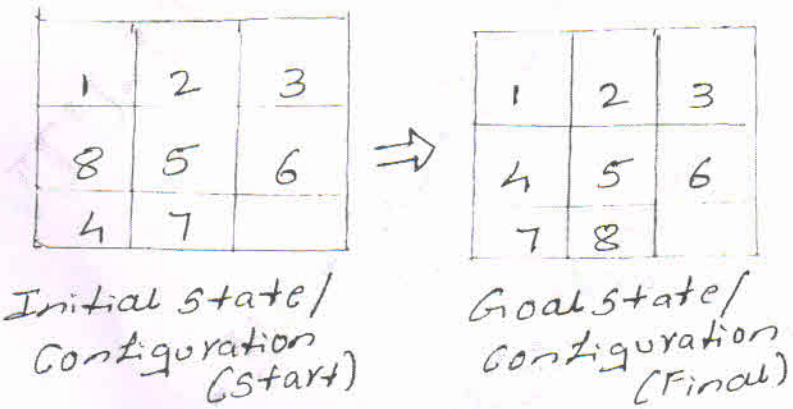
BAI654D

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to 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 artificial intelligence, classify the task domains of artificial intelligence.	10	L2	CO1
	b.	Construct the state space tree and show one possible solution for the following given initial and goal state of the 8-puzzle problem : 	10	L3	CO1
		OR			
Q.2	a.	A water jug problem states "you are provided with two jugs, first one with 6-gallon capacity and the second one with 8-gallon capacity. Neither have any measuring markers on it". How can you get exactly half of water into 8-gallon jug? i) Write down the production rules for the above problem ii) Construct the state space tree with any one possible solution.	10	L4	CO1
	b.	Discuss the State of the Art with respect to AI.	2	L3	CO1
	c.	Explain in detail generate and Test algorithms.	8	L2	CO1
		Module – 2			
Q.3	a.	What are the components of first-order logic? Explain each with an example.	10	L2	CO2
	b.	Discuss the forward and backward chaining/reasoning algorithm in propositional logic.	10	L3	CO2
		OR			
Q.4	a.	Define the following with examples in respect of sentences in proposition logic, i) Logical equivalence ii) Validity or tautology iii) Satisfiability or contingency iv) Contradiction.	10	L1	CO2
	b.	Discuss the resolution in predicate logic algorithm. Write the example also.	10	L3	CO2

		Module – 3			
Q.5	**a.**	Define quantifier, explain the types of quantifiers with examples.	**10**	**L2**	**CO3**
	b.	What is logic programming? Explain with an appropriate example.	**10**	**L2**	**CO3**
		OR			
Q.6	**a.**	Look at the following sentences : i) Marcus was a man ii) Marcus was a Pompeian iii) Marcus was born in 040 AD iv) All men are mortal v) All Pompeian's died in 079 AD vi) No mortal lives for more than 150 years Convert them into predicate logic.	**10**	**L3**	**CO3**
	b.	What do you mean by uncertainty? Discuss briefly the approaches to deal with the same.	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Explain Minmax search algorithm.	**10**	**L2**	**CO4**
	b.	Explain Alpha Beta pruning Algorithm with example in AI.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Discuss the steps /phases of natural language processing with the advantages and disadvantages.	**10**	**L3**	**CO4**
	b.	Write Depth First Search Iterative Deepening Algorithm.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain various learning techniques with examples.	**10**	**L2**	**CO5**
	b.	Discuss inductive learning with an example.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	What is an expert system? List and explain various expert systems.	**10**	**L2**	**CO5**
	b.	What is an analogy? Explain deviational analogy.	**10**	**L2**	**CO5**

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BCS602

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Machine Learning

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.	State Tom Mitchell's definition of machine learning. List and explain the challenges of machine learning.	7	L1	CO1
	b.	List and explain the visualization aids available for univariate data analysis with example for each.	7	L2	CO1
	c.	For the patients age list {12, 14, 19, 22, 24, 26, 28, 31, 34}. Find the IQR.	6	L3	CO1
		OR			
Q.2	a.	Explain in detail the machine learning process with a neat diagram.	7	L2	CO1
	b.	Explain data preprocessing with measures to solve the problem of missing data.	7	L2	CO1
	c.	Find the 5-point summary of the list {13, 11, 2, 3, 4, 8, 9} and plot the box plot for the same.	6	L3	CO1
		Module – 2			
Q.3	a.	Let the data points be $\begin{pmatrix}2\\6\end{pmatrix}$ and $\begin{pmatrix}1\\7\end{pmatrix}$. Apply Principal Component Analysis (PCA) and find the transformed data.	10	L3	CO1
	b.	Apply candidate elimination algorithm on the dataset given in Table Q.3(b) to obtain the complete version space.	10	L3	CO2
		OR			
Q.4	a.	Find Singular Value Decomposition (SVD) of the matrix $A = \begin{pmatrix}1 & 2\\4 & 9\end{pmatrix}$.	10	L3	CO2

Table Q.3(b)

