

Enrol. No. **S R H U**Regn. No. **D D**

END SEMESTER EXAMINATION, DECEMBER - 2024
B. Tech. (Hons.) CSE in AI & ML and DS & ML Semester - V

Course Name: Compiler Design**Course code: CS501T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type (Very short) Attempt all.****(10×2=20)**

Q. N.	Questions	CO	PO
a.	Describe the role of lexical analysis in compiler design.	1	1
b.	Explain about Language Processor in compiler Design.	1	1
c.	List the various error recovery strategies for a lexical analysis.	2	2
d.	The postfix form of $A*B + C/D$ is.....	2	2
e.	Does the compiler program translate the whole source code in one step? YES / No	2	1
f.	Which tool is used for grouping of characters in tokens in the compiler? (a) Parser (b) Code optimizer (c) Code generator (d) Scanner	4	1
g.	Which derivation is generated by the bottom-up parser? (a) Right-most derivation in reverse (b) Left-most derivation in reverse (c) Right-most derivation (d) Left-most derivation	2	2
h.	Which parser is most powerful in the following parsers? (a) Operator Precedence (b) SLR (c) Canonical LR (d) LALR	2	1
i.	Which graph describes the basic block and successor relationship? (a) Control graph (b) DAG (c) Flow graph (d) Hamilton graph	4	1
j.	When is type checking done? (a) During lexical analysis (b) During syntax-directed translation (c) During syntax analysis (d) During code optimization	3	1

Q.2. Short notes Type (Attempt any five out of Seven)**(5×4=20)**

a.	Differentiate compiler and interpreter.	1	1
b.	Differentiate between top down and bottom-up parsing techniques.	2	1
c.	Eliminate immediate left recursion for the following grammar: $E \rightarrow E+T \mid T$ $T \rightarrow T*F \mid F$ $F \rightarrow (E) \mid id$	2	2
d.	Define left most derivation and right most derivation with example.	2	1
e.	Explain intermediate code representations.	4	1
f.	Explain various storage allocation strategies with examples.	3	1
g.	Write the principal sources of optimization.	5	1

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(3×10=30)

Q.3. Structured Question (Attempt any three out of four) a. Translate the following expression: $(a + b) * (c + d) + (a + b + c)$ into (i) Quadruples (ii) Triples	4	1
b. (i) Illustrate loop optimization with suitable example. (ii) Explain machine dependent and machine independent optimization.	5	1
c. (i) Explain about Global data flow analysis. (ii) Define Symbol table. Explain different types of Data structure for symbol table.	5	2
d. (i) Construct the DAG for following statement. $a+b*c+d+b*c$. (ii) Give the applications of DAG.	3	1

Q.4. Long Answer type (Attempt any two out of three)

(2×15=30)

a. Discuss about the following: (i) Copy Propagation (ii) Dead code Elimination (iii) Code motion	5	1
b. (i) Construct the DAG for the following basic blocks- 1. $t1 := 4 * i$ 2. $t2 := a[t1]$ 3. $t3 := 4 * i$ 4. $t4 := b[t3]$ 5. $t5 := t2 * t4$ 6. $t6 := prod + t5$ 7. $prod := t6$ 8. $t7 := i + 1$ 9. $i := t7$ 10. if $i \leq 20$ goto 1 (ii) Construct CLR parse table for grammar: $S \rightarrow L = R \mid R$ $R \rightarrow L$ $L \rightarrow *R \mid id$	4, 2	1
c. (i) Write a note on bootstrapping. (ii) Explain the role of symbol table in various phases of compiler.	2	

END SEMESTER EXAMINATION, DECEMBER - 2024**B. Tech. (Hons.) CSE in AI & ML and DS & ML Semester - V****Course Name: Computer Graphics****Course code: CS502T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type (Very short) Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	What are 3D Projections?	3	2
b.	Define MIDI in multimedia data formats.	5	2
c.	Define color depth in computer graphics.	1	2
d.	Define Scaling and what are the types of scaling.	2	2
e.	Explain window and view?	3	2
f.	How RGB is converted to CMY?	5	2
g.	Define translation in 3D?	5	2
h.	Categorize the 3D object representations?	3	2
i.	Define RTF.	5	2
j.	What are the different types of Clipping?	2	2

Q.2. Short notes Type (Attempt any five out of Seven)**(5×4=20)**

QN	Questions	CO	PO
a.	Describe the working principle of interactive input devices.	1	2
b.	Explain the Boundary Fill and Flood Fill algorithms with examples.	2	2
c.	What are the different types of transformations in 2D? Explain with examples.	2	2
d.	Discuss the importance of the Window-to-Viewport transformation.	2	2
e.	Explain Phong Shading and its application in surface shading.	3	2
f.	Describe the B-spline method for designing curves and surfaces.	4	2
g.	Explain the difference between Parallel and Perspective Projections with diagrams.	3	2

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Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

Q N	Questions	CO	PO
a.	i. Define Area Filling Algorithms in Computer Graphics. ii. Apply rotation to rotate a triangle with vertices (1, 2), (4, 5), and (6, 2) by 90 degrees counterclockwise around the origin.	3	2
b.	i. Differentiate between 'Display buffer' and 'Frame buffer'. How is the frame buffer used to control the intensity of pixels? Use a suitable diagram/table to discuss the intensity control by frame buffer. ii. Explain the differences between bitmap and vector character generation.	1	2
c.	i. What are Authoring tools? What are the various types of authoring tools available? Discuss any one of them. ii. Apply a composite transformation (rotation by 45° followed by scaling by 2) to a point (1, 1). Show all steps.	4	2
d.	Attempt all.(3+3+4) (i) Explain Window to Viewport transformation. (ii) Compare and contrast between Perspective projection and Parallel projection. Give a suitable diagram for each. (iii) Discuss the advantages of Gouraud Shading Scheme over Constant Shading Scheme.	3	2

Q.4. Long Answer type (Attempt any two out of three)

(2×15=30)

Q N	Questions	CO	PO
a.	i. Digitize a line from (10,12) to (15,15) on a raster screen using Bresenham's straight line Algorithm what are the various line drawing algorithms. ii. Explain the Sutherland-Hodgman polygon clipping algorithm. iii. What is aliasing in computer graphics? How does it affect the quality of rendered images?	1	2
b.	(i) Define Bezier curves. Also explain zero-order, one-order and two-order continuity (Co, C1 and C2). (ii) Apply the following transformations to a 3D point P(2,3,4). Translate by $T_x=2$, $T_y=-1$, $T_z=3$ Scale by $S_x=2$, $S_y=0.5$, $S_z=1$ Rotate by 90 degrees around the z-axis.	4	3
c.	i. Explain with diagram raster scan display technique. Explain the Z buffer visible surface detection method. ii. Apply the Cohen-Sutherland algorithm to clip a line with endpoints (4, 6) and (10, 8) against a clipping window with coordinates (2, 2) and (8, 6). Show all steps.	3	2

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END SEMESTER EXAMINATION, DECEMBER - 2024**B. Tech. (Hons.) CSE in DS & ML Semester - V****Course Name: Data Visualization Techniques****Course Code: PC525T**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type (Very short) Attempt all.**(10×2=20)**

QN	Questions	CO	PO
a.	Describe the concept of a 'treemap' and its use in visualizing hierarchical data.	1	1
b.	What is a violin plot, and how does it differ from a box plot?	2	1
c.	How can time series data be effectively visualized?	1	1
d.	Explain the concept of 'data normalization' in the context of visualization.	1	2
e.	What is a box plot, and what does it represent in data visualization?	1	2
f.	Why is it important to avoid chartjunk in data visualizations?	1	1
g.	Explain the concept of 'data aggregation' in visualizations.	1	1
h.	What are bubble charts, and when are they preferred over scatter plots?	1	1
i.	Define the term 'outlier' and explain how it can be visualized.	1	2
j.	What is a mosaic plot, and how does it visualize categorical data?	2	1

Q.2. Short notes Type (Attempt any five out of Seven)**(5×4=20)**

QN	Questions	CO	PO
a.	What is in short basemap, also define multi-indexing and reindexing in pandas	1	1
b.	Outline the steps involved in fitting a model to a dataset.	2	1
c.	Define filters in Tableau and explain their various types.	1	1
d.	What is the main purpose of Crosstab functions in Python?	1	1
e.	How can you create a random color for a plot in Matplotlib using Python?	2	3
f.	What do you think about the purpose of visualization?	1	1
g.	Briefly explain stream graph, heat map and gantt chart	1	1

Q.3. Structured Question (Attempt any three out of four)**(3×10=30)**

QN	Questions	CO	PO
a.	Consider the Series object s12 that stores the contribution of each section, as shown below: A 6700 B 8000 C 5400 D 3400 Write code to modify the amount of section 'A' as 8800 and for section 'C' and 'D' as 7700. Print the changed object.	4	1
b.	Write a program to print PASCAL TRIANGLE	3	2
c.	Write short note on Matplotlib, Contour plot and Subplot	2	2
d.	What is pseudocode? Explain the use of data visualization in data analysis.	4	3

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Q.4. Long Answer type (Attempt any two out of three)

(2×15=30)

Q. Long Answer type (Attempt any two out of three) (2×15=30)

QN	Questions	CO	PO																								
a.	The give table represented our data set, we have two columns- Brightness and Saturation. Each row in the table has a class of either Red or Blue. Perform KNN classifier algorithm in following dataset and predict the class for (Brightness=20, Saturation= 35) where assume the value of K=5. <table><tr><th>Brightn ess</th><th>Saturat ion</th><th>Class</th></tr><tr><td>40</td><td>20</td><td>Red</td></tr><tr><td>50</td><td>50</td><td>Blue</td></tr><tr><td>60</td><td>90</td><td>Blue</td></tr><tr><td>10</td><td>25</td><td>Red</td></tr><tr><td>70</td><td>70</td><td>Blue</td></tr><tr><td>60</td><td>10</td><td>Red</td></tr><tr><td>25</td><td>80</td><td>Blue</td></tr></table>	Brightn ess	Saturat ion	Class	40	20	Red	50	50	Blue	60	90	Blue	10	25	Red	70	70	Blue	60	10	Red	25	80	Blue	5	1
Brightn ess	Saturat ion	Class																									
40	20	Red																									
50	50	Blue																									
60	90	Blue																									
10	25	Red																									
70	70	Blue																									
60	10	Red																									
25	80	Blue																									
b.	Calculate three-yearly moving averages of number of students studying in a higher secondary school in a particular village from the following data. <table><tr><th>Year</th><td>1995</td><td>1996</td><td>1997</td><td>1998</td><td>1999</td><td>2000</td><td>2001</td><td>2002</td><td>2003</td><td>2004</td></tr><tr><th>Number of students</th><td>332</td><td>317</td><td>357</td><td>392</td><td>402</td><td>405</td><td>410</td><td>427</td><td>435</td><td>438</td></tr></table>	Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Number of students	332	317	357	392	402	405	410	427	435	438	5	2		
Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004																	
Number of students	332	317	357	392	402	405	410	427	435	438																	
c.	Let consider an example where the five weeks sales data(in thousand) is given as shown in table: Apply linear regression techniques to predict the 7th and 12th week sales. <table><tr><th>Xi (week)</th><th>Yi (sales in thousand)</th></tr><tr><td>1</td><td>1.2</td></tr><tr><td>2</td><td>1.8</td></tr><tr><td>3</td><td>2.6</td></tr><tr><td>4</td><td>3.2</td></tr><tr><td>5</td><td>3.8</td></tr></table>	Xi (week)	Yi (sales in thousand)	1	1.2	2	1.8	3	2.6	4	3.2	5	3.8	3	3												
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1	1.2																										
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END SEMESTER EXAMINATION, DECEMBER - 2024**B. Tech. (Hons.) CSE in AI & ML and DS & ML Semester - V****Course Name: Web Technology****Course code: CS503T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type (Very short) Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	How do you create an HTML button that submits a form?	1	1
b.	Differentiate between XML and HTML.	3	1,2
c.	Explain any two Features of Ruby on Rails.	5	1,2
d.	How do you create a radio button?	1	1
e.	What is the purpose of console.log()?	1	1
f.	What is the HTML element for creating a form?	1	1
g.	How do you create an ordered list in HTML?	1	1
h.	How can you apply a specific background color to an element in HTML?	1	1
i.	Mention applications of PHP.	4	1,2,3
j.	How do you create a hyperlink in HTML?	2	1,2,3

