

Roll Number:

**Thapar Institute of Engineering and Technology, Patiala**  
Department of Computer Science

**BE: Auxiliary Exam**

**EST**

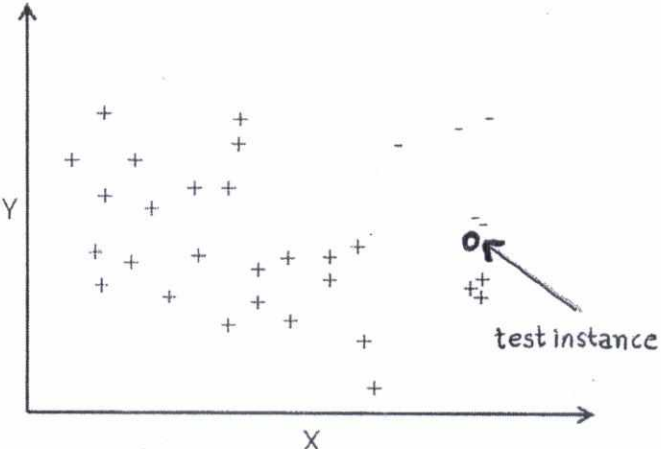
**UCS411: Artificial Intelligence**

**August 2024**

Time: 3 Hours; M. Marks: 100

Faculty: Dr. Anu Bajaj

*Note: All questions are compulsory*

Q1	Draw diagrams of different types of Intelligent Agent architectures	(20)									
Q2	Explain Genetic Algorithm with example.	(20)									
Q3	Differentiate the Expert System from the conventional system and explain its architecture with example.	(20)									
Q4	What are different types of Knowledge representations? Explain any two.	(20)									
Q5	<p>(i) Consider the following confusion matrix for some models on some dataset</p> <table><tr><td></td><td>Predicted+</td><td>Predicted-</td></tr><tr><td>True+</td><td>200</td><td>10</td></tr><tr><td>True-</td><td>20</td><td>5</td></tr></table> <p>a) What is the macro precision of the model? Provide its formula and value. b) What is the macro recall of the model? Provide its formula and value. c) What is macro F1-score of the model? Provide its formula and value. (4+4+2=10)</p> <p>(ii) Suppose we have the following training set of positive (+) and negative (-) instances and a single test instance (o). All instances are projected onto a vector space of two real-valued features (X and Y). Answer the following questions. Assume "unweighted" KNN (every nearest neighbor contributes equally to the final vote). Distance between instances is measured using Euclidean distance.</p> <p>a) What class would be assigned to this test instance for K=1? b) What class would be assigned to this test instance for K=3? c) What class would be assigned to this test instance for K=5? d) Setting K to a large value seems like a good idea. We get more votes! Given this particular training set, would you recommend setting K = 11? Why or why not? (2+2+2+4)</p> 		Predicted+	Predicted-	True+	200	10	True-	20	5	(20)
	Predicted+	Predicted-									
True+	200	10									
True-	20	5									