CGPA	Interactiveness	Practical knowledge	Communication skills	Logical thinking	Job offer
≥ 9	Yes	Excellent	Good	Fast	YES
≥ 9	Yes	Good	Good	Fast	YES
≥ 8	No	Good	Good	Fast	NO
≥ 9	Yes	Good	Good	Slow	YES

	b.	Write Find-S algorithm. Apply the algorithm to obtain the hypothesis for the dataset given in the Table Q.4(b). Table Q.4(b) Sky | Air temp | Humidity | Wind | Water | Forecast | Enjoy sport Sunny | Warm | Normal | Strong | Warm | Same | YES Sunny | Warm | High | Strong | Warm | Same | YES Rainy | Cold | High | Strong | Warm | Change | NO Sunny | Warm | High | Strong | Cool | Change | YES	10	L3	CO2
		Module – 3			
Q.5	a.	Apply K-nearest neighbor algorithm, for the dataset given in Table Q.5(a). Given a test instance (6.1, 40, 5), use the training set to classify the test instance. Choose K = 3. Table Q.5(a) CGPA | Assessment | Project submitted | Result 9.2 | 85 | 8 | PASS 8 | 80 | 7 | PASS 8.5 | 81 | 8 | PASS 6 | 45 | 5 | FAIL 6.5 | 50 | 4 | FAIL 5.8 | 38 | 5 | FAIL	6	L3	CO3
	b.	Explain types of regression methods and limitations of regression methods.	7	L2	CO3
	c.	Explain the structure of a decision tree and write the procedure to construct a decision the using ID3 algorithm.	7	L2	CO3
		OR			
Q.6	a.	Write the nearest-centroid classifier algorithm. Apply the same to predict the class for the given test instance (6, 5) using the training dataset given in Table Q.6(a). X | Y | Class 3 | 1 | A 5 | 2 | A 4 | 3 | A 7 | 6 | B 6 | 7 | B 8 | 5 | B Table Q.6(a)	7	L3	CO3
	b.	Distinguish between i) Regression and correlation ii) Regression and causation iii) Linearity and non-linearity relationships.	6	L2	CO3
	c.	Explain the advantages and disadvantages of decision tree. Write the general algorithm for decision tree.	7	L2	CO3

Module – 4

Q.7 a. Using Naïve bayes classifier classify the new data (Red, SUV, Domestic) using the training dataset given in Table Q.7(a). **10 L3 CO4**

Table Q.7(a)

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

b. Explain the simple model of an artificial neuron along with the artificial neural network structure. **10 L2 CO4**

OR

Q.8 a. Explain Bayes theorem, Maximum A Posteriori (MAP) hypothesis and Maximum Likelihood (ML) hypothesis in detail. **10 L2 CO4**

b. Explain different activation functions used in artificial neural network. **10 L2 CO4**

Module – 5

Q.9 a. Consider the following set of data given in Table Q.9(a). Cluster it using K-means algorithm with initial value of objects 2 and 5 with the coordinate values (4, 6) and (12, 4) as initial seeds. **10 L3 CO5**

Table Q.9(a)

Objects	X-coordinate	Y-coordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

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b. Explain the various components of reinforcement learning. **10 L2 CO5**

OR

Q.10 a. Find the Manhattan and Chebyshev distance if the coordinates of the objects are (0, 3) and (5, 8). **4 L3 CO5**

b. Explain the mean shift clustering algorithm. **6 L2 CO5**

c. List and explain the **10 L3 CO5**

i) Characteristics of reinforcement learning
ii) Challenges of reinforcement learning
iii) Applications of reinforcement learning

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BCS613D

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Advanced 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.	What is a collection framework? Explain the methods defined by collection interface.	10	L2	CO1
	b.	Develop a java program to create an ArrayList of objects of type string. Add any five strings, display size and contents of list. Remove any two strings and display size and contents.	10	L3	CO1
		OR			
Q.2	a.	Explain the constructors of tree set class and develop a java program to create Treeset collection and access it via an iterator.	10	L3	CO1
	b.	Explain any four legacy classes of Java's collection framework.	10	L2	CO1
		Module – 2			
Q.3	a.	What is string in Java? Illustrate java program that demonstrates any four constructors of string class.	10	L2	CO2
	b.	Compare between equals( ) and = = with respect to string comparison.	4	L2	CO2
	c.	Explain the following character extraction methods : i) charAt( ) ii) getChars( ) iii) toCharArray( )	6	L2	CO2
		OR			
Q.4	a.	Explain any four string modification methods of string class.	10	L2	CO2
	b.	Explain the following methods of string buffer class: i) append( ) ii) insert( ) iii) reverse( ) iv) replace( )	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the key features of swing and also develop the program.	10	L3	CO3
	b.	Build a program to demonstrate an icon-based button. Each button displays an icon that represents the flag of a country. When a button is pressed, the name of that country is displayed in the label.	10	L3	CO3
		OR			
Q.6	a.	Explain the event handling mechanism used by swing and also develop the program.	10	L3	CO3
	b.	Illustrate the use of radio buttons and also develop the program.	10	L3	CO3