Q.2. Short notes Type (Attempt any five out of Seven)**(5×4=20)**

QN	Questions	CO	PO
a.	Discuss the functions of the <tr>, <td>, and <th> tags in an HTML table? Give example.	1	1
b.	Discuss how JavaScript can be used to find and interact with elements in an HTML document.	2	1,2,3
c.	What is the purpose of the echo and print commands in PHP?	4	1,2,3
d.	List the different types of input elements available in an HTML form.	1	1
e.	Discuss the role of constructors in object creation. Explain with example.	2	1,2,3
f.	Describe how Rails stands out as a web development framework and its use in creating a wide array of applications.	5	1,2
g.	Explore JavaScript's primary data types.	2	1,2,3

Q.3. Structured Question (Attempt any three out of four)**(3×10=30)**

QN	Questions	CO	PO
a.	Explain the various types of CSS selectors and demonstrate how they are used to target HTML elements with examples.	1	1
b.	Create a JavaScript program that illustrates the use of arrays and demonstrates various array methods.	2	1,2,3
c.	Explain the features and functionalities of phpMyAdmin. Discuss its role in managing databases and common issues encountered while using it.	4	1,2,3
d.	Discuss the concept of event handling in JavaScript.	2	1,2,3

Q.4. Long Answer type (Attempt any two out of three)**(2×15=30)**

QN	Questions	CO	PO
a.	Create a basic HTML webpage that showcases the use of inline, internal, and external CSS. to style various elements.	1	1
a.	How do you associate a CSS stylesheet with an XML document? Provide an example to demonstrate the usage.	3	1,2
b.	Analyze how an associative array differs from a regular array in PHP. Provide examples to illustrate the differences.	4	1,2,3

END SEMESTER EXAMINATION, DECEMBER - 2024
B. Tech. (Hons.) CSE in AI & ML and DS & ML Semester - V

Course Name: Neural Networks & Deep Learning**Course code: PC514T/PC524T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type (Very short) Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	What is the use of loss Function?	2	1,2
b.	What is the function of the Pandas library in Python?	5	2,5
c.	Unsupervised learning works on data.	2	1,2
d.	Explain deep learning.	1	1,2
e.	Define MSE.	4	1,2,4
f.	Name commonly used loss function in classification problems.	2	1,2
g.	Explain CRF.	3	1,2
h.	Mention two machine learning algorithms.	1	1,2
i.	Define dataset.	1	1,2
j.	Explain pooling.	5	2,3

Q.2. Short notes Type (Attempt any five out of Seven)**(5×4=20)**

QN	Questions	CO	PO
a.	Comment on any two deep learning frameworks.	5	3,5
b.	How does regularization improve the generalization of neural networks?	3	1,2,3
c.	Discuss the role of backpropagation in reducing error during neural network training.	2	1,2
d.	What is an autoencoder, and how is it used for dimensionality reduction?	4	1,2,5
e.	Explain the concept of underfitting.	1	1,2
f.	Describe the process of Risk Minimization.	2	1,2
g.	Elaborate Generative Adversarial Network.	4	1,2,5

Q.3. Structured Question (Attempt any three out of four)**(3×10=30)**

QN	Questions	CO	PO
a.	Discuss the structure and components of a linear chain CRF.	3	1,2,3
b.	Discuss the evolution of activation functions in deep learning.	2	1,2
c.	Explain the difference between convolutional layers and fully connected layers in	4	1,2,5
d.	Highlight the importance of loss functions in machine learning. Also discuss different forms of loss functions used.	2	1,2

Q.4. Long Answer type (Attempt any two out of three)**(2×15=30)**

QN	Questions	CO	PO
a.	Discuss the architecture and applications of Deep Belief Networks (DBNs).	5	2,3,5
b.	Explain regularization techniques in machine learning, including L1, L2 regularization, and dropout, and their effects on model performance.	4	1,2,4
c.	Compare supervised, unsupervised, and reinforcement learning algorithms, and explain their use cases in training neural networks.	2	1,2

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. Semester - V

Course Name: Theory of Computation

Course Code: CCS354

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)

	CO	PO
a. Explain variants of Turing Machine?	4	2
b. Compare deterministic and non-deterministic versions of PDA	2	2
c. Classify some applications of Context Free grammar.	3	2
d. Explain reduced grammar.	2	1
e. Is it possible to reduce the unit production in context free grammar? Justify through example.	2	1
f. Compare NFA and PDA.	2	1
g. When is a string accepted by a PDA?	4	3
h. Classify some closure properties of CFL?	3	3
i. When we say a problem is decidable? Give an example of undecidable problem?	3	2
j. State the pumping lemma for CFLs	3	2

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

(5×4=20)

a. Construct state diagram of an NFA which accepts binary strings which end with '00' or '11'.	2	2
b. Define push down automata? Explain acceptance of PDA with empty stack.	4	3
c. Draw a deterministic and non-deterministic finite automate which accept 00 and 11 at the end of a string containing 0, 1 in it, e.g., 01010100 but not 000111010. {HINT: Draw a string that accepts 000111010 and make Non final state to final state and final to non final}	3	2
d. Prove that $L = \{ww \mid w \in \{0, 1\}^*\}$ is not regular.	3	3
e. Expand Chomsky Classification of language taking suitable example of each classification.	2	2
f. Construct a finite automata for the regular expression $(0+1)^*(00+11)(0+1)^*$.	4	3
g. Difference between Moore and Mealy Machines with their State transition diagram	2	2

Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

a. (i) Prove that Halting problem is undecidable. (ii) Explain in detail the closure properties of Regular languages .	5	4
b. (i) Define regular language and regular expressions (ii) Create a FA which accepts the only input 101 over the input set $Z = \{0, 1\}$.	2	3
c. (i) Design a TM to accept the language $L = \{0^n 1^n \mid n \geq 1\}$ (ii) Explain how a TM can be used to determine the given number is prime or not.	4	3
d. (i) Construct PDA for the language $L = \{ww^R \mid W \text{ in } (a+b)^*\}$ (ii) Differentiate between leftmost and rightmost derivations.	3	3

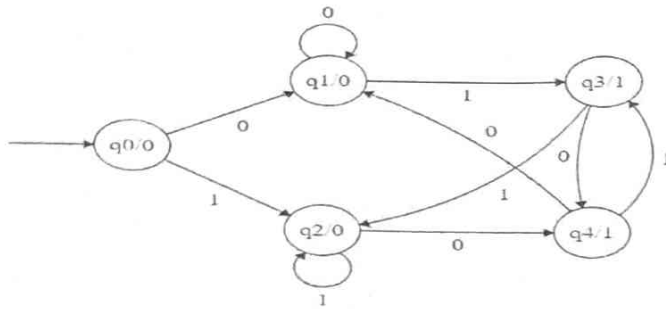
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Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

a. (i) Convert Moore to Mealy Machine

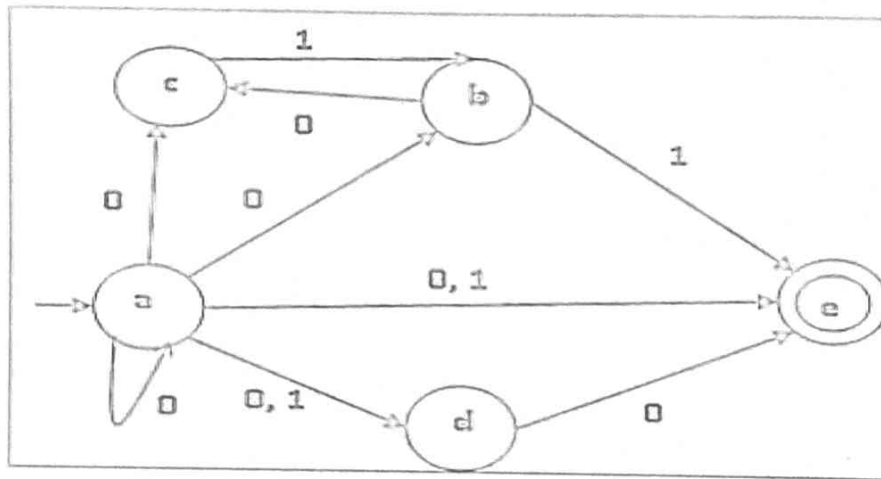
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(ii) Discuss Normal forms-Chomsky and Greibach Normal forms with example.

b. (i) Convert NDFA to DFA and then do minimization of that DFA.

