GUJARAT TECHNOLOGICAL UNIVERSITY

BE-6 SEMESTER – OLD PAPER – S22 TO W25 – QUESTION BANK

Subject Name & Code:

DATA VISUALIZATION (3160717)

Unit 1: Introduction to Data Visualization

Repeated Questions:

1. **Define Infographics. Explain with example.** (W24 - Q1a, 03 marks; S25 - Q1a, 03 marks; W25 - (in content), 03 marks)
2. **What is Data Visualization? How is it used in the real world? / Describe data visualization and its any three applications.** (S23 - Q1a, 03 marks; W25 - Q1b, 04 marks)
3. **Explain charting primitives. List all types of charts and explain [specific chart types].** (W22 - Q1c, 07 marks; W24 - Q1c, 07 marks)
4. **Why is HTML5 so important to data visualization?** (W22 - Q2b, 04 marks; W24 - Q2b, 04 marks)

Other Important Questions:

1. **Define the following terms: Data Point, Scale, Infographics.** (S22 - Q1a, 03 marks)
2. **Discuss the real applications of data visualization in short.** (S22 - Q1b, 04 marks)
3. **What are the key factors for Data Visualization? Explain in short.** (S23 - Q1b, 04 marks)
4. **Explain any three key factors of data visualization.** (W25 - Q1a, 03 marks)
5. **What is Acquiring and Visualizing Data?** (W22 - Q1a, 03 marks)
6. **Describe Simultaneous acquisition and visualization.** (W22 - Q1b, 04 marks; W24 - Q1b, 04 marks)
7. **What are Charting Primitives? Explain any three chart types with an example of each.** (S25 - Q2, 07 marks)
8. **Exploring the Visual Data Spectrum: charting Primitives (Data Points, Line Charts, Bar Charts, Pie Charts, Area Charts), Exploring advanced Visualizations (Candlestick Charts, Bubble Charts, Surface Charts, Map Charts, Infographics).** (Syllabus - Unit 1 Content)
9. **Define following Term: Visualization, Filtering, Axes.** (S24? - Q1a, 03 marks)
10. **Differentiate following: 1) Canvas and SVG 2) Linear Scale and Ordinal Scale.** (S24? - Q1b, 04 marks)

Unit 2: Basics of Data Visualization – Tables

Repeated Questions:

1. **Write a code to read CSV file and display its content on the browser.** (S24? - Q2b, 04 marks; W23 - Q2b implicit, 04 marks; W25 - Q3c, 07 marks)
2. **Explain how to read data from a JSON file.** (W24 - Q3a OR, 03 marks; S24? - Q3b OR, 04 marks; W23 - Q2b, 04 marks)
3. **Explain how to read data from an XML file.** (W24 - Q3a, 03 marks; W23 - Q2c OR, 07 marks; W25 - Q3c, 07 marks)
4. **What is a Semantic table? Explain it with a suitable example.** (S23 - Q3c, 07 marks; W23 - Q2c, 07 marks)

Other Important Questions:

1. **Differentiate CSV vs JSON files.** (S22 - Q2a, 03 marks)
2. **Write down a code for reading and displaying csv file using JQuery.** (S22 - Q2b, 04 marks)
3. **Differentiate: (1) Canvas Vs SVG (2) JSON Vs XML.** (S23 - Q2a, 03 marks)
4. **Write down a code for reading and displaying .txt file.** (S23 - Q2b, 04 marks)
5. **How do you assure maximum readability? Explain it with example.** (S23 - Q2c, 07 marks)
6. **Differentiate CSV Vs XML files.** (W23 - Q2a, 03 marks)
7. **Differentiate between .xml file and .csv file.** (S24? - Q3a OR, 03 marks)
8. **Explain the reading and displaying of the JSON content in brief.** (S25 - Q3, 03 marks)
9. **Describe how to read data from a text file and display it in a table using jQuery.** (W25 - Q2a, 03 marks)
10. **Outputting Basic Table Data (Building a table, Using Semantic Table, Configuring the columns), Assuring Maximum readability (Styling your table, Increasing readability, Adding dynamic Highlighting).** (Syllabus - Unit 2 Content)

