

Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL

A Constituent Institution of Manipal University

III SEMESTER MCA

END SEMESTER EXAMINATIONS, NOV/DEC 2017

SUBJECT: ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS [MCA 5009]

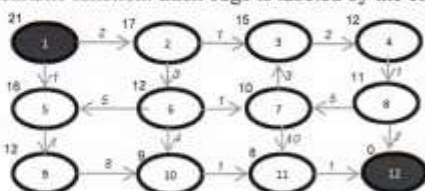
REVISED CREDIT SYSTEM
(22 /11/2017)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitably assumed.

1A.	Given the initial state of the game Tic-Tac-Toe board [b b b b b X b b], generate the move table for the next best 3 moves.	5
1B.	State the water-jug problem precisely and analyze the problem along any 4 dimensions.	3
1C.	Give any one definition of an Artificial Intelligence.	2
2A.	Using the A* algorithm on the state space graph below in figure-1 to find the shortest path from node 1 to node 12. Each node is labeled by a number and the value of a heuristic function. Each edge is labeled by the cost to traverse that edge. 	5
2B.	What is Heuristic Function? Justify why Best First Search is called a heuristic technique, as compared to DFS and BFS, which are not.	3
2C.	What is zero-sum game playing?	2
3A.	Consider the following English sentences - Every gardener likes the sun. - All students are smart - There is a student who is smart - Mary buys carrots by the bushel - All Pompeians were Romans. Convert the above facts into predicate form.	5

3B.	<p>Perform the MiniMax algorithm on the below given state space tree and find out the best cost at the root node.</p>	3
3C.	What is problem reduction in AI?	2
4A.	What is Non-monotonic reasoning? Explain the importance and use of Truth-Maintenance-System (TMS) in a reasoning system.	5
4B.	Give and compare the time and space complexities for the uninformed search algorithms.	3
4C.	What are the differences between supervised and un-supervised learning?	2
5A.	<p>Draw a semantic network representing the following knowledge:</p> <ul style="list-style-type: none"> - Tom is a cat. Tom caught a bird. Tom is owned by John. Tom is ginger in colour. Cats like cream. The cat is sat on the mat. A cat is a mammal. All mammals are animals. Mammals have fur. 	5
5B.	Write a block diagram showing the components of a typical expert system. Also, explain the process of inference takes place in the working memory.	3
5C.	What is an Intelligent Agent? Also, discuss any one agent architecture.	2