		Module – 4			
Q.7	a.	List and explain the core classes and interfaces in javax.servlet package.	10	L2	CO4
	b.	Develop a java servlet program to accept two parameters from webpage, find the sum of them and display the result in the webpage. Also give necessary html script to create web page.	10	L3	CO4
		OR			
Q.8	a.	Define JSP. Explain different JSP tags with suitable example program.	8	L2	CO4
	b.	Explain the life cycle of a servlet.	4	L2	CO4
	c.	What is a cookie? Listout the methods defined by cookie. Develop a Java program to add a cookie.	8	L3	CO4
		Module – 5			
Q.9	a.	Explain four types of JDBC drivers.	5	L2	CO5
	b.	Construct a code snippet to describe the various steps involved in JDBC process.	10	L3	CO5
	c.	Explain database meta data and result set metadata.	5	L2	CO5
		OR			
Q.10	a.	What is statement object in JDBC? Explain the following statement objects: i) Callable statement object ii) Prepared statement object.	10	L2	CO5
	b.	Develop a java program to execute a database transaction.	6	L3	CO5
	c.	Show any two syntax of establishing a connection to database.	4	L2	CO5

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BCS654B

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Fundamentals of Operating Systems

Time: 3 hrs. Max. Marks: 100

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

		Module – 1	M	L	C
Q.1	a.	Define Operating System. Explain dual mode of operating system with a neat diagram.	10	L1 L2	CO1
	b.	Explain the different computer system architectures.	10	L2	CO1
		OR			
Q.2	a.	List and explain the services of the operating system with respect to programs and the users.	10	L2	CO1
	b.	What are system calls? List and explain the different types of system calls.	10	L1 L2	CO1
		Module – 2			
Q.3	a.	Define Process. Explain different states of a process with state diagram.	10	L1 L2	CO1
	b.	Define IPC. Explain shared memory and message passing mechanisms.	10	L1 L2	CO1
		OR			
Q.4	a.	Explain the following : i) Context switching ii) Process creation iii) Process termination	10	L2	CO1
	b.	Describe the various multithreading models and discuss the benefits of multithreaded programming.	10	L2	CO1
		Module – 3			
Q.5	a.	Define Turn-around time, Response time and CPU utilization.	06	L1	CO2
	b.	Calculate the average waiting time and average turn around time by drawing Gantt-chart using FCFS, SJF, Priority (lowest number has higher priority) and RR (Q = 2 ms)	14	L3	CO2
		OR			
Q.6	a.	What is critical section? What are the requirements for the solution to critical section problem? Explain Peterson's solution.	10	L1 L2	CO3
	b.	What is semaphore? Discuss the solution to the classical dinning philosopher problem using semaphore.	10	L1 L2	CO3

Process	Burst Time	Priority
P_1	10	3
P_2	1	2
P_3	2	1
P_4	4	4

Module – 4

Q.7	a.	What is a Deadlock? What are the necessary conditions for the deadlock to occur?	10	L1 L2	CO3
	b.	Consider the following snap shot of the system: Apply Banker's algorithm to answer the following : i) What is the content of the need matrix? ii) Is the system in a safe state? If so, find a safe sequence.	10	L3	CO3

Process	Allocation			Max			Available		
	R_1	R_2	R_3	R_1	R_2	R_3	R_1	R_2	R_3
P_1	0	1	0	7	5	3	3	2	2
P_2	2	0	0	3	2	2			
P_3	3	0	2	9	0	2			
P_4	2	1	1	2	2	2			
P_5	0	0	2	4	3	3			

OR

Q.8	a.	What is paging? Explain TLB in detail with a simple paging system and neat diagram.	10	L1 L2	CO4
	b.	What is fragmentation? Differentiate internal fragmentation and external fragmentation.	10	L1 L4	CO4

Module – 5

Q.9	a.	What is page fault? With a neat diagram explain steps in handling page fault.	10	L1 L2	CO4
	b.	Consider the page reference string for a memory with three frames. Determine the number of page faults using FIFO and LRU page replacement algorithms. 7, 0, 1, 2, 0, 3, 0, 4, 2, 3 ; 0, 3, 2, 1, 2, 0, 1, 7, 0, 1	10	L3	CO4

OR

Q.10	a.	Define file. Explain the different file allocation methods.	10	L1 L2	CO5
	b.	Explain the following : i) Protection ii) File sharing iii) File system mounting	10	L2	CO5

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BIS613D

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Cloud Computing and Security