Unit 3: Visualizing Data Programmatically

Repeated Questions:

1. **How to use the HTML5 canvas to render dynamic column charts?** (W22 - Q2c, 07 marks; W24 - Q2c, 07 marks; S25 - Q5 OR, 07 marks)
2. **What is Google API? Explain how it can be used in data visualization? Explain it with examples.** (S23 - Q1c, 07 marks; W23 - Q1c, 07 marks)
3. **Write HTML code to display a Bar/Pie chart using Google APIs.** (W23 - Q1c, 07 marks; S24? - Q1c, 07 marks; S25 - Q6, 07 marks)
4. **Explain linear gradient and radial gradient in HTML5 Canvas with example.** (S22 - Q2c, 07 marks; W24 - Q2a, 03 marks)

Other Important Questions:

1. **Write a code to display both Pie chart and Column chart using Google API in a single browser window.** (S22 - Q1c, 07 marks)
2. **Explain linear interpolation? How is it important in Charting?** (S25 - Q4, 04 marks)
3. **Creating HTML5 CANVAS Charts (HTML5 Canvas basics, Linear interpolations, A Simple Column Chart, Animations).** (Syllabus - Unit 3 Content)
4. **Explain HTML5 canvas with example. Explain code to draw linear & circular gradient, using HTML5 canvas.** (W25 - Q1c, 07 marks)
5. **Starting with Google charts (Google Charts API Basics, A Basic bar chart, A basic Pie chart, Working with Chart Animations).** (Syllabus - Unit 3 Content)
6. **How to use the Google Charts API to render a pie chart for sales data of various electronic devices.** (W22 - Q2c OR, 07 marks)
7. **How to use the Google Charts API to render a column chart for University result data of various subjects.** (W24 - Q2c OR, 07 marks)
8. **How to use the Google Charts API to render a Pie chart for Election data of various states.** (W24 - Q3c, 07 marks)
9. **How Chart Animations work? Explain with an example of Google Chart APIs.** (S25 - Q5 OR, 07 marks)
10. **How to use the Google Charts API to animate a bar chart?** (W22 - Q3c OR, 07 marks)
11. **Prepare column chart using the HTML5 canvas.** (W22 - Q4a OR, 03 marks; W24 - Q4a OR, 03 marks)
12. **Explain the difference between** <canvas> **tag and SVG.** (S25 - Q5, 07 marks)
13. **Write down code to display Line chart and Area chart. Explain it.** (S23 - Q3c OR, 07 marks)

Unit 4: Introduction to D3.js

Repeated Questions:

1. **What is D3.js? Explain in short.** (S22 - Q3a, 03 marks; S23 - Q3a, 03 marks; W23 - Q3a, 03 marks)
2. **Explain data joins in D3.js with suitable example.** (S23 - Q4b, 04 marks; S24? - Q4c, 07 marks; S25 - Q4, 04 marks)
3. **Explain Selection in D3. / How to use selection in D3.js?** (S24? - Q4a, 03 marks; S25 - Q3 OR, 03 marks)
4. **Explain select and append command in D3.js with example.** (S24? - Q4b, 04 marks; W24 - Q4b, 04 marks)
5. **Explain Loading and Filtering External Data in data visualization. / Describe Loading and Filtering External Data in data visualization.** (W22 - Q4c, 07 marks; W24 - Q4c OR, 07 marks)

Other Important Questions:

