B.Sc. (HONS.) IN CSE FOURTH YEAR, SEVENTH SEMESTER EXAMINATION, 2022

ARTIFICIAL INTELLIGENCE

[According to the New Syllabus]

Subject Code : 540201

Examination Code : 5617

Time—3 hours

Full marks—80

[N.B : The figures in the margin indicate full marks. Answer any four questions.]

			Marks
1.	(a)	What is Artificial Intelligence? Differentiate between Knowledge and Intelligence.	2+3=5
	(b)	How a machine can work as an Intelligent System?	5
	(c)	What are the significant features of an expert system?	5
	(d)	What are the different domain of AI? Describe them.	5
2.	(a)	What is meant by rational agent and omniscient agent? Define agent function and agent program.	5
	(b)	Discuss goal based agent with figure.	5
	(c)	Describe the various types of environment.	6
	(d)	What are the criteria for evaluating search strategies? Explain.	4
3.	(a)	Why we need searching algorithm in AI? Differentiate between informed and uninformed searching algorithm.	2+4=6
	(b)	Describe Depth first search and Breadth first search algorithm with example.	5
	(c)	What are the limitations of Blind search?	4
	(d)	Write a short note on 8-puzzle problem.	5
4.	(a)	What is admissible heuristic? Write down the benefits of A* search with respect to greedy search.	2+4=6
	(b)	What do you know about $\alpha - \beta$ pruning? How does $\alpha - \beta$ pruning improve the minimax algorithm? Explain.	2+5=7
	(c)	What are four ways to represent knowledge in AI? Explain frame representation technique.	2+5=7

[Please turn over

Marks

5. *(a)* What is perceptron? Describe single layer and multi layer perceptron. 2+3=5

(b) How error is calculated in Backpropagation? 3

(c) Mention the variations on Backpropagation. Explain any one of them. 1+4=5

(d) Using the data given below, calculate the final weights for the single layer perceptron : 7

Threshold $\theta = 0{\cdot}2$

Learning rate $\alpha = 0{\cdot}1$

Inputs		Desired output	Initial weights		Actual output	Error	Final Weights	
X_1	X_2	(Yd)	W_1	W_2	Y	(e)	W_1	W_2
1	0	0	0·3	−0·1		−1	?	?

6. Write short notes on following topics (any **four**) : 5×4=20

(a) Genetic Algorithm

(b) Game Theory

(c) Perceptron Learning

(d) Backpropagation

(e) Knowledge Representation

(f) Machine Learning.

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COMPILER DESIGN AND CONSTRUCTION

[According to the New Syllabus]

Subject Code : 540203

Examination Code : 5617

Time—3 hours

Full marks—80

*[N.B : The figures in the margin indicate full marks. Answer any **four** questions.]*

			Marks
1.	(a)	What do you mean by compiler? Describe the parts of compilation with example.	8
	(b)	Describe a language-processing system.	4
	(c)	Illustrate the functions of a preprocessor.	4
	(d)	Define symbol table. What are the functions of a symbol table?	4
2.	(a)	What do you mean by parse tree? Write down the properties of parse tree.	5
	(b)	Define ambiguous grammar. Consider the following grammar— string→string + string string→string–string string→0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 Is the grammar ambiguous for the string 9 – 5 + 2? Justify your answer.	5
	(c)	How does a lexical analyzer interface between input stream and a parser?	5
	(d)	Describe about NFA and DFA.	5
3.	(a)	Define regular definition. Write down the regular definition for Pascal Identifiers.	2+2=4
	(b)	What are the phases for creating a lexical analyzer with Lex?	5
	(c)	Write down the algorithm for constructing a DFA from an NFA.	5
	(d)	Construct a DFA for the regular expression $(a/b)^*$ abb.	6

[Please turn over

Marks

4. *(a)* What is operator precedence parsing? Write down some advantages and disadvantages of operator precedence parsing. 4

(b) What do you mean by left factoring? Consider the following grammar : 6

S → iCts / iCtSeS / a
C→b

Left factor the above grammar.

(c) Find FIRST and FOLLOW for the following grammar : 6

S→iCtSS′ / a

S′→eS /E

C→b

(d) What do you mean by parsing? Difference between top-down and bottom-up parsing? 4

5. *(a)* What do you mean by three-address code? What is the implementation method of three address code? Describe with example. 5

(b) Implement three address code, quadruples, triples and indirect triples for the statement a : = b * – c + b * –c. 8

(c) Write down the algorithm for partitioning into basic blocks. 5

(d) Give the main idea of dead code elimination. 2

6. *(a)* Define register and address descriptors. Write down a code-generation algorithm. 6

(b) What are the properties of good error diagnostic? 4

(c) Define error. What are the different types of syntactic error? 5

(d) Describe the plan of error detector and corrector. 5

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COMPUTER GRAPHICS

[According to the New Syllabus]

Subject Code : 540205

Examination Code : 5617

Time—3 hours

Full marks—80

[N.B : The figures in the margin indicate full marks. Answer any four questions.]

Marks

1. (a) What do you understand by Computer Graphics? Discuss the real life use of computer graphics. 4

   (b) What is raster scan? Explain with diagram raster scan CRT display. 1+5=6

   (c) What is scan conversion? Describe briefly Bresenham's line drawing algorithm. 1+5=6

   (d) What is output device? Explain different types of graphics output device. 1+3=4

2. (a) What is transformation? Explain different types of geometric transformation. 1+6=7

   (b) Discuss Bresenham's circle algorithm. 6

   (c) Differentiate geometric transformation and co-ordinate transformation. 4

   (d) Define Refresh flicker, Aspect ratio and resolution. 3

3. (a) What is composite transformation? Explain with an example. 4

   (b) Briefly explain Cohen-Sutherland line clipping algorithm. 6

   (c) Perform a 45° rotation of a triangle A (0, 0), B (1, 1) and C (5, 2) : 6

      (i) about the origin

      (ii) about p(−1, −1).

   (d) Explain 2D graphics pipeline. 4

Marks

4. (a) Define projection. Explain the taxonomy of projection. 1+5=6

(b) Discuss different types of parallel projection. 5

(c) Discuss Painter's algorithm for visible surface determination. 5

(d) Explain Eight-way symmetry of a circle. 4

5. (a) Explain the ways of representing a polygonal net model. 4

(b) Write down the properties of Bezier approximation. 4

(c) How can you test whether a polygon P obscure another polygon or not? 6

(d) Describe Z-buffer algorithm. 6

6. (a) Define color model? What is the purpose of chromaticity diagram. 4

(b) Explain different interpolative shading methods. 6

(c) Given points $P_1(1, 2, 0)$, $P_2(3, 6, 20)$ and $P_3(2, 4, 6)$ and a viewpoints at $C(0, 0, -10)$. Determine which point obscure the other when viewed from C. 4

(d) What is Coherence? Explain different types of Coherence. 6