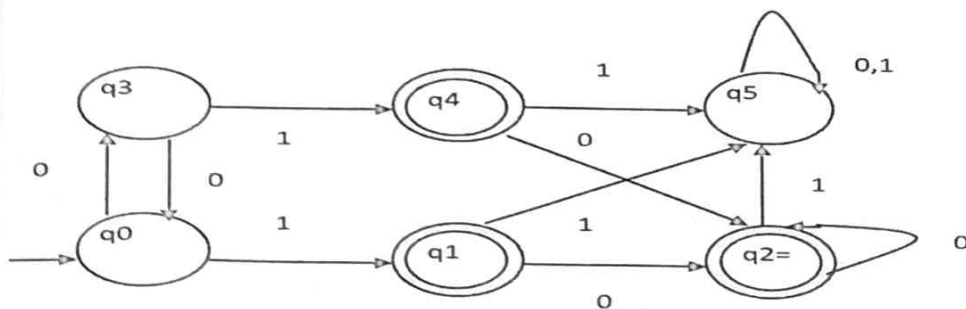
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(ii) Design PDA for odd number of palindromes

c. (i) Minimize the following DFA

4 3



(ii) Briefly explain the different types of Turing machines.

END SEMESTER EXAMINATION, DECEMBER - 2024**B. Tech. (Hons.) CSE in AI & ML Semester - V****Course Name: Problem Solving and Robotics****Course Code: PC515T****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	Give pheromone update equation with vaporization used in ACO?	1	1
b.	What is Population?	1	2
c.	ACO Mimics the _____ of ants.	2	1
d.	In PSO Particles communicate by adjusting their positions based on _____ & _____ solutions.	2	2
e.	What do you mean by personal best?	3	1
f.	What are various types of machine vision techniques?	5	2
g.	Define global minima?	4	1
h.	Define optimization.	2	2
i.	Explain need of GA Operators.	2	1
j.	Define sequence control.	3	2

Q.2. Attempt any five out of Seven.**(5×4=20)**

QN	Questions	CO	PO
a.	Explain Architecture of expert systems.	1	1
b.	Draw a comparison b/w ACO & PSO.	5	2
c.	Discuss the concept of Principles of bird flocking and fish schooling.	3	3
d.	List the working rule algorithm for GA.	5	3
e.	Write short notes on: Convergence criteria	3	4
f.	Distinguish between Reproduction & Crossover.	5	2
g.	Differentiate b/w Update Mechanisms of ACO & ABC.	3	2

Q.3. Attempt any three out of four.**(3×10=30)**

QN	Questions	CO	PO
a.	Describe in detail Image processing and analysis.	5	4
b.	Suppose an ant travels city 2 to city 4 & then from city 4 to city 1. Pheromone matrix is updated after each tour. If tour length = 60 units, Pheromone constant Q =100 calculate updated pheromone value on the edge b\w city 2 & city 4.	3	2
c.	In PSO show velocity & position update: $X_1=-9.6$ $X_2=-6$ $X_3=-2.6$ $X_4=-1.1$ $X_5=0.6$ $X_6=2.3$, $X_7=2.8$, $X_8=8.3$, $X_9=10$ {C1=C2=1, R1=0.213 R2=0.876 } Minimize: $f(x)=x^2+5x+20$. Compute Gbset & Pbest for iteration 1.	2	2
d.	Show ABC employer bee phase working: Maximize $f(X) = x_1^2 - x_1$. $x_2 + x_2^2 + 2x_1 + 4x_2 + 3$ where $-5 \leq x_1, x_2 \leq 5$ for given input: Give result in vector form food source, $f(X)$, fit, trial vector. Food source 3.1472 -4.0246 4.0579 -2.2150 -3.7301 0.4688 4.1338 4.5751 1.3236 4.6489 $fit = \begin{cases} 1 + f & f < 0 \\ \frac{1}{1+f} & f \geq 0 \end{cases} \quad \{\phi=0.71\} \quad \text{for each iteration consider}$ random partner $i=i+1$th	3	3

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