

# University of Mumbai

Examinations Summer 2022

Master of Engineering

Time: 2 hour 30 minutes

Max. Marks: 80

| Q1.       | Choose the correct option for following questions. All the Questions are compulsory and carry equal marks                     |
|-----------|---|
| 1.        | A processor performing fetch or decoding of different instruction during the execution of another instruction is called ____. |
| Option A: | Super-scaling   |
| Option B: | Pipe-lining   |
| Option C: | Parallel Computation  |
| Option D: | none of above   |
| 2.        | Scaling Characteristics of Parallel Programs $T_s$ is   |
| Option A: | increase  |
| Option B: | constant  |
| Option C: | decreases   |
| Option D: | none  |
| 3.        | Mappings are determined by_   |
| Option A: | task dependency   |
| Option B: | task interaction graphs   |
| Option C: | Both A and B  |
| Option D: | None of Above   |
| 4.        | Mpi Recv used for   |
| Option A: | reverse message   |
| Option B: | receive message   |
| Option C: | forward message   |
| Option D: | Collect message   |
| 5.        | To which class of systems does the von Neumann computer belong?   |
| Option A: | SIMD (Single Instruction Multiple Data)   |
| Option B: | MIMD (Multiple Instruction Multiple Data)   |
| Option C: | MISD (Multiple Instruction Single Data)   |
| Option D: | SISD (Single Instruction Single Data)   |
| 6.        | The $n \times n$ matrix is partitioned among $n^2$ processors such that each processor owns a _ element                       |
| Option A: | N   |
| Option B: | $2n$  |
| Option C: | single  |
| Option D: | double  |
| 7.        | Decomposition Techniques are_   |
| Option A: | recursive decomposition   |
| Option B: | data decomposition  |
| Option C: | exploratory decomposition   |
| Option D: | All of above  |

|           |   |
|-----------|---|
| 8.        | NUMA architecture uses _____ in design  |
| Option A: | cache   |
| Option B: | shared memory   |
| Option C: | message passing   |
| Option D: | distributed memory  |
| 9.        | What strategy does the GPU employ if the threads within a warp diverge in their execution?                        |
| Option A: | Threads are moved to different warps so that divergence does not occur within a single warp                       |
| Option B: | Threads are allowed to diverge  |
| Option C: | All possible execution paths are run by all threads in a warp serially so that thread instructions do not diverge |
| Option D: | None of above   |
| 10.       | Which of the following correctly describes a GPU kernel   |
| Option A: | A kernel may contain a mix of host and GPU code   |
| Option B: | All thread blocks involved in the same computation use the same kernel  |
| Option C: | A kernel is part of the GPU's internal micro-operating system, allowing it to act as in independent host          |
| Option D: | None of above   |

|            |   |                     |
|------------|---|---------------------|
| <b>Q2.</b> | <b>Solve any Four out of Six</b>                          | <b>5 marks each</b> |
| A          | What is Open MP?  |                     |
| B          | Write short note : Nanotechnology                         |                     |
| C          | Write short note : Quantam Computers                      |                     |
| D          | What are different levels of parallel processing?         |                     |
| E          | Give advantages of using non uniform memory access model. |                     |
| F          | Explain pipelined execution.                              |                     |

|            |  |                      |
|------------|--|----------------------|
| <b>Q3.</b> | <b>Solve any Two Questions out of Three</b>    | <b>10 marks each</b> |
| A          | State and explain Amdahl's law with example.   |                      |
| B          | Write short note : SIMD matrix multiplication. |                      |
| C          | Explain Flynn's classification in detail.      |                      |

|            |   |                      |
|------------|---|----------------------|
| <b>Q4.</b> | <b>Solve any Two Questions out of Three</b>   | <b>10 marks each</b> |
| A          | What are the different performance metrics?   |                      |
| B          | What is a Data Race? Why Data-Races are Undesired? How Data-Races can be prevented? |                      |
| C          | Explain granularity, concurrency and dependency graph .                             |                      |

