

Roll No: -----



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Programme: B.Tech (CSE with all specializations)

Semester : VI

Course Name: Artificial Intelligence

Max. Marks : 100

Course Code: CSEG344

Duration : 3 Hrs

No. of page/s: 02

| Section-A (Answer all questions, each question carries 4 marks) | | | |
|--|---|--------------|-----------|
| S.N o | | Marks | CO |
| 1 | Define State Space and Branching Factor. | 4 | CO2 |
| 2 | Classify the learning algorithms and briefly describe the performance affecting factors for learning algorithms. | 4 | CO4 |
| 3 | Briefly explain how HMM is used for real world applications | 4 | CO5 |
| 4 | Explain the role of AI in NLP | 4 | CO 5 |
| 5 | Write the differences between conventional computing and intelligent computing | 4 | CO1 |
| Section-B (Answer all questions, each question carries 10 marks) | | | |
| 6 | Give Semantic Net representation of the facts given below: "Ramesh is a 52 year old Professor of Computer Science at University of Delhi. The name of his wife, son and daughter are respectively Seema, Yash and Kavita. | 10 | CO3 |
| 7 | Explain different types of Multilayer feed forward Networks, analyze how multilayer feed forward networks supports supervised learning paradigm. | 10 | CO4 |
| 8 | What is search problem and explain informed and uninformed search techniques. | 10 | CO2 |
| 9 | Model the 8 puzzle problem in terms of search problem | 10 | CO2 |

Section-C
(Answer all questions, each question carries 20 marks)

| 10 | <p>Convert the following statements in Predicate logic</p> <p>Marcus was a man. Marcus was a Pompeian. All Pompeians were Romans. Caesar was a ruler. All Romans were either loyal to Caesar or hated him. Everyone is loyal to someone. People only try to assassinate rulers they are not loyal to Marcus tried to assassinate Caesar.</p> <p>Apply the above Predicate logic statements answer, “Was Marcus loyal to Caesar”?</p> | 20 | CO3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|--|---------|----------|---------|----------|-------|----------------|---|-----|----|-------|----------|--|---|-----|-----|-------|----------|--|---|----|-----|-----|----------|--|---|----|----|-----|-------|--|---|-----|----|-------|-------|--|---|----|----|-------|-------|----|-------------|
| 11 | <p>Data set of computer files provided, to derive model for virus identification. Considering ‘class’ as class label attribute, construct a decision tree for the given data.</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>WRITABLE</th> <th>UPDATED</th> <th>SIZE</th> <th>CLASS</th> </tr> </thead> <tbody> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">DATASET</td> <td>1</td> <td>yes</td> <td>no</td> <td>small</td> <td>infected</td> </tr> <tr> <td></td> <td>2</td> <td>yes</td> <td>yes</td> <td>large</td> <td>infected</td> </tr> <tr> <td></td> <td>3</td> <td>no</td> <td>yes</td> <td>med</td> <td>infected</td> </tr> <tr> <td></td> <td>4</td> <td>no</td> <td>no</td> <td>med</td> <td>clean</td> </tr> <tr> <td></td> <td>5</td> <td>yes</td> <td>no</td> <td>large</td> <td>clean</td> </tr> <tr> <td></td> <td>6</td> <td>no</td> <td>no</td> <td>large</td> <td>clean</td> </tr> </tbody> </table> | | WRITABLE | UPDATED | SIZE | CLASS | DATASET | 1 | yes | no | small | infected | | 2 | yes | yes | large | infected | | 3 | no | yes | med | infected | | 4 | no | no | med | clean | | 5 | yes | no | large | clean | | 6 | no | no | large | clean | 20 | CO4, CO5 |
| | WRITABLE | UPDATED | SIZE | CLASS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DATASET | 1 | yes | no | small | infected | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2 | yes | yes | large | infected | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | no | yes | med | infected | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4 | no | no | med | clean | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 | yes | no | large | clean | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6 | no | no | large | clean | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Section-A (Answer all questions, each question carries 4 marks) | | | |
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| S.No | | Marks | CO |
| 1 | Define agent and agent program. | 4 | CO1 |
| 2 | What is supervised learning and mention supervised learning algorithms. | 4 | CO4 |
| 3 | Briefly explain how SVM is used for real world applications | 4 | CO5 |
| 4 | Explain the role of AI in MT | 4 | CO 5 |
| 5 | Model the 4 queens problem in terms of search problem | 4 | CO2 |
| Section-B (Answer all questions, each question carries 10 marks) | | | |
| 6 | Give Semantic Net representation of the facts given below: "Sri Ram is a 22 year old business man in Dehradun. The name of his wife, son and daughter are respectively Sita, Kush and Love. | 10 | CO3 |
| 7 | What is uncertainty? Briefly introduce the Bayesian Networks with an example. | 10 | CO4 |
| 8 | Explain Best first and A* search algorithms through example | 10 | CO2 |
| 9 | Draw the general model of learning agents. | 10 | CO2 |

