KUMARAGURU
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M.TECH. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Second Semester

DATA SCIENCE

P18ITI2206 : Data Visualization

COURSE OUTCOMES

CO1: Explain principles of visual perception.

CO2: Apply core skills for visual analysis.

CO3: Describe visualization for time-series analysis and ranking analysis.

CO4: Explain visualization for deviation analysis and distribution analysis.

CO5: Describe visualization for correlation analysis and multivariate analysis

CO6: Summarize issues and best practices in information dashboard design.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A) : Data visualization refers to the graphical representation of   CO1   [K1]

   information and data using visual elements like charts, graphs and maps etc.

   Reason (R) : To install matplotlib library we can use the command

   pip install matplotlib.

   a) Both A and R are individually true and   b) Both A and R are individually true but

       R is the correct explanation of A   R is not the correct explanation of A

   c) A is true but R is false   d) A is false but R is true

2. Which of the following graph may be used to mark the hours of the day and represent   CO1   [K2]
   the cyclical nature of time?

   a) Scatter plot   b) Pie chart

   c) Bar chart   d) Spider graph

3. Which of the following shows data in a hierarchical format?   CO2   [K2]

   a) Tree maps   b) Scatter plots

   c) Line charts   d) Stacked bar charts

4. Match List I with List II   CO2   [K₁]

List I	List II
A. Graphs / Chart	i. Timeline
B. Diagrams	ii. Connection Map
C. Tables	iii. Bubble chart
D. Geographical	iv. Heatmap

	A	**B**	**C**	**D**
a)	i	ii	iii	iv
b)	ii	iii	iv	i
c)	ii	iv	iii	i
d)	iii	i	iv	ii

5. Assertion(A) : In histogram X-axis is about bin ranges where Y-axis talks about   CO3   [K₃]
frequency
Reason(R) : The bins (intervals) must be adjacent, and are often (but are not required to be) of equal size

a) Both A and R are individually true and R is the correct explanation of A
b) Both A and R are individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

6. What features might be visible in scatterplots?   CO5   [K₂]

1. Correlation
2. Associations
3. Outliers
4. Clusters
5. Gaps

a) 1,2,3,4,5
b) 1,2,4,5
c) 1,2,3,5
d) 1,3,4,5

7. In the distribution analysis, the shape is said to be curved upward, when the peak   CO4   [K₂]
value:

a) Is at minima
b) Is at maxima
c) Is at centre
d) Can be anywhere

8. Two fundamental principles should guide the selection of the ideal dashboard display   CO6   [K₁]
media:
Assertion (A): It must be the best way to display a particular type of information that is commonly found in dashboards.
Reason (R): It must be able to serve its purpose even when sized to fit into a small space.

a) Both A and R are individually true and R is the correct explanation of A
b) Both A and R are individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

9. Which of the following is the least important objective for a dashboard design? CO6 [K1]

    a) Clear purpose of dashboard   b) Able to monitor at a single glance

    c) Able to fit on a single screen   d) Rich graphics

10. Positive exponential means 'y' will: CO3 [K1]

    a) Slow increase followed by rapid increase   b) Rapid increase followed by slow increase

    c) Rapid decrease followed by slow increase   d) Slow decrease followed by rapid increase

PART B (10 x 2 = 20 Marks)

11.	Compare information visualization with scientific visualization.	CO1	[K2]
12.	In which situation, using a Radar graph will be advisable? Give example.	CO2	[K3]
13.	Provide a use case for a pareto chart.	CO2	[K3]
14.	Explain Anscombe's quartet with an example.	CO3	[K3]
15.	Brief about Heatmap and its usage.	CO3	[K2]
16.	Identify the meaningful attributes of correlation.	CO5	[K2]
17.	What are the key visual characteristics of distribution?	CO4	[K2]
18.	What are the common mistakes in dashboard design?	CO6	[K2]
19.	Summarize the five primary components of bullet graph.	CO4	[K2]
20.	Comment on the importance of enhancing the data pixels and reducing the non-data pixels.	CO6	[K2]

PART C (10 x 5 = 50 Marks)

21.	Explain the pre-attentive attributes with examples.	CO1	[K2]
22.	Explain characteristics of trellises and crosstabs.	CO2	[K2]
23.	Mention the six patterns of time series analysis with real-world example.	CO3	[K2]
24.	List the best practices in correlation with examples.	CO5	[K3]
25.	Describe about deviation analysis with example.	CO4	[K2]
26.	Explain multi-variate analysis with examples.	CO5	[K3]
27.	Briefly explain about dashboard design issues and assessment of needs.	CO6	[K2]
28.	What makes a chart effective? Substantiate in detail.	CO1	[K2]
29.	Provide any two case studies for ranking analysis.	CO3	[K3]
30.	Identify the importance of how graphs are used for dashboard display.	CO5	[K3]

Answer any TWO Questions
PART D (2 x 10 = 20 Marks)

31. Through examples, explain in detail about part-to-whole patterns.   CO2   [K$_3$]

32. Provide any two case studies to explain the distribution analysis.   CO4   [K$_3$]

33. Discuss in detail about categorizing dashboards.   CO6   [K$_2$]

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