**SUB: Advance Soft Computing**  
**ME Sem II**  
**University of Mumbai**

Time: 2 hour 30 minutes

Max. Marks: 80

|            |  |
|------------|--|
| <b>Q1.</b> | <b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>   |
| 1.         | Choose the statement which is true for Hard Computing?   |
| Option A:  | Hard computing systems can work with partial truth.  |
| Option B:  | Hard Computing is suitable for complex real world problems.  |
| Option C:  | Hard computing requires precisely stated analytical model.   |
| Option D:  | Hard computing systems allow parallel computations.  |
| 2.         | Consider a given fuzzy preposition “IF food is good THEN time taken for consumption is slow”. The technique which helps to deduces time taken for consumption when food is very good is called |
| Option A:  | Generalised Modus Tollens  |
| Option B:  | Generalised Modus Ponens.  |
| Option C:  | Universal specialization   |
| Option D:  | Chain rule.  |
| 3.         | Give the functionality of layer 2 in ANFIS :   |
| Option A:  | Layer 2 in ANFIS is responsible for fuzzification.   |
| Option B:  | Layer 2 in ANFIS is responsible for determining firing strength of rule.   |
| Option C:  | Layer 2 in ANFIS is responsible for normalization of firing strength of rule.  |
| Option D:  | Layer 2 in ANFIS is responsible for giving summation of all incoming signal.   |
| 4.         | Which of the following is not true about Perceptron ?  |
| Option A:  | It can classify linearly separable patterns  |
| Option B:  | It has only one output unit.   |
| Option C:  | It has multiple input units.   |
| Option D:  | It can not classify linearly separable patterns  |
| 5.         | How is perceptron different from Mc Culloch Pitts model of neuron?   |
| Option A:  | Perceptron introduced the concept of only binary weights for input.  |
| Option B:  | Perceptron has the mechanism to learn.   |
| Option C:  | In perceptron inputs are limited to Boolean values.  |
| Option D:  | Perceptron uses only linear activation functions.  |
| 6.         | Which of the following nets employ unsupervised learning?  |
| Option A:  | Kohonen’s Self-Organizing Map (SOM)  |
| Option B:  | Multi-layer Perceptron (MLP)   |
| Option C:  | Backpropagation network  |
| Option D:  | Adaline  |
| 7.         | Which of the techniques mentioned below fall under derivative free optimization?   |
| Option A:  | Genetic Algorithm  |
| Option B:  | Newton's Method  |
| Option C:  | Steepest Descent   |
| Option D:  | Gradient descent   |

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|-----------|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.        | <p>Consider the example below left side represents an image block and right side represent output after performing an operation on it. Choose the correct operation that is performed on the image block.</p> <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td style="background-color: #007bff;">2</td><td style="background-color: #007bff;">2</td><td style="background-color: #28a745;">7</td><td style="background-color: #28a745;">3</td></tr> <tr><td style="background-color: #007bff;">9</td><td style="background-color: #007bff;">4</td><td style="background-color: #28a745;">6</td><td style="background-color: #28a745;">1</td></tr> <tr><td style="background-color: #ffc107;">8</td><td style="background-color: #ffc107;">5</td><td style="background-color: #dc3545;">2</td><td style="background-color: #dc3545;">4</td></tr> <tr><td style="background-color: #ffc107;">3</td><td style="background-color: #ffc107;">1</td><td style="background-color: #dc3545;">2</td><td style="background-color: #dc3545;">6</td></tr> </table> <div style="text-align: center;"> <p>→</p> <p>Filter - (2 x 2)<br/>Stride - (2, 2)</p> </div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td style="background-color: #007bff;">9</td><td style="background-color: #28a745;">7</td></tr> <tr><td style="background-color: #ffc107;">8</td><td style="background-color: #dc3545;">6</td></tr> </table> </div> | 2 | 2 | 7 | 3 | 9 | 4 | 6 | 1 | 8 | 5 | 2 | 4 | 3 | 1 | 2 | 6 | 9 | 7 | 8 | 6 |
| 2         | 2  | 7 | 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9         | 4  | 6 | 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8         | 5  | 2 | 4 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3         | 1  | 2 | 6 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9         | 7  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8         | 6  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option A: | Highest Pooling  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option B: | Random Pooling   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option C: | Max Pooling  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option D: | Average Pooling  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9.        | Choose the correct option illustrating the Steps of fuzzy logic controller   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option A: | Fuzzification ->Input variable identification->rule formation-> Rule strength calculation ->rule evaluation->defuzzification.  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option B: | Input variable identification ->Fuzzification -> rule formation ->rule evaluation->Rule strength calculation ->defuzzification.  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option C: | Input variable identification ->Fuzzification -> rule formation-> Rule strength calculation ->rule evaluation->defuzzification.  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option D: | Input variable identification ->Fuzzification -> Rule strength calculation ->rule formation ->rule evaluation ->defuzzification.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10.       | Which of the following is not the purpose of Rough sets?   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option A: | Rough sets constitute a sound basis for KDD  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option B: | Rough set analysis is induction of (learning) approximations of concepts   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option C: | Rough set analysis allow us to develop control system  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Option D: | It offers mathematical tool to discover patterns hidden in data  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

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| <b>Q2</b><br>(20 Marks Each) | <b>Solve any Four out of Six</b><br><i>Please delete the instruction shown in front of every sub question</i>  | <b>5 marks each</b> |
|------------------------------|--|---------------------|
| A                            | <p>Let X and Y be propositions with their truth values as given below:<br/>                     X: Radha is efficient, T(P)=0.8<br/>                     Y: Raj is efficient, T(P)=0.65<br/>                     Find out the truth values of following fuzzy propositions using fuzzy connectives.</p> <ol style="list-style-type: none"> <li>1. Radha is not efficient.</li> <li>2. Raj is not efficient.</li> <li>3. Radha is efficient and so is Raj.</li> <li>4. Either Radha or Raj is efficient.</li> <li>5. IF Radha is efficient THEN so is Raj.</li> </ol> |                     |
| B                            | <p>What is deep learning? Give historical context related to deep learning.</p>  |                     |
| C                            | <p>Given two fuzzy set relations R and S defined by</p> $R = \begin{bmatrix} 0.0 & 0.2 & 0.8 \\ 0.3 & 0.6 & 1.0 \end{bmatrix} \quad S = \begin{bmatrix} 0.3 & 0.7 & 1.0 \\ 0.5 & 1.0 & 0.6 \\ 1.0 & 0.2 & 0.0 \end{bmatrix}$ <p>Find:</p> <ol style="list-style-type: none"> <li>1. Max-min composition.</li> <li>2. Max-product composition.</li> </ol>   |                     |
| D                            | <p>How Weights of the hidden layers are updated in EBPTA algorithm? Give the steps and mathematical formulas used in the process.<br/>                     Prove that for</p>  |                     |
| E                            | <p>Write a short note on Neuro-Genetic systems.</p>  |                     |
| F                            | <p>Explain the term Soft Computing with an example? Give various characteristics of Soft Computing.</p>  |                     |

[P.T.O.]

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| <b>Q3</b><br>(20 Marks Each) | <b>Solve any Two out of Three marks each</b><br><i>Please delete the instruction shown in front of every sub question</i>  |
|------------------------------|--|
| A                            | <p>Train following data for two clusters using Kohanan's SOM. Determine final Weight vector after one Epoch.</p> <p>Input patterns <math>X = [x_1, x_2]</math>, Assume learning Rate <math>c = 0.2</math></p> <p><math>x_1 = [1 \ 0 \ 0]</math>, <math>x_2 = [1 \ 0 \ 1]</math>. Initial Weight Vector <math>W = \begin{bmatrix} 1 &amp; 1 \\ 0.5 &amp; 0 \\ 0.5 &amp; 0.5 \end{bmatrix}</math></p>  |
| B                            | <p>Describe ART algorithm. Give two advantages of ART over SOM. What is a difference between ART-1 and ART-2?</p>  |
| C                            | <p>Design a fuzzy controller that regulates the temperature of a Air-conditioner. Make following assumptions:</p> <ol style="list-style-type: none"> <li>The input temperature is sensed by Temp Sensor.</li> <li>The value of the required temp is set.</li> <li>Input variable can be considered as difference between Set temperature and Sensed temperature</li> <li>Control variable is the speed of the compressor motor.</li> <li>domain for temperature: 15 to 30 °C.</li> <li>Speed of the motor can be expressed in terms of percentage.</li> </ol> <p>Perform the following steps required for designing of fuzzy controller:</p> <ol style="list-style-type: none"> <li>Identify the input and output variable and decide descriptors for same.</li> <li>Define membership functions for input and output variables.</li> <li>Form a rule base.</li> </ol> |

