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TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

**PRN:**

# Term End Examination

Dec 2023

## CET2007B - Artificial Intelligence and Expert System

Question Paper ID: 027175

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| **Faculty/School** | Engineering and Technology | **Term** | Semester V |
| **Program** | TY B.Tech CSE | **Duration** | **2 Hours 30 Minutes** |
| **Specialization** | | **Max. Marks** | **70** |

**Section - 1 (7 X 10 Marks)**
**Answer any 7 questions**

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| 1 | a. How would you leverage AI in financial forecasting to enhance accuracy and efficiency? Discuss two types of AI techniques/Algorithms employed in financial forecasting.<br><br>b. What is an Artificial Neural Network? Explain its resemblance with biological neural networks. Support the explanation with a neat and labeled diagram. | **10 marks** | CO5 | Understanding |
| 2 | a. In a bolt factory, three machines $M_1$, $M_2$, and $M_3$ manufacture 2000, 2500, and 4000 bolts every day. Of their output 3%, 4%, and 2.5% are defective bolts. One of the bolts is drawn very randomly from a day's production and is found to be defective. What is the probability that it was produced by machine $M_2$?<br><br>b. What do you understand about Probabilistic Reasoning? Explain its need with an example. | **10 marks** | CO2, CO3 | Evaluating |
| 3 | a. Draw a neat architecture for Expert System and also explain all basic components of an Expert System.<br><br>b. List out 10 important characteristics of expert systems. | **10 marks** | CO4 | Remembering |
| 4 | a. Explain the process of constructing a Bayesian Network. Discuss the significance of the graphical structure and the concept of conditional probability in Bayesian Network<br><br>b. Develop a Fuzzy logic system based on Air Conditioner with clear explanation of all steps involved. | **10 marks** | CO3, CO4 | Understanding |

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| 5 | a. Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1 : 2 : 4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8, 0.5 and 0.3, respectively. If the change does not take place, find the probability that it is due to the appointment of C.<br><br>b. How is Bayes' Rule applied in probability theory, and what is its practical use in real-world scenarios? | **10 marks** | CO3 | Evaluating |
| 6 | a. Derive 3 different heuristic functions to solve 8 puzzle problem and Explain admissibility property of A* algorithm in detail.<br><br>b. Explain the Minimax Algorithm with Alpha-beta pruning for the game of Chess | **10 marks** | CO1, CO2 | Analysing |
| 7 | a. A given "situation" ("state") can be described using a formula made up of the following predicates<br>1. ON(A, B):block A is on block B<br>2. ONTABLE(A):block A is on the table<br>3. CLEAR(A):there is nothing on top of block A<br>4. HOLDING(A):the robot arm is holding block A<br>5. ARMEMPTY:the robot arm is holding nothing<br>a) Write preconditions, add, and delete for following four actions<br>a.1) UNSTACK (x,y)<br>a.2) STACK (x,y)<br>a.3) PICKUP (x)<br>a.4) PUTDOWN(x)<br><br>b. Provide insights into five various techniques for expressing knowledge. | **10 marks** | CO2 | Applying |
| 8 | a. Draw neat and labeled architecture of MYCIN and explain each component.<br><br>b. How to fetch knowledge from domain experts to design expert systems. | **10 marks** | CO4 | Understanding |
| 9 | a. Present a diagrammatic explanation of Hierarchical Planning.<br><br>b. Clarify the procedures of Forward and Backward Chaining using a graphical representation and a relevant example. | **10 marks** | CO1, CO2 | Applying |
| 10 | a. Explain the fundamental concept of a Convolutional Neural Network (CNN) and its significance in image processing.<br><br>b. Provide the key differences between supervised learning and unsupervised learning in the context of machine learning. | **10 marks** | CO5 | Applying |

END OF THE QUESTION PAPER