1. **Define Data Binding. Also explain different uses of append(), text(), selectAll() (using class.id).** (S22 - Q3c, 07 marks)
2. **Explain Various Functions of D3.js with example code.** (S23 - Q4c, 07 marks)
3. **List down installation setup steps of D3.** (W22 - Q3c, 07 marks)
4. **Which Data formats you can use with D3?** (W22 - Q4a, 03 marks)
5. **How can we deal with Asynchronous requests?** (W22 - Q3a OR, 03 marks)
6. **Explain steps to create and upload data in D3.** (W22 - Q4c OR, 07 marks; W25 - Q4a OR, 03 marks)
7. **Explain Nested Selections in D3.** (S25 - Q4, 04 marks)
8. **Explain the importance of update, enter, and exit function in D3.** (S25 - Q4, 03 marks)
9. **Explain Select all and exit command in D3.js with example.** (S24? - Q4b OR, 04 marks; W24 - Q4b OR, 04 marks)
10. **Explain use of DOM in D3.** (S25 - Q4 OR, 03 marks)
11. **Making selections, changing selection's attribute, Loading and filtering External data : Building a graphic that uses all of the population distribution data, Data formats you can use with D3, Creating a server to upload your data, D3's function for loading data, Dealing with Asynchronous requests, Loading and formatting Large Data Sets.** (Syllabus - Unit 4 Content)

Unit 5: Advanced Data Visualization (Making Charts Interactive & Animated)

Repeated Questions:

1. **What is Data Joins? Explain in short.** (S22 - Q4a, 03 marks; W23 - Q4a, 03 marks)
2. **Explain interactive buttons with a suitable example.** (S23 - Q5b, 04 marks; W23 - Q4b, 04 marks; W24 - Q4b concept, 04 marks; S25 - Q5, 04 marks)
3. **Write a code to demonstrate a play button and explain it. / How to add a Play button to the page? Explain with example.** (W23 - Q4c OR, 07 marks; S24? - Q5b OR, 04 marks; W24 - Q5b OR, 04 marks; S25 - Q6 OR, 07 marks)
4. **Explain transaction with respect to data visualization.** (W24 - Q4a, 03 marks; W23 - Q4b OR, 04 marks)
5. **How do you update charts? Explain in short.** (S22 - Q5b, 04 marks; W23 - Q5a, 03 marks; W24 - Q5a, 03 marks)

Other Important Questions:

1. **Explain interactive button. Explain it in short.** (S22 - Q4b, 04 marks)
2. **Write a code that uses the join() method to merge two datasets and create a new dataset.** (S22 - Q4c, 07 marks)
3. **What is sequence w.r.t data visualization?** (S22 - Q4a OR, 03 marks; W23 - Q4a OR, 03 marks)
4. **Write down a code snippet that demonstrates transaction w.r.t data visualization.** (S22 - Q4b OR, 04 marks)
5. **What is an Asynchronous request? How do you deal with it.** (S23 - Q4b OR, 04 marks)
6. **Write a code snippet to demonstrate animation on the page.** (S23 - Q4c OR, 07 marks)
7. **Write down a code to animate a Rectangle using Canvas API.** (S22 - Q3c OR, 07 marks)
8. **Explain Data joins, updates and exits, interactive buttons, Updating charts, Adding transactions, using keys.** (Syllabus - Unit 5 Content)
9. **Explain transition(), data() and append() functions with example.** (W25 - Q4c, 07 marks)
10. **Explain join(), enter() and attr() functions with example.** (W25 - Q4c OR, 07 marks)
11. **How to interrupt the play button? Explain with an example code.** (W23 - Q4c OR, 07 marks; S25 - Q5 OR, 04 marks)
12. **What are transitions? How do they work? How can they be chained together?** (S25 - Q6 OR, 07 marks)
13. **Explain interruption of the play action.** (W25 - Q4a, 03 marks)
14. **Explain animation with example.** (W25 - Q4b OR, 04 marks)

Unit 6: Information Dashboard Design

Repeated Questions:

1. **What is an Information Dashboard? Explain various design issues of it. / What are dashboard design issues and assessment of needs?** (W23 - Q5c, 07 marks; S25 - Q7 OR, 07 marks; W24 - Q5c OR, 07 marks; W25 - Q5c OR, 07 marks)
2. **What is a Bullet graph? / Explain designing of a bullet graph.** (S22 - Q5a OR, 03 marks; W23 - Q5a OR, 03 marks; S25 - Q5, 03 marks)
3. **What is a Sparkline? Explain in short. / Explain designing of a sparkline graph.** (S23 - Q5a, 03 marks; W23 - Q5b OR, 04 marks; S25 - Q5 OR, 03 marks)
4. **Explain the advantages of using Graphics Library of graphs.** (S23 - Q5c OR, 04 marks; S25 - Q6, 04 marks; W25 - Q5b, 04 marks)
5. **Explain critical design practices w.r.t. data visualization.** (S22 - Q5b OR, 04 marks; S25 - Q7 OR, 07 marks)

Other Important Questions:

1. **What is eloquence? Explain in short. / How do you achieve eloquence? Explain it.** (S22 - Q5a, 03 marks; W23 - Q5b, 04 marks; W24 - Q5b OR, 04 marks)
2. **Create a sketch/wireframe of any hypothetical Engineering College dashboard.** (S22 - Q5c, 07 marks)
3. **Draw an information dashboard of any hypothetical University.** (S23 - Q5c, 07 marks)
4. **What are the different considerations associated with the visual presentation of an information dashboard?** (S22 - Q5c OR, 07 marks; W23 - Q5c OR, 07 marks)
5. **Explain the characteristics of a well-designed dashboard.** (S25 - Q6 OR, 04 marks)
6. **Dashboard design issues and assessment of needs, Considerations for designing dashboard-visual perception, Achieving eloquence, Advantages of Graphics _Library of Graphs, Designing Bullet Graphs, Designing Sparklines, Dashboard Display Media, Critical Design Practices, Putting it all together - Unveiling the dashboard.** (Syllabus - Unit 6 Content)
7. **Explain dashboard and its real-world example.** (W25 - Q5c, 07 marks)
8. **Describe dashboard design issues and how to solve them.** (W25 - Q5c OR, 07 marks)

Additional / Cross-Unit & Syllabus-Based Questions

(These questions cover multiple units or are directly from the syllabus content list)

1. **Define following terms: Candlestick Charts, Bubble Charts, and Surface Charts.** (W22 - Q2a, 03 marks)
2. **Explain Bar chart, Pie chart, line chart, bubble chart with example.** (S24? - Q3c, 07 marks)
3. **Explain Bar chart in short.** (S23 - Q3a, 03 marks)
4. **Explain Bubble Chart in short.** (S23 - Q3b, 04 marks)
5. **Explain Candlestick Charts in short.** (S22 - Q3b, 04 marks)
6. **Explain Data points and XY chart with example.** (S24? - Q3c OR, 07 marks; W24 - Q3c OR, 07 marks)
7. **What is XSLT? Explain with example.** (S24? - Q2a, 03 marks; W25 - Q2c, 07 marks)
8. **Define Document Object Model (DOM). Write a code to Read an XML file and display its content.** (S24? - Q2c, 07 marks)
9. **What is AJAX in the context of data reading? Explain its use with an example.** (S25 - Q1, 04 marks; W25 - Q5a OR, 03 marks)
10. **Explain CSS-style selectors with example.** (W22 - Q3b, 04 marks; W24 - Q3b, 04 marks; W25 - Q3b, 04 marks)
11. **What is dynamic highlighting? Explain it using a suitable code example.** (W23 - Q3b OR, 04 marks; W25 - Q3a, 03 marks)
12. **Differentiate native vs JavaScript validation.** (W25 - Q2b, 04 marks)
13. **Differentiate server-side vs client-side validation.** (W25 - Q3a OR, 03 marks)
14. **Explain HTML5 inputs with example.** (W25 - Q3b OR, 04 marks)
15. **Explain click(), each(), and text() jQuery functions.** (W25 - Q5a, 03 marks)
16. **Explain with example JQuery validation engine using four different validation rules.** (W25 - Q2c OR, 07 marks)

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