Section-C
(Answer all questions, each question carries 20 marks)

| 10 | <p>Convert the following statements in Predicate logic</p> <p>A, B and C belong to the Himalayan club. Every member in the club is either a mountain climber or a skier or both. A likes whatever B dislikes and dislikes whatever B likes. A likes rain and snow. No mountain climber likes rain. Every skier likes snow.</p> <p>Apply the above Predicate logic statements answer; <i>“Is there a member who is a mountain climber and not a skier?”</i></p> | 20 | CO3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|--|-------------|----------|-------------|------------|------|------------|----|-------|-----|------|------|----|----|-------|-----|------|--------|----|----|----------|-----|------|------|-----|----|------|------|------|------|-----|----|------|------|--------|------|-----|----|------|------|--------|--------|----|----|----------|------|--------|--------|-----|----|-------|------|------|------|----|----|-------|------|--------|------|-----|-----|------|------|--------|------|-----|-----|-------|------|--------|--------|-----|-----|----------|------|------|--------|-----|-----|----------|-----|--------|------|-----|-----|------|------|------|--------|----|----|-------------|
| 11 | <p>Draw the Decision Tree for the following data and predict the value of PlayTennis for <Outlook = sunny, Temp = cool, Humidity = high, Wind = strong></p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Day</th> <th>Outlook</th> <th>Temperature</th> <th>Humidity</th> <th>Wind</th> <th>PlayTennis</th> </tr> </thead> <tbody> <tr><td>D1</td><td>Sunny</td><td>Hot</td><td>High</td><td>Weak</td><td>No</td></tr> <tr><td>D2</td><td>Sunny</td><td>Hot</td><td>High</td><td>Strong</td><td>No</td></tr> <tr><td>D3</td><td>Overcast</td><td>Hot</td><td>High</td><td>Weak</td><td>Yes</td></tr> <tr><td>D4</td><td>Rain</td><td>Mild</td><td>High</td><td>Weak</td><td>Yes</td></tr> <tr><td>D5</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Weak</td><td>Yes</td></tr> <tr><td>D6</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Strong</td><td>No</td></tr> <tr><td>D7</td><td>Overcast</td><td>Cool</td><td>Normal</td><td>Strong</td><td>Yes</td></tr> <tr><td>D8</td><td>Sunny</td><td>Mild</td><td>High</td><td>Weak</td><td>No</td></tr> <tr><td>D9</td><td>Sunny</td><td>Cool</td><td>Normal</td><td>Weak</td><td>Yes</td></tr> <tr><td>D10</td><td>Rain</td><td>Mild</td><td>Normal</td><td>Weak</td><td>Yes</td></tr> <tr><td>D11</td><td>Sunny</td><td>Mild</td><td>Normal</td><td>Strong</td><td>Yes</td></tr> <tr><td>D12</td><td>Overcast</td><td>Mild</td><td>High</td><td>Strong</td><td>Yes</td></tr> <tr><td>D13</td><td>Overcast</td><td>Hot</td><td>Normal</td><td>Weak</td><td>Yes</td></tr> <tr><td>D14</td><td>Rain</td><td>Mild</td><td>High</td><td>Strong</td><td>No</td></tr> </tbody> </table> | Day | Outlook | Temperature | Humidity | Wind | PlayTennis | D1 | Sunny | Hot | High | Weak | No | D2 | Sunny | Hot | High | Strong | No | D3 | Overcast | Hot | High | Weak | Yes | D4 | Rain | Mild | High | Weak | Yes | D5 | Rain | Cool | Normal | Weak | Yes | D6 | Rain | Cool | Normal | Strong | No | D7 | Overcast | Cool | Normal | Strong | Yes | D8 | Sunny | Mild | High | Weak | No | D9 | Sunny | Cool | Normal | Weak | Yes | D10 | Rain | Mild | Normal | Weak | Yes | D11 | Sunny | Mild | Normal | Strong | Yes | D12 | Overcast | Mild | High | Strong | Yes | D13 | Overcast | Hot | Normal | Weak | Yes | D14 | Rain | Mild | High | Strong | No | 20 | CO4, CO5 |
| Day | Outlook | Temperature | Humidity | Wind | PlayTennis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D1 | Sunny | Hot | High | Weak | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D2 | Sunny | Hot | High | Strong | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D3 | Overcast | Hot | High | Weak | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D4 | Rain | Mild | High | Weak | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D5 | Rain | Cool | Normal | Weak | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D6 | Rain | Cool | Normal | Strong | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D7 | Overcast | Cool | Normal | Strong | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D8 | Sunny | Mild | High | Weak | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D9 | Sunny | Cool | Normal | Weak | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D10 | Rain | Mild | Normal | Weak | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D11 | Sunny | Mild | Normal | Strong | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D12 | Overcast | Mild | High | Strong | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D13 | Overcast | Hot | Normal | Weak | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D14 | Rain | Mild | High | Strong | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |