

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22

(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

Nov – Dec 2021

(B.Tech/M.Tech.) Program: Computer Engineering

Examination: LY Semester: VII

Course Code: **1UCEC701** and Course Name: **Artificial Intelligence**

Duration: 03 Hours

Max. Marks: 60

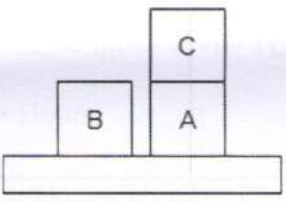
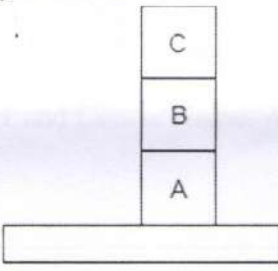
Instructions:

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

| | | Max. Marks | CO | BT level |
|-------------|----------------------------------------------------|------------|----|----------|
| Q 1 | Solve any six questions out of eight: | 12 | | |
| i) | Define Artificial Intelligence. | 2 | 1 | R |
| ii) | What are the PEAS descriptors for 8 queen problem? | 2 | 2 | A |
| iii) | What is heuristic function? | 2 | 3 | U |
| iv) | What is a purpose of unification? | 2 | 4 | U |
| v) | What is the performance measure of A* algorithm? | 2 | 3 | U |

| vi) | Convert the following statement into FOLP 1.All basketball players are tall 2.Some people like cricket | 2 | 4 | A | | | | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|---------------------|-------------------------|--|--|--------------|---------------------|--------------|---------------------|---------------|------|------|------|------|----------------------|------|------|------|------|---|---|---|
| vii) | What is supervised and unsupervised learning? | 2 | 5 | U | | | | | | | | | | | | | | | | | | | | |
| viii) | What is expert system? | 2 | 6 | U | | | | | | | | | | | | | | | | | | | | |
| Q.2 | Solve any four questions out of six. | 16 | | | | | | | | | | | | | | | | | | | | | | |
| i) | Write a short note on simulated annealing? | 4 | 3 | U | | | | | | | | | | | | | | | | | | | | |
| ii) | Apply problem formulation steps for tic-tac-toe game | 4 | 2 | A | | | | | | | | | | | | | | | | | | | | |
| iii) | Explain Turing test designed for satisfactory operational definitions of intelligence. | 4 | 1 | An | | | | | | | | | | | | | | | | | | | | |
| iv) | From the given table find the probability having "No cavity when toothache is there" <table border="1"> <thead> <tr> <th></th> <th colspan="2"><i>toothache</i></th> <th colspan="2">\neg <i>toothache</i></th> </tr> <tr> <th></th> <th><i>catch</i></th> <th>\neg <i>catch</i></th> <th><i>catch</i></th> <th>\neg <i>catch</i></th> </tr> </thead> <tbody> <tr> <th><i>cavity</i></th> <td>.108</td> <td>.012</td> <td>.072</td> <td>.008</td> </tr> <tr> <th>\neg <i>cavity</i></th> <td>.016</td> <td>.064</td> <td>.144</td> <td>.576</td> </tr> </tbody> </table> | | <i>toothache</i> | | \neg <i>toothache</i> | | | <i>catch</i> | \neg <i>catch</i> | <i>catch</i> | \neg <i>catch</i> | <i>cavity</i> | .108 | .012 | .072 | .008 | \neg <i>cavity</i> | .016 | .064 | .144 | .576 | 4 | 4 | A |
| | <i>toothache</i> | | \neg <i>toothache</i> | | | | | | | | | | | | | | | | | | | | | |
| | <i>catch</i> | \neg <i>catch</i> | <i>catch</i> | \neg <i>catch</i> | | | | | | | | | | | | | | | | | | | | |
| <i>cavity</i> | .108 | .012 | .072 | .008 | | | | | | | | | | | | | | | | | | | | |
| \neg <i>cavity</i> | .016 | .064 | .144 | .576 | | | | | | | | | | | | | | | | | | | | |
| v) | Explain partial order planning with a suitable example. | 4 | 5 | U | | | | | | | | | | | | | | | | | | | | |
| vi) | Explain neuro-fuzzy system. | 4 | 6 | U | | | | | | | | | | | | | | | | | | | | |
| Q.3 | Solve any two questions out of three. | 16 | | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----|
| i) | <p>Apply A* algorithm on the figure shown below. Find the path from initial state to goal states. S is a start state and G is a goal state..</p> | 8 | 3 | A |
| ii) | Draw and Describe the Architecture of Utility based agent. How is it different from Model based agent? | 8 | 2 | An |
| iii) | <p>Consider the following sentences:</p> <ol style="list-style-type: none"> 1. Every child loves Santa. 2. Everyone who loves Santa loves any reindeer. 3. Rudolph is a reindeer, and Rudolph has a red nose. 4. Anything which has a red nose is weird or is a clown. 5. No reindeer is a clown. 6. Scrooge does not love anything which is weird. 7. (Conclusion) Scrooge is not a child <p>1. Apply FOL 2. Apply CNF</p> | 8 | 4 | A |
| Q.4 | Solve any two questions out of three. | 16 | | |
| i) | Write short notes on Hybrid approach. Explain Neuro-fuzzy system with suitable diagram. | 8 | 6 | A |
| ii) | Calculate the probability that alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and David and Sophia both called the Harry. Draw a Bayesian network for this domain with suitable probability table. | 8 | 4 | A |

| | | | | |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
| ii) | <p>Calculate the probability that alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and David and Sophia both called the Harry. Draw a Bayesian network for this domain with suitable probability table.</p> | 8 | 4 | A |
| iii) | <p>Give the partial order plan for the following blocks-world problem.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Start State</p> </div> <div style="text-align: center;">  <p>Goal State</p> </div> </div> | 8 | 5 | A |