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.	Describe the vision introduced by cloud computing?	06	L2	CO1
	b.	Provide brief characteristics of distributed system with examples?	06	L3	CO1
	c.	What is the major revoluation introduced by web 2.0?	08	L2	CO1
		OR			
Q.2	a.	Describe the main characteristic of service orientation of cloud computing with examples.	06	L3	CO1
	b.	What is the major distributed computing technology that led to cloud computing.	06	L2	CO1
	c.	Briefly summarize the challenges still open in cloud computing.	08	L1	CO1
		Module – 2			
Q.3	a.	What is Xen? Discuss its elements for virtualization.	06	L2	CO2
	b.	Discuss the reference module of full virtualization.	06	L3	CO2
	c.	List and discuss different types of virtualization.	08	L2	CO2
		OR			
Q.4	a.	How is cloud development different from traditional software development.	06	L2	CO2
	b.	Discuss the architecture of Hyper – V. Discuss its use in cloud computing.	06	L2	CO2
	c.	Discuss classification on taxonomy of visualization of different levels?	08	L3	CO2
		Module – 3			
Q.5	a.	Explain the three primary cloud service models: IaaS PaaS, and SaaS with examples.	06	L2	CO3
	b.	Differentiate between Public, Private and hybrid cloud with advantages and limitation.	06	L3	CO3
	c.	What is a warehouse – scale data center? How does it differ from modular data centers.	08	L2	CO3
		OR			
Q.6	a.	Compare the services and target applications of GAE, AWS and Microsoft Azure.	06	L3	CO3
	b.	Describe the fat-free topology and explain its use in data center network architecture.	06	L2	CO3
	c.	Explain the key requirements for an efficient cloud data center interconnection network.	08	L2	CO3

		Module – 4			
Q.7	**a.**	What is a trusted Hypervisor? Explain the mobile devices face a range of security challenges?	**06**	**L2**	**CO4**
	b.	Discuss the Security Risks posed by shared images and management os?	**06**	**L2**	**CO4**
	c.	Describe the Hidden Risk in the cloud computing.	**08**	**L3**	**CO4**
		OR			
Q.8	**a.**	Explain the best Top 5 Cloud Security Best practices.	**06**	**L2**	**CO4**
	b.	What are the most important advantages of cloud technology for social network.	**06**	**L2**	**CO4**
	c.	Describe the key features of Google?	**08**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What are the benefits and challenges of using server less computing in the cloud?	**06**	**L2**	**CO5**
	b.	How does grid computing differ from cloud computing.	**06**	**L2**	**CO5**
	c.	What are the key features of cloud computing platforms.	**08**	**L2**	**CO5**
		OR			
Q.10	**a.**	How do multi cloud and hybrid cloud strategies differ.	**06**	**L2**	**CO5**
	b.	What is infrastructure as code (IaC) and how if it used in the cloud.	**06**	**L2**	**CO5**
	c.	What are emerging cloud environments.	**08**	**L2**	**CO5**

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BIS601

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Full Stack Development

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 difference between var, let and const with suitable examples.	5	L2	CO1
	b.	Describe the various data types in JavaScript. Give examples for each.	5	L2	CO1
	c.	Write a program that creates an array of 5 cities and performs the following: i) Adds a city at the end ii) Removes the first city iii) Logs the total numbers of cities iv) Finds the index of a special city v) Search for a specific city vi) Replace specific city with another	10	L3	CO1
		OR			
Q.2	a.	Create a JavaScript object named student with properties: name, grade and subjects. Add a method displayInfo( ) to log student details.	5	L3	CO1
	b.	Explain the structure of a JavaScript function. How are parameters and return values used?	5	L2	CO1
	c.	Explain the usage of at least five different string methods in JavaScript with the help of suitable code snippets.	10	L2	CO1
		Module – 2			
Q.3	a.	What is the Document Object Model (DOM)? Explain its significance in web development.	5	L2	CO2
	b.	Explain event delegation and how it helps improve performance in DOM manipulation.	5	L2	CO2
	c.	Explain any six different DOM method used to access or manipulate HTML elements in JavaScript, including their syntax, use cases and when each in preferred.	10	L2	CO2
		OR			
Q.4	a.	How can you select HTML elements using JavaScript? List and explain at least three methods.	5	L2	CO2
	b.	What are event listeners in JavaScript? How do they differ from traditional event attributes (like onclick) for binding events?	5	L2	CO2

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	c.	Create a button in your HTML with the text "Click Mc". Add an event listener to log "Button clicked!", to the console when the button is clicked. Select on image and add a mouseover event listener to change its border color. Add on event listener to the document that logs the key pressed by the user.	10	L3	CO
		Module – 3			
Q.5	a.	Explain the components of the MERN stack and discuss how they interact in a full stack application. Highlight the role of each component with examples.	10	L2	CO3
	b.	Describe how to implement a simple REST API using express to return a list of issues. Include an explanation of routing, request handling and how JSON data is sent as a response.	10	L3	CO3
		OR			
Q.6	a.	Discuss how react uses JSX for rendering UI components. What are the benefits of using JSX over plain JavaScript in react applications?	10	L3	CO3
	b.	Describe the steps involved in creating a react components using ES6 class syntax. What are the essential life cycle methods used in such a component?	10	L3	CO3
		Module – 4			
Q.7	a.	Explain how state is initialized and update in a react class component. Illustrate with an example from the issue tracker application.	10	L2	CO4
	b.	Discuss how event handling is implemented in react. How does it differ from traditional DOM event handling in vanilla JavaScript?	10	L3	CO4
		OR			
Q.8	a.	Differentiate between stateless and stateful components in react. When should each be used in a component – based architecture?	10	L2	CO4
	b.	Write a react class component that displays a button and a counter. Each time the button is clicked, increase the count and display it. Use constructor to initialize state and setstate( ) to update it.	10	L3	CO4
		Module – 5			
Q.9	a.	Discuss the key differences between insert, update and find operations in MongoDB. How does MongoDB handle flexible schema and embedded documents?	10	L2	CO5
	b.	Create a simple webpack. config.js file that: i) Bundles on entry point file App.jsx ii) Uses babel – loader to transpile JSX iii) Outputs app. bundle.js in a static directory. iv) Uses ES6 presets for react.	10	L3	CO5

