

GUJARAT TECHNOLOGICAL UNIVERSITY

BE-7 SEMESTER – OLD PAPER – S22 TO S25 – QUESTION BANK

Subject Name & Code:

Application of GIS in Civil Engineering- 3170617

Unit 1: GIS and Civil Engineering Projects

Repeated Questions:

1. **Explain/Discuss the applications of GIS in Hydrology and Flood Control.**
 - Appeared in: S23 (Q1b, 03 marks), S23 (Q1c, 04 marks), S24 (Q1c, 07 marks), S25 (Q1c, 07 marks), W24 (Q1b, 04 marks)
2. **Explain how GIS can be utilized in Water Resources Management.**
 - Appeared in: S23 (Q5a, 03 marks), W22 (Q1c, 07 marks), S24 (Q2c-OR, 07 marks)
3. **Explain the application of GIS in Urban Planning.**
 - Appeared in: S24 (Q1c, 07 marks), S22 (Q3c, 07 marks)
4. **Explain the application of GIS in Solid and Hazardous Waste Management.**
 - Appeared in: S23 (Q2c-OR, 07 marks), S22 (Q1b, 04 marks)
5. **Compare the salient features of ArcGIS and QGIS.**
 - Appeared in: S23 (Q1c, 07 marks), S24 (Q3c, 07 marks), W23 (Q2c, 07 marks)
6. **Write a note on GIS / Explain the significance of GIS in civil engineering projects.**
 - Appeared in: S24 (Q1a, 03 marks), W22 (Q1a, 03 marks), W23 (Q1a, 03 marks), S25 (Q1a, 03 marks), W24 (Q1a, 03 marks)

Other Important Questions:

1. **Discuss the application of GIS in water supply and distribution for urban city area.**
 - Appeared in: S23 (Q1a, 03 marks)
2. **Write the functions of GIS in hydrological flood assessment.**
 - Appeared in: S23 (Q1b, 03 marks)
3. **Write a note on Land use/Land cover system in India.**
 - Appeared in: S23 (Q2c, 07 marks)
4. **Explain the usefulness of GIS in soil mapping.**
 - Appeared in: S23 (Q2b, 03 marks)
5. **Enlist the application of GIS in Civil Engineering.**
 - Appeared in: S24 (Q1b, 04 marks), W22 (Q1b, 04 marks)
6. **List various civil engineering projects where GIS interface is used.**
 - Appeared in: W23 (Q1b, 04 marks)
7. **Describe the application of GIS in flood hazard management with a suitable example.**
 - Appeared in: W23 (Q1c, 07 marks)
8. **“GIS - The IT of Civil Engineering” Explain.**
 - Appeared in: W23 (Q1a, 03 marks)
9. **Enlist GIS tools which may be useful for transportation and utility system.**
 - Appeared in: S22 (Q1a, 03 marks), W23 (Q3a, 03 marks)

10. **Write a note on non-spatial data operations.**
 - Appeared in: S22 (Q1c, 07 marks)
11. **Write the applications of GIS in soil erosion risk mapping.**
 - Appeared in: S22 (Q2c, 07 marks)
12. **Explain the role of GIS in urban planning.**
 - Appeared in: S22 (Q3c, 07 marks)
13. **Discuss the applications of GIS in waste collection and municipal operations in a metropolitan city.**
 - Appeared in: S25 (Q1b, 04 marks)
14. **What is the methodology that can be adopted for soil erosion modelling using GIS?**
 - Appeared in: W24 (Q1c, 07 marks)
15. **List the applications of GIS in the field of traffic management.**
 - Appeared in: W24 (Q2a, 03 marks)
16. **Explain the concept of GIS analysis in water distribution.**
 - Appeared in: W24 (Q2b, 04 marks)
17. **Discuss how GIS can be useful to improve the road traffic management in a metropolitan city.**
 - Appeared in: S25 (Q2c, 07 marks)
18. **List the applications of GIS in the field of hydrology.**
 - Appeared in: S25 (Q2a, 03 marks)
19. **List out the applications of GIS in urban analysis.**
 - Appeared in: W24 (Q3a, 03 marks)

Unit 2: Introduction to ArcGIS / QGIS Desktop GIS

Repeated Questions:

1. **Explain the procedure/purpose of Georeferencing in QGIS.**
 - Appeared in: S23 (Q2a, 03 marks), S24 (Q2a, 03 marks), W23 (Q3c, 07 marks), S25 (Q3c, 07 marks)
2. **List open-source GIS software.**
 - Appeared in: S24 (Q3a, 03 marks), W22 (Q2a, 03 marks)
3. **What are the limitations of QGIS?**
 - Appeared in: W23 (Q2a, 03 marks)
4. **Explain the process of Raster Mosaicking and Clipping in QGIS.**
 - Appeared in: S22 (Q3a, 03 marks)
5. **Write down the full form of QGIS and its salient features.**
 - Appeared in: S24 (Q3c-OR, 07 marks), W22 (Q2c, 07 marks)

Other Important Questions:

1. **Write the differences of salient features of ArcGIS and QGIS.**
 - Appeared in: S23 (Q1c, 07 marks)
2. **How to carry out Terrain analysis using QGIS?**
 - Appeared in: W22 (Q2c-OR, 07 marks)
3. **Explain TIN analysis.**
 - Appeared in: S24 (Q2b, 04 marks)
4. **Explain Spatial overlay operator.**
 - Appeared in: S24 (Q3b, 04 marks)
5. **Difference between spatial and non-spatial data operation?**
 - Appeared in: S24 (Q3a-OR, 03 marks)
6. **Explain ArcGIS desktop.**
 - Appeared in: S24 (Q3b-OR, 04 marks)
7. **Write few file formats supported by QGIS as per Raster and Vector.**
 - Appeared in: W23 (Q2b, 04 marks)
8. **What do you mean by raster data compression in GIS?**
 - Appeared in: S22 (Q3a-OR, 03 marks)
9. **Discuss the features of Arc GIS.**
 - Appeared in: S22 (Q2c-OR, 07 marks)
10. **List out the tools of QGIS used in vector data analysis.**
 - Appeared in: S25 (Q3a, 03 marks)
11. **Explain the update and erase in feature manipulation.**
 - Appeared in: S25 (Q2b, 04 marks)
12. **Briefly describe the procedure of watershed delineation in ArcMap.**
 - Appeared in: S25 (Q2c-OR, 07 marks)
13. **Explain the concept of geoprocessing in ArcGIS.**
 - Appeared in: W24 (Q3a-OR, 03 marks)
14. **Explain the importance of coordinate systems and spatial references in ArcGIS.**
 - Appeared in: W24 (Q3c, 07 marks)
15. **Explain the concept of geocoding and reverse geocoding in ArcGIS.**
 - Appeared in: W24 (Q2c, 07 marks)
16. **Explain the steps involved in creating a network dataset and solving a routing problem.**
 - Appeared in: W24 (Q2c-OR, 07 marks)

Unit 3: GIS and Data Science

Repeated Questions:

1. **Differentiate between spatial and non-spatial data.**
 - Appeared in: W22 (Q3b, 04 marks), W23 (Q3a-OR, 03 marks), S24 (Q3a-OR, 03 marks)
2. **Differentiate between Raster data model and Vector data model.**
 - Appeared in: S23 (Q4b, 04 marks), W22 (Q3c, 07 marks), W23 (Q3b-OR, 04 marks)
3. **Describe the raster and vector data structures. What are the relative advantages and disadvantages of both data structures?**
 - Appeared in: W22 (Q3c, 07 marks), S25 (Q4c-OR, 07 marks)
4. **Define metadata, attribute data and spatial data.**
 - Appeared in: W22 (Q3a, 03 marks), S24 (Q5a-OR, 03 marks)
5. **Define Cadastral maps, Topographical maps and Thematic maps.**
 - Appeared in: W22 (Q3a, 03 marks), S24 (Q5a, 03 marks)
6. **Give classification of map projection and explain cylindrical map projection in detail.**
 - Appeared in: W22 (Q4c-OR, 07 marks), S24 (Q2c, 07 marks)
7. **List out agency which provides free GIS data on internet.**
 - Appeared in: W22 (Q4a, 03 marks), S24 (Q5b-OR, 04 marks), S22 (Q5b, 04 marks)
8. **Explain linking of spatial and attribute data in GIS for further analysis.**
 - Appeared in: W22 (Q4b, 04 marks), S24 (Q5b, 04 marks), S25 (Q3b, 04 marks)
9. **What do you mean by transformation and Why it is required?**
 - Appeared in: W22 (Q4b, 04 marks)
10. **Enlist various file formats of raster data.**
 - Appeared in: W22 (Q4a, 03 marks), S22 (Q5a-OR, 03 marks)

Other Important Questions:

1. **What is geo spatial analysis? Explain network analysis in detail.**
 - Appeared in: W22 (Q3c, 07 marks)
2. **Write a short note with sketch on “Types of Digitizing Errors in GIS”.**
 - Appeared in: W22 (Q3b, 04 marks)
3. **Write short note on: Buffering and Neighbourhood.**
 - Appeared in: W22 (Q4c, 07 marks)
4. **Explain any two types of errors associated with spatial data analysis.**
 - Appeared in: W23 (Q3b, 04 marks)
5. **What are the different file formats used to store Raster data and Vector data?**
 - Appeared in: W23 (Q3b-OR, 04 marks)
6. **List out the GIS analysis functions. Describe an overlay analysis.**
 - Appeared in: W23 (Q3c-OR, 07 marks)
7. **Explain Neighborhood Operations.**
 - Appeared in: W23 (Q4a, 03 marks)
8. **What is data redundancy in DBMS? Give advantages and disadvantages of data redundancy.**
 - Appeared in: S25 (Q3b, 04 marks)
9. **Write a note on following GIS spatial data sources: (i) USGS earth explorer (ii) Open Street map.**
 - Appeared in: S25 (Q3c, 07 marks)
10. **Explain the spatial and database queries in GIS.**

- Appeared in: S25 (Q4b, 04 marks)
- 11. **Differentiate between horizontal co-ordinate systems and vertical co-ordinate systems in GIS.**
 - Appeared in: S25 (Q4c, 07 marks)
- 12. **Explain Metadata styles and standards.**
 - Appeared in: S25 (Q4b-OR, 04 marks)
- 13. **Point out the topological consistency rules.**
 - Appeared in: W24 (Q4a, 03 marks)
- 14. **Distinguish between geo-relational data model and the object-based data model.**
 - Appeared in: W24 (Q4b, 04 marks)
- 15. **Show the regