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Term End Examination 2025-2026
Programme – B.Tech.(CSE)-AIML-2021/B.Tech.(CSE)-DS-2021/B.Tech.(CSE)-AIML-2022/B.Tech.(CSE)-DS-2022
Course Name – Introduction to Data Analytics and Visualization
Course Code - PEC-CSM702B/PEC-CSD702B
(Semester VII)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Indicate the software is primarily used for creating 2-D graphics.
a) Blender b) Adobe Illustrator
c) AutoCAD d) Maya

(ii) Identify a common 2-D drawing tool.
a) Cinema 4D b) Illustrator
c) Rhino d) Fusion

(iii) Select the aim of photorealism in art.
a) To create abstract representations b) To replicate photographs as closely as possible
c) To use bright colors and bold shapes d) To simplify images for easy understanding

(iv) Identify the graph is typically used to show the cumulative total over time.
a) Bar Chart b) Area Chart
c) Line Graph d) Pie Chart

(v) Indicate the context of graph networks in data visualization, which of the following best describes the purpose of node centrality.
a) To measure the number of edges in the entire graph. b) To determine the shortest path between any two nodes.
c) To identify the most important or influential nodes within the network. d) To visualize the structure of the graph using colors and shapes.

(vi) Classify in a graph visualization,what do the nodes typically re-present
a) Relationships between data points b) Data points or entities
c) The layout of the graph d) The style of the visualization

(vii) Relate the following can be customized in Matplotib plot.
a) Title and labels b) Colors and markers
c) Line styles and gridlines d) All of the above

(viii) Identify the plot that shows the relationship between three continuous variables, with the third variable represented by color intensity.

a) Scatter Plot
b) Line Plot
c) Heatmap
d) Pie Chart

(ix) Identify the primary advantage of using a logarithmic scale on the y-axis of a line plot.

a) It makes trends easier to spot
b) It allows you to compare values that span several orders of magnitude
c) It provides more precise data points
d) It reduces the number of data points to display

(x) When visualizing time-series data, identify the advantage of using a line plot over a bar chart.

a) Line plots show trends more clearly over time
b) Line plots are easier to interpret for categorical data
c) Bar charts are more suitable for showing multiple time periods
d) Bar charts give a more precise depiction of data trends

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(xi) Identify the visualization type that is most effective for comparing quantities across multiple categories.

a) Pie Chart
b) Line Chart
c) Bar Chart
d) Scatter Plot

(xii) Identify the situation would a heatmap be used to visualize numerical data?

a) To show the relationship between two categorical variables
b) To visualize the frequency distribution of one variable
c) To compare numerical values across two dimensions using color
d) To represent proportions of a whole

(xiii) Identify the following is NOT one of Tufte's principles for effective visualization design?

a) Maximize the data-ink ratio
b) Show multivariate data
c) Use chartjunk for emphasis
d) Erase non-data ink

(xiv) Choose the primary goal of data visualization?

a) To make the data look beautiful
b) To provide accurate data analysis
c) To communicate data insights clearly and effectively
d) To create colorful graphics

(xv) Choose In parallel coordinates, how are multiple variables represented?

a) On a two-dimensional scatter plot
b) By bars in a bar chart
c) By vertical lines where each line corresponds to a variable
d) Through a pie chart

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the difference between a directed and an undirected network (3)
3. Determine the types of data that are best represented through visualization. (3)
4. Identify the differences between a line plot and an area plot. Estimate a scenario where each type of plot would be most effectively used. (3)
5. Explain the challenges associated with data mapping. (3)
6. Consider a bubble plot to compare the population, GDP per capita, and CO2 emissions of different countries. Justify how you would encode each of these variables in the plot. (3)

OR

Consider a waffle chart to represent the distribution of market share among five major companies. Justify how you would organize and color-code the chart to make it easy to interpret. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Develop a strategy to use area plots to illustrate the distribution of university funding across various departments over the past five years. (5)
8. Justify role does color play in data visualization, and how can it be used effectively? (5)
9. Express some challenges in creating effective visualizations. (5)
10. Predict the limitations of 2-D graphics compared to 3-D graphics. (5)
11. Justify Edward Tufte's Design Rules, and why are they important in data visualization? (5)
12. Analyze the role of node size in graph visualization (5)

OR

Conclude the edge thickness used in graph visualization (5)

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