

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO-2022)**

**CLASS: B.TECH.
BRANCH: CSE**

**SEMESTER : VII
SESSION : MO-2022**

**SUBJECT: IT401 DATA ANALYSIS AND INTERPRETATION
TIME: 03 Hours FULL MARKS: 50**

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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- Q.1(a) Write the descriptive note on hypothesis tests. [2]
- Q.1(b) What do you mean by Probability Distributions? With the help of an example explain the use of the bell curve formed in a Gaussian Distribution. [3]
- Q.1(c) Differentiate between descriptive & inferential statistics with the help of examples & formulas. Shed light on the limitations of Descriptive statistics. [5]
- Q.2(a) What do we understand by the term 'residuals'? How do we check if regression is appropriate using residuals? What transformation is needed when the scatter of the dataset is heteroscedastic. [2]
- Q.2(b) How machine learning algorithms and machine learning models interrelate with each other. What are different machine learning algorithms and how different models are formed using those algorithms? [3]
- Q.2(c) How does regularization affect the nonlinearity in regression analysis? Explain with examples how ridge and lasso add the regularization function to avoid over fitting. [5]
- Q.3(a) Describe Bias-Variance Dichotomy. Explain with suitable graphs and examples. [2]
- Q.3(b) Plot hyper-plane of the following points: $\{(1,1),(2,1),(1,-1),(2,-1),(4,0),(5,1),(5,-1),(6,0)\}$ using Support Vector Machine. [3]
- Q.3(c) Describe Linear Discriminant Analysis with Drawing an example. How QDA is different from LDA? [5]
- Q.4(a) How will you develop an AI-based Decision Review System in the cricket game using object detection and other deep learning approaches? [2]
- Q.4(b) Explain all types of activation functions in Neural Networks with their graph and formula. Which activation function is used for multiclass classification? In which layer Soft max and ReLU (Rectifier Linear Unit) activation functions are used? [3]
- Q.4(c) Alisha got high-quality images (4K x 4K) in her office. Her manager wants her to classify between cow and buffalo using the given image dataset with the help of a deep neural network. Explain the best suitable approach to solve this problem. Develop code for a deep feed-forward neural network of at least 5 layers with Adam optimizer and Sparse Categorical Cross Entropy loss using Tensor Flow's Keras to solve this classification problem. Which layer will you add to avoid over fitting? [5]
- Q.5(a) Differentiate between reinforcement learning and supervised learning? [2]
- Q.5(b) Explain Strategies for sub-sampling in active learning with proper examples and appropriate diagrams. [3]
- Q.5(c) Explain with the help of a diagram for the creation of data for analysis using a designed experiment approach. [5]

::: 29/11/2022 :::M