[P.T.O.]

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| <b>Q4.</b><br><b>(20 Marks Each)</b> | <b>Solve any Two out of Three marks each</b> <b>10 marks each</b><br><i>Please delete the instruction shown in front of every sub question</i>  |         |           |         |           |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
|--------------------------------------|---|---------|-----------|---------|-----------|-------|--------|----|---|---|---|---|---|----|---|---|---|---|---|----|----|---|---|---|---|----|---|---|---|---|---|----|----|---|---|---|---|----|----|---|---|---|---|----|---|---|---|---|---|----|----|---|---|---|---|
| <b>A</b>                             | What is CANFIS? How it is different from ANFIS. Explain Colour recipe prediction using CANFIS.  |         |           |         |           |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| <b>B</b>                             | <p>Generate the defuzzification area and apply the following techniques to get defuzzified value</p> <ol style="list-style-type: none"> <li>1. Centroid Method [5]</li> <li>2. Centre of Sums [2.5]</li> <li>3. Weighted Average Method. [2.5]</li> </ol> <div style="text-align: center;"> </div>  |         |           |         |           |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| <b>C</b>                             | <p>For a given DS,</p> <ol style="list-style-type: none"> <li>1. Identify Indiscernible equivalent classes for<br/> <math>U = \{\text{Chemistry}\}</math>, <math>U = \{\text{Admit?}\}</math>, <math>U = \{\text{Chemistry, Maths}\}</math>, <math>U = \{\text{Physics, Chemistry, Maths}\}</math>, [5]</li> <li>2. Find Upper Bound and Lower bound for Admit? = Yes, Admit? is a Decision Attribute based on <math>IND = \{\text{Physics, Chemistry, Maths}\}</math> [5]</li> </ol> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>U</th> <th>Roll No</th> <th>Physics</th> <th>Chemistry</th> <th>Maths</th> <th>Admit?</th> </tr> </thead> <tbody> <tr><td>U1</td><td>1</td><td>A</td><td>B</td><td>A</td><td>Y</td></tr> <tr><td>U2</td><td>5</td><td>B</td><td>B</td><td>A</td><td>Y</td></tr> <tr><td>U3</td><td>14</td><td>B</td><td>B</td><td>C</td><td>N</td></tr> <tr><td>U4</td><td>9</td><td>A</td><td>C</td><td>A</td><td>Y</td></tr> <tr><td>U5</td><td>12</td><td>C</td><td>A</td><td>C</td><td>N</td></tr> <tr><td>U6</td><td>30</td><td>C</td><td>B</td><td>C</td><td>N</td></tr> <tr><td>U7</td><td>7</td><td>B</td><td>C</td><td>A</td><td>N</td></tr> <tr><td>U8</td><td>10</td><td>A</td><td>B</td><td>B</td><td>Y</td></tr> </tbody> </table> | U       | Roll No   | Physics | Chemistry | Maths | Admit? | U1 | 1 | A | B | A | Y | U2 | 5 | B | B | A | Y | U3 | 14 | B | B | C | N | U4 | 9 | A | C | A | Y | U5 | 12 | C | A | C | N | U6 | 30 | C | B | C | N | U7 | 7 | B | C | A | N | U8 | 10 | A | B | B | Y |
| U                                    | Roll No   | Physics | Chemistry | Maths   | Admit?    |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U1                                   | 1   | A       | B         | A       | Y         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U2                                   | 5   | B       | B         | A       | Y         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U3                                   | 14  | B       | B         | C       | N         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U4                                   | 9   | A       | C         | A       | Y         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U5                                   | 12  | C       | A         | C       | N         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U6                                   | 30  | C       | B         | C       | N         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U7                                   | 7   | B       | C         | A       | N         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |
| U8                                   | 10  | A       | B         | B       | Y         |       |        |    |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |

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| Q1.       | Choose the correct option for following questions. All the Questions are compulsory and carry equal marks  |
|-----------|--|
| 1.        | Which of the following is not a part of the data science process?  |
| Option A: | Model planning   |
| Option B: | Discovery  |
| Option C: | Communication building   |
| Option D: | Operationalize   |
| 2.        | Suppose we are using dimensionality reduction as pre-processing technique, i.e, instead of using all the features, we reduce the data to k dimensions with PCA. And then use these PCA projections as our features. Which of the following statement is correct? |
| Option A: | Higher 'k' means more regularization   |
| Option B: | Higher 'k' means less regularization   |
| Option C: | Higher 'k' means medium regularization   |
| Option D: | None of the mentioned  |
| 3.        | Which of the following methods do we use to best fit the data in Logistic Regression?  |
| Option A: | Least Square Error   |
| Option B: | Maximum Likelihood   |
| Option C: | Jaccard distance   |
| Option D: | Least Square Error and Jaccard distance  |
| 4.        | What is the aim of nosql?  |
| Option A: | NoSQL provides an alternative to SQL databases to store textual data   |
| Option B: | NoSQL is not suitable for storing structured data  |
| Option C: | NoSQL databases allow storing non-structured data  |
| Option D: | NoSQL is a new data format to store large datasets   |
| 5.        | A correct way to preprocess the data When performing regression or classification is   |
| Option A: | Normalize the data → PCA → training  |
| Option B: | Normalize the data → PCA → normalize PCA output → training   |
| Option C: | PCA → normalize PCA output → training  |
| Option D: | PCA → training → normalize PCA output  |
| 6.        | In an hypothesis testing, Type II error is made if   |
| Option A: | we reject the null hypothesis when the alternative hypothesis is true  |
| Option B: | we do not reject the null hypothesis when the null hypothesis is true  |
| Option C: | we reject the null hypothesis when the null hypothesis is true   |



|           |   |
|-----------|---|
| Option D: | we do not reject the null hypothesis when the alternative hypothesis is true  |
| 7.        | Typical text mining tasks include?  |
| Option A: | text categorization   |
| Option B: | text clustering   |
| Option C: | entity relation modeling  |
| Option D: | text categorization , text clustering, entity relation modeling   |
| 8.        | What would you do in PCA to get the same projection as SVD?   |
| Option A: | Transform data to zero mean   |
| Option B: | Transform data to zero median   |
| Option C: | Transform data to zero max  |
| Option D: | Not possible  |
| 9.        | A majority of work in R uses systems internal memory and with large datasets, situations may arise when the R workspace cannot hold all the R objects in memory. So removing the unused objects is one of the solution. Which of the following command will remove an R object / variable named “sam” from the workspace? |
| Option A: | remove(sam)   |
| Option B: | rm(sam)   |
| Option C: | Both  |
| Option D: | None  |
| 10.       | Elementary commands in R consist of either _____ or assignments.  |
| Option A: | packages  |
| Option B: | language  |
| Option C: | expressions   |
| Option D: | utilstats   |

|           |  |                      |
|-----------|--|----------------------|
| <b>Q2</b> | <b>Solve any Two Questions out of Three</b>  | <b>10 marks each</b> |
| A         | Explain Linear discriminant analysis with example.   |                      |
| B         | How sentiment analysis can be used for Social media monitoring? Explain with example.                |                      |
| C         | What infrastructure is most appropriate for Hadoop? Draw and describe Hadoop Ecosystem Architecture. |                      |

|           |   |                      |
|-----------|---|----------------------|
| <b>Q3</b> | <b>Solve any Two Questions out of Three</b>                                   | <b>10 marks each</b> |
| A         | Explain Probabilistic PCA in detail.  |                      |
| B         | Describe null hypothesis and alternative hypothesis with appropriate example. |                      |
| C         | Explain the process of content based RS with suitable example.                |                      |

| <b>Q4</b> | <b>Solve any Two Questions out of Three</b>  | <b>10 marks each</b> |
|-----------|--|----------------------|
| A         | Draw and describe the information visualization process.   |                      |
| B         | Discuss characteristics of Big Data. How Data Science is different from Big Data and Data Analytics? |                      |
| C         | Explain singular value.decomposition (SVD) with an example   |                      |

**University of Mumbai**  
**Examinations Summer 2022**

Time: 2 hour 30 minutes

Max. Marks: 80

|            |  |
|------------|--|
| <b>Q1.</b> | <b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b> |
| 1          | The people who are entitled to apply for the registration of the copyright are                                   |
| Option A:  | assignee and licensee  |
| Option B:  | Author or artist   |
| Option C:  | Composer & producer  |
| Option D:  | All above  |
| 2.         | Section _____ provides the inventions which are not patentable under the patent Act.                             |
| Option A:  | Section 3 & 4  |
| Option B:  | Section 5  |
| Option C:  | Section 20   |
| Option D:  | All above  |
| 3.         | Which of the following is not an instrument of IPR?  |
| Option A:  | copyright  |
| Option B:  | Land record  |
| Option C:  | Patents  |
| Option D:  | Trademarks   |
| 4.         | The description of Patent is called  |
| Option A:  | Draft  |
| Option B:  | Specification  |
| Option C:  | Assignment   |
| Option D:  | License  |
| 5          | The infringement of copyright may attract punishment with fine which may extend up to                            |
| Option A:  | Rs 2 Lac to 3 Lac  |
| Option B:  | Rs. 10 Lac   |
| Option C:  | Rs. 50000 to Rs 2 Lac  |
| Option D:  | Rs 1 Crore   |
| 6.         | The patent right gives an exclusive right to the patent to gain _____ out of his invention.                      |
| Option A:  | Monitory benefit   |
| Option B:  | Personal benefit   |
| Option C:  | Reputation in society  |
| Option D:  | All above  |
| 7          | What protects the intellectual property created by Poetry writer?  |
| Option A:  | copyright  |
| Option B:  | Registered designs   |
| Option C:  | Patents  |
| Option D:  | Trademarks   |
| 8.         | The new requirement for the patentable of the invention is _____   |
| Option A:  | Marketable   |
| Option B:  | Non obvious  |
| Option C:  | Profitable   |
| Option D:  | Inventive steps  |

|           |   |
|-----------|---|
| 9.        | Trademark is used for _____               |
| Option A: | It identifies the product and its origin. |
| Option B: | Earning the money from rent               |
| Option C: | Keeping business secrete                  |
| Option D: | All above                                 |
| 10.       | The term of patent shall be _____ years   |
| Option A: | 10  |
| Option B: | 30  |
| Option C: | 2-3                                       |
| Option D: | 20  |

|           |   |                      |
|-----------|---|----------------------|
| <b>Q2</b> | <b>Solve any Two Questions out of Three</b>   | <b>10 marks each</b> |
| A         | Discuss filling of Patents through PCT route  |                      |
| B         | With the help of example explain in detail Patentable and non-patentable inventions |                      |
| C         | List out the purposes for which fair use of copyright work is permitted             |                      |

|           |   |                      |
|-----------|---|----------------------|
| <b>Q3</b> | <b>Solve any Two Questions out of Three</b>   | <b>10 marks each</b> |
| A         | What is copyright? Give the remedies for the infringement of copyright.                       |                      |
| B         | What is GI? List down prohibited GI in India.   |                      |
| C         | Explain Multilateral treaties where India is a member (ex. TRIPS agreement, Paris convention) |                      |

|           |  |                      |
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| <b>Q4</b> | <b>Write short notes on any two Questions out of three</b> | <b>10 marks each</b> |
| A         | Patent Litigation process                                  |                      |
| B         | WIPO   |                      |
| C         | PCT  |                      |