		OR			
Q.10	a.	Write Mongo shell commands to perform the following operations: • Insert three employee documents with different fields. • Update one document to add a middle name. • Delete one document by-id • Create an index on the age field • Query employees whose age is greater than 30.	10	L3	CO5
	b.	Explain the purpose of using webpack in a full stack project. Describe how webpack helps in modularization and bundling.	10	L2	CO5

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21AI71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Advanced AI and ML

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Explain the task environment and properties of task environments. **(10 Marks)**

b. Describe and compare the four basic types of agent programs. **(10 Marks)**

OR

2 a. Explain the concept of adversarial search in game playing agents. How does minimax algorithm help an agent make decisions in a competitive environment? **(10 Marks)**

b. Explain the alpha beta search algorithm also write the effectiveness of alpha beta pricing. **(10 Marks)**

Module-2

3 a. Describe the quantification problem in the context of logical agents acting under uncertainty. **(10 Marks)**

b. How does an agent uses degrees of belief to handle uncertainty in decision making? **(10 Marks)**

OR

4 a. Describe the naïve Bayes model and its assumptions about conditional independence. **(10 Marks)**

b. What is Bayes 'theorem' and how it is applied in combining multiple source of evidence? **(10 Marks)**

Module-3

5 a. Explain the concept of a Perceptron with a neat diagram. Discuss the Perceptron training rule. **(10 Marks)**

b. Explain the derivation of the Back propagation rule. **(10 Marks)**

OR

6 a. Explain the prototypical of a genetic algorithm. **(10 Marks)**

b. Explain the Hypothesis space search in the genetic algorithm. **(10 Marks)**

Module-4

7 a. Explain the association rule mining with an example. **(10 Marks)**

b. Explain the application of collaborative filtering in building recommendation systems. Illustrate with python code Implementation. **(10 Marks)**

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21AI733

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Full Stack Development

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Explain MVC (Model-view-Controller) Design Pattern. **(05 Marks)**
b. Discuss the process of mapping URL's to views in Django with an example. **(10 Marks)**
c. Describe loose coupling in Django. Why it is important? **(05 Marks)**

OR

2 a. What are Wild card patterns in URL's? Give an example of how they are used in Django. **(10 Marks)**
b. Explain the evolution of Django and mention any two key features. **(05 Marks)**
c. Discuss the concept of views in Django. **(05 Marks)**

Module-2

3 a. Explain Basic Template Tags and Filters. **(10 Marks)**
b. Explain MVT Development Pattern. **(10 Marks)**

OR

4 a. Explain Template inheritance with an example. **(10 Marks)**
b. Explain the steps involved in inserting and updating data in Django model. **(10 Marks)**

Module-3

5 a. What are the benefits of using Django admin interfaces? **(05 Marks)**
b. Describe the process of creating and processing feedback forms in Django. **(10 Marks)**
c. How can custom validation be implemented in Django forms? Provide an example. **(05 Marks)**

OR

6 a. Explain how to activate and use Django admin interfaces. **(05 Marks)**
b. Explain customizing the admin interface. **(10 Marks)**
c. What are URL conf Ticks and why are they used? **(05 Marks)**

Module-4

7 a. Define Generic views and explain its types. **(10 Marks)**
b. Explain the following :
(i) Cookies
(ii) Users and Authentication. **(10 Marks)**

OR

8 a. Describe the process of creating a syndication feed in Django. **(10 Marks)**
b. Describe how to generate non-HTML content like CSV and pdf using Django. **(10 Marks)**

Module-5

9 a. Discuss the settings of JavaScript in Django. **(10 Marks)**
b. Construct a program to develop a search application in Django using AJAX that displays courses enrolled by a student being searched. **(10 Marks)**

OR

10 a. Explain XHTML HTTP Request and Response. **(10 Marks)**
b. Develop a registration page for student enrollment without page refresh using AJAX. **(10 Marks)**

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21CS71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Big Data Analytics

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Define Big data. Explain big Data characteristics. **(10 Marks)**

b. Explain the classification of data in Big data. **(10 Marks)**

OR

2 a. Define Data, Web Data. Illustrate by considering example of E-commerce, how big data is used. **(10 Marks)**

b. With a neat diagram, explain the function of each of the five layers in big data architecture. **(10 Marks)**

Module-2

3 a. With a neat diagram, explain Hadoop main components and ecosystem. **(10 Marks)**

b. Explain the features of Hadoop HDFS with the functions of Name node and Data node. **(10 Marks)**

OR

4 a. Explain HDFS block replicator and HDFS safe mode. **(10 Marks)**

b. Discuss the Apache Sqoop import and export methods with a neat diagram. **(10 Marks)**

Module-3

5 a. Explain the features of Big Table, RC, ORC and parquet data stores. **(10 Marks)**

b. With example explain Key-values store. **(10 Marks)**

OR

6 a. Explain NOSQL Data store and its characteristics. **(10 Marks)**

b. Describe the features of MongoDB and its industrial application. **(10 Marks)**

Module-4

7 a. Describe the Map task, Reduce tasks and Map reduce execution process. **(10 Marks)**

b. Describe Hive architecture and features. **(10 Marks)**

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OR

8 a. Explain the architecture, feature and application of PIG. **(10 Marks)**

b. Illustrate by considering an example the working of the map reduce programming model. **(10 Marks)**

Module-5

9 a. How does Regression analysis predict the value of dependent variable incase of linear regression. **(10 Marks)**

b. Explain with an example and algorithm the working principle of Apriori process for adopting the subset of frequent item set. **(10 Marks)**

OR

10 a. Define the term web mining. Discuss the broad classification of web mining and their application. **(10 Marks)**

b. Define the term social network. Explain social network as graph with Centralities, Ranking and Anomaly detection. **(10 Marks)**

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21CS72

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Cloud Computing

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. With neat diagram, explain Cloud Computing reference model. **(10 Marks)**
b. List the advantages and disadvantages of cloud computing. **(10 Marks)**

OR

2 a. Explain the following :
i) Amazon Web Service (AWS)
ii) Microsoft Azure
iii) Hadoop. **(10 Marks)**
b. Briefly discuss Historical developments of Cloud computing. **(10 Marks)**

Module-2

3 a. List and explain characteristics of Virtualized Environments. **(10 Marks)**
b. Explain different types of Hardware Virtualization techniques. **(10 Marks)**

OR

4 a. List and explain Pros and Cons of Virtualization. **(10 Marks)**
b. Explain the following in detail : i) Xen ii) VM ware. **(10 Marks)**

Module-3

5 a. With a neat diagram, explain Cloud Computing Architecture. **(10 Marks)**
b. Explain different types of Clouds. **(10 Marks)**

OR

6 a. Explain the open challenges faced in Cloud computing in detail. **(10 Marks)**
b. Explain the following in detail :
i) IaaS (Infrastructure or Service)
ii) Platform or Service
iii) Software or Service. **(10 Marks)**

Module-4

7 a. What are the security risk faced by Cloud users? **(10 Marks)**
b. Discuss privacy and privacy impact assessment in Cloud security. **(10 Marks)**

OR

8 a. List and explain Hypervisor Based and VM Based threats. **(10 Marks)**
b. Explain the following :
i) OS Security ii) Trust in cloud computing. **(10 Marks)**

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Module-5

9 a. What is AWS? What types of Service does it provide? **(10 Marks)**

b. With a neat diagram, explain Google AppEngine Plat from Architecture. **(10 Marks)**

OR

10 a. What are the most important advantages of Cloud technologies for social networking applications and media applications? **(10 Marks)**

b. Describe an applications of cloud computing technology in scientific applications. **(10 Marks)**

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21CS735

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Internet of Things

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1	a.	With a neat diagram, briefly explain evolution of IoT.	(10 Marks)
	b.	List IoT planes and explain various enablers of IoT.	(10 Marks)
		OR	
2	a.	Briefly explain IoT networking components.	(10 Marks)
	b.	Discuss classification of addressing strategies in IoT.	(10 Marks)

Module-2

3	a.	List and explain classification of sensors based on : i) Power requirements ii) Sensor output iii)Property to be measured.	(10 Marks)
	b.	With a block diagram, explain functional blocks of a typical sensor node in IoT.	(10 Marks)
		OR	
4	a.	Define sensor. Explain sensor characteristics with an example.	(10 Marks)
	b.	What is actuator? Briefly explain actuator types.	(10 Marks)

Module-3

5	a.	With neat diagram, explain two types of off-site processing topologies.	(10 Marks)
	b.	Explain IoT device design and selection considerations.	(10 Marks)
		OR	
6	a.	Explain three parts of data offloading.	(10 Marks)
	b.	Explain types of data formats and also explain importance of processing in IoT.	(10 Marks)

Module-4

7	a.	Explain various communication topologies in Zigbee with neat diagram.	(10 Marks)
	b.	With neat diagram, discuss the functional protocol stack of thread in comparision to the OSI stack.	(10 Marks)
		OR	
8	a.	Explain an outline of the RFID operation of communication with neat diagram.	(10 Marks)
	b.	With block diagram, explain bluetooth protocol stack.	(10 Marks)

Module-5

9	a.	Explain any five important features of IPv6.	(10 Marks)
	b.	With block diagram. Explain "Physical web" as one of the discovery protocol.	(10 Marks)
		OR	
10	a.	What is MQTT? Briefly explain MQTT message types.	(10 Marks)
	b.	With block diagram of URI link, explain URI.	(10 Marks)

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21CS741

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Software Architecture and Design Patterns

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is design pattern? Explain how design patterns solve design problems. **(10 Marks)**
b. Explain four essential elements of design pattern. **(04 Marks)**
c. Explain how design patterns and frameworks are different. **(06 Marks)**

OR

2 a. What is object oriented development? Explain the key concepts of OOD. **(08 Marks)**
b. Describe the common causes of redesign. **(08 Marks)**
c. Define:
i) Cohesion
ii) Coupling
iii) Modularity
iv) Modifiability. **(04 Marks)**

Module-2

3 a. Explain the consequences and implementation issues of bridge pattern. **(10 Marks)**
b. Explain the motivation, applicability and structure of adapter pattern. **(10 Marks)**

OR

4 a. Explain the consequences and implementation issues of decorator pattern. **(10 Marks)**
b. Give the structure of proxy pattern and explain it. **(05 Marks)**
c. Explain the implementation issues of composite design pattern. **(05 Marks)**

Module-3

5 a. Define behavioral patterns. Explain the motivation applicability and structure of chain of responsibility. **(10 Marks)**
b. Explain the structure, implementation and consequences of iterator pattern. **(10 Marks)**

OR

6 a. Explain the consequences and participants of mediator and interpreter patterns. **(10 Marks)**
b. Explain the intent, motivation and applicability of state and memento patterns. **(10 Marks)**

Module-4

7 a. Explain MVC architecture and its alternate view. **(10 Marks)**
b. Mention the characteristics of architectural patterns. **(05 Marks)**
c. Draw the use case for drawing a line and explain it. **(05 Marks)**

OR

8 a. Explain the scheme of implementing undo operation with issues. (10 Marks)
b. What are the benefits of design of a sub system? (05 Marks)
c. Draw and explain the sequence diagram for adding a line. (05 Marks)

Module-5

9 a. With a neat diagram, explain basic architecture of client/server systems. (10 Marks)
b. Explain GET and post methods. (05 Marks)
c. Explain the state transition diagram for adding a book in library system. (05 Marks)

OR

10 a. Explain the steps to set up a remote object system. (08 Marks)
b. Explain how the library system is deployed on the world wide web. (06 Marks)
c. Explain how to implement object oriented systems on the web. (06 Marks)

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21CS745

USN

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
NoSQL Database

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. What is NoSQL? Explain briefly about aggregate data models with a neat diagram. Consider example of relations and aggregates. **(10 Marks)**

b. Define materialized view. How are they different from views? Briefly explain the two main strategies to build a materialized view. **(10 Marks)**

OR

2 a. Describe in detail the attack of clusters. **(07 Marks)**

b. Explain Impedance mismatch with the help of suitable example. **(07 Marks)**

c. What are schemaless databases? Explain. **(06 Marks)**

Module-2

3 a. Explain Master Slave and Peer to Peer distribution models with a neat diagram. **(10 Marks)**

b. Explain about update consistency and read consistency with an example. **(10 Marks)**

OR

4 a. What are Version Stamps? What are the ways to create version stamps? **(10 Marks)**

b. What is CAP theorem? How is it applicable to NoSQL systems? **(10 Marks)**

Module-3

5 a. What is Map Reduce? Explain Map Reduce techniques with an example. **(10 Marks)**

b. What are the features of key value databases? Explain. **(10 Marks)**

OR

6 a. Explain 2 stage Map Reduce with suitable examples and a neat diagram. **(10 Marks)**

b. Explain how data can be read and posted from and to the bucket using queries in Riak. **(05 Marks)**

c. What is key value store? List some popular key value databases. **(05 Marks)**

Module-4

7 a. What are document databases? Explain with example list and explain any 2 features of document database. **(10 Marks)**

b. Explain suitable use cases of document data store. **(10 Marks)**

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OR

8 a. Describe scaling and sharding in MongoDB. **(10 Marks)**

b. How to ensure consistency and availability in MongoDB? **(10 Marks)**

Module-5

9 a. What are the features of graph databases? Explain. **(10 Marks)**

b. Explain some suitable use cases of graph databases and describe when we should not use graph databases. **(10 Marks)**

OR

10 a. With a neat diagram, explain the 3 ways in which graph databases can be scaled. **(10 Marks)**

b. How to query on graph? Explain with example. **(10 Marks)**

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21CS752

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to AI and ML

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On compleung 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.

Module-1

1 a. Define AI and briefly explain four approaches to AI. **(10 Marks)**

b. List and discuss the foundations of artificial intelligence. **(10 Marks)**

OR

2 a. Explain Omniscience, learning and autonomy. **(10 Marks)**

b. With block diagram, explain simple reflex agents. **(10 Marks)**

Module-2

3 a. List and explain four-phase problem-solving process for an agent enjoying a touring vacation in Romania as shown in Fig.Q.3(a). **(10 Marks)**

Fig.Q.3(a)

b. Explain the standard formulation and problem definition of the 8 puzzle as shown in Fig.Q.3(b). **(10 Marks)**

7	2	4
5		6
8	3	1

Start state

	1	2
3	4	5
6	7	8

Goal state

Fig.Q.3(b)

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OR

4 a. With neat diagram, explain breadth-first search. **(10 Marks)**
b. Explain Bidirectional heuristic search. **(10 Marks)**

Module-3

5 a. List and briefly explain types of machine learning. **(10 Marks)**
b. Explain challenges of machine learning. **(10 Marks)**

OR

6 a. List and explain characteristics of Big Data. **(10 Marks)**
b. Briefly explain data analytics frame work. **(10 Marks)**

Module-4

7 a. With neat diagram, explain learning environment. **(10 Marks)**
b. List and explain four steps of design of learning system. **(10 Marks)**

OR

8 a. Explain weighted K-Nearest-Neighbor algorithm. **(10 Marks)**
b. Explain K-Nearest-Neighbor algorithm. **(10 Marks)**

Module-5

9 a. With neat diagram, explain artificial neural network structure. **(10 Marks)**
b. With neat diagram, explain perceptron model. **(10 Marks)**

OR

10 a. With neat diagram, explain architecture of RBFNN (Radial Basis Function Neural Network). **(10 Marks)**
b. Discuss self-organizing features map algorithm. **(10 Marks)**

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21CS754

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to Data Science

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1	a.	Explain main categories of data.	(10 Marks)
	b.	Explain NoSQL database in big data technologies.	(10 Marks)
		OR	
2	a.	Explain data science process.	(10 Marks)
	b.	Write the benefits and uses of data science and big data.	(10 Marks)

Module-2

3	a.	Write an overview of techniques to handle missing data.	(10 Marks)
	b.	Why correct errors as early as possible in data science?	(10 Marks)
		OR	
4	a.	Write a note on retrieving data.	(10 Marks)
	b.	Explain presentation and automation.	(10 Marks)

Module-3

5	a.	What is machine learning? Applications for machine learning in data science.	(10 Marks)
	b.	Explain packages for working with data in memory.	(10 Marks)
		OR	
6	a.	Explain modeling process.	(10 Marks)
	b.	Explain types of machine learning.	(10 Marks)

Module-4

7	a.	Explain dashboard development tools.	(10 Marks)
	b.	Design a code to generate total stock overtime graph.	(10 Marks)
		OR	
8	a.	What are uses of data visualization options?	(10 Marks)
	b.	Write a code to generate average stock per medicine graph.	(10 Marks)

Module-5

9	a.	Explain Map Reduce flow for counting the colors in input texts.	(10 Marks)
	b.	What is spark? How does spark solve the problems of Map Reduce?	(10 Marks)
		OR	
10	a.	Explain Data preparation in spark.	(10 Marks)
	b.	List of common hadoop file system commands.	(10 Marks)

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21IS71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Cryptography and Network Security

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Define substitution and transposition techniques with an example. **(05 Marks)**

b. Define the following terms:
i) Cryptanalysis
ii) Ciphertext
iii) Encryption
iv) Kirchoff's Principles **(08 Marks)**

c. Explain playfair cipher algorithm. Find the ciphertext for plaintext "Computer Science" with key "MONARCHY". **(07 Marks)**

OR

2 a. Distinguish between stream cipher and block cipher. **(04 Marks)**

b. With a neat diagram, explain feistel structure for encryption and decryption. **(08 Marks)**

c. Explain DES encryption algorithm with a neat diagram. **(08 Marks)**

Module-2

3 a. Explain RSA algorithm. Perform encryption and decryption using RSA algorithm where P = 3, Q = 11, C = 3 and M = 9. **(10 Marks)**

b. Explain Public key crypto systems. **(10 Marks)**

OR

4 a. Describe Elgamal cryptographic systems. **(10 Marks)**

b. Perform a diffie-hellman key exchange for prime number q = 71 and primitive root $\alpha = 5$.
i) If user A has private key $X_A = 5$, what is A's public key $Y_A = ?$
ii) If User B has private key $X_B = 12$, what is B's public key $Y_B = ?$
iii) What is shared key? **(10 Marks)**

Module-3

5 a. Explain key distribution scenario, with neat diagram. **(10 Marks)**

b. Explain the distribution of public keys with public key authority. **(10 Marks)**

OR

6 a. Explain secret key distribution with confidentiality and authentication. (10 Marks)

b. Explain distribution of public keys using public key certicates. (10 Marks)

Module-4

7 a. Explain X.509 certificate format. (10 Marks)

b. Describe public key infrastructure, with neat diagram. (10 Marks)

OR

8 a. Explain Kerberos version 4 message exchange with neat diagram. (10 Marks)

b. Explain remote user authentication principles. (10 Marks)

Module-5

9 a. Describe in detail PGP (Pretty Good Privacy) cryptographic functions. (10 Marks)

b. Write short note on :
(i) S/MIME functionality
(ii) Types of S/MIME message (10 Marks)

OR

10 a. Describe IP security architecture, with neat diagram. (10 Marks)

b. Explain Internet Key Exchange (IKE) key determination features. (10 Marks)

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