

**K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22**  
**(Autonomous College Affiliated to University of Mumbai)**

**End Semester Exam**

Nov – 2021

(B. Tech) Program: Information Technology

Examination: LY Semester: VII

Course Code: IUITC701 and Course Name: Artificial Intelligence

Duration: 03 Hours

Max. Marks: 60

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

|            |  | Max. Marks | CO  | BT level |
|------------|--|------------|-----|----------|
| <b>Q 1</b> | <b>Solve any six questions out of eight:</b>   | <b>12</b>  |     |          |
| i)         | Discuss the real world applications of AI?   | 2          | CO1 | U        |
| ii)        | List PEAS description for Part Picking Robot ?   | 2          | CO2 | R        |
| iii)       | Describe the time and space complexities of DFS and BFS ?  | 2          | CO3 | U        |
| iv)        | Explain how FOL is superior than predicate logic ?   | 2          | CO4 | U        |
| v)         | Explain the terms : Entailment, Knowledge base.  | 2          | CO4 | U        |
| vi)        | Define the term "Hierarchical Planning".   | 2          | CO4 | R        |
| vii)       | Explain Bayesian Network.  | 2          | CO5 | U        |
| viii)      | Define Chatbot.  | 2          | CO6 | R        |
| <b>Q.2</b> | <b>Solve any four questions out of six.</b>  | <b>16</b>  |     |          |
| i)         | Describe the case of Alibaba's E-Commerce website. If the company wishes to apply AI for enhancing the business, which is the suitable AI algorithm?   | 4          | CO1 | U        |
| ii)        | Interpret Uninformed, Informed and Local Search Algorithms? Discuss the OPEN and CLOSED List as the algorithm DFS and BFS progresses.  | 4          | CO2 | Ap       |
| iii)       | Testing a crossword puzzle that can be posed as a CSP problem. Given an empty crossword grid and sets of words of different lengths, express the crossword problem generator as a CSP problem. | 4          | CO3 | An       |
| iv)        | Identify different types of Planning? Explain Partial Order Planning.  | 4          | CO4 | U        |

| v)            | State and Explain Bay's Theorem?  | 4         | CO5      | U       |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
|---------------|---|-----------|----------|---------|----------|---|---|-------|---------|-------|---------|-------------|-------|-------|-------|-------|---------------|-------|-------|-------|-------|---|-----|----|
| vi)           | Describe different levels of knowledge used in language understanding?  | 4         | CO6      | U       |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| <b>Q.3</b>    | <b>Solve any two questions out of three.</b>  | <b>16</b> |          |         |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| i)            | Define PEAS? Describe the PEAS properties of the task environment for the Drug Discovery Agent.   | 8         | CO2      | R       |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| ii)           | Demonstrate a plan to solve blocks world problem using 3 tables and 5 blocks.   | 8         | CO4      | Ap      |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| iii)          | From the given table find the probability of having " Lung Cancer when person being a smoker" and "No Lung cancer when a person is being smoker"  | 8         | CO5      | An      |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
|               | <table border="1"> <thead> <tr> <th></th> <th colspan="2">smoker</th> <th colspan="2">¬ smoker</th> </tr> <tr> <th></th> <th>catch</th> <th>¬ catch</th> <th>catch</th> <th>¬ catch</th> </tr> </thead> <tbody> <tr> <td>Lung Cancer</td> <td>0.108</td> <td>0.012</td> <td>0.072</td> <td>0.008</td> </tr> <tr> <td>¬ Lung cancer</td> <td>0.016</td> <td>0.064</td> <td>0.144</td> <td>0.576</td> </tr> </tbody> </table> |           | smoker   |         | ¬ smoker |   |   | catch | ¬ catch | catch | ¬ catch | Lung Cancer | 0.108 | 0.012 | 0.072 | 0.008 | ¬ Lung cancer | 0.016 | 0.064 | 0.144 | 0.576 |   |     |    |
|               | smoker  |           | ¬ smoker |         |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
|               | catch   | ¬ catch   | catch    | ¬ catch |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| Lung Cancer   | 0.108   | 0.012     | 0.072    | 0.008   |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| ¬ Lung cancer | 0.016   | 0.064     | 0.144    | 0.576   |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| <b>Q.4</b>    | <b>Solve any two questions out of three.</b>  | <b>16</b> |          |         |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| i)            | Demonstrate Constraint Satisfaction Problem. What would be the constraints for the crypto arithmetic problem described in below figure. Solve it.<br><table border="1"> <tr><td>F</td><td>I</td><td>V</td><td>E</td></tr> <tr><td>+</td><td>S</td><td>E</td><td>V</td><td>E</td><td>N</td></tr> <tr><td>+</td><td>F</td><td>I</td><td>V</td><td>E</td></tr> <tr><td colspan="5">H A I K U</td></tr> </table>                | F         | I        | V       | E        | + | S | E     | V       | E     | N       | +           | F     | I     | V     | E     | H A I K U     |       |       |       |       | 8 | CO3 | Ap |
| F             | I   | V         | E        |         |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| +             | S   | E         | V        | E       | N        |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| +             | F   | I         | V        | E       |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| H A I K U     |   |           |          |         |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| ii)           | Convert the following to predicates:<br>a. Neeta makes tea if she has honey otherwise makes coffee.<br>b. Coffee is a bitter drink.<br>c. Neeta has honey.<br>Will Neeta make a bitter drink? Use Backward Chaining technique.  | 8         | CO4      | Ap      |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |
| iii)          | Interpret TF-IDF using an example. Differentiate between Stemming and Lemmatization.  | 8         | CO6      | Ap      |          |   |   |       |         |       |         |             |       |       |       |       |               |       |       |       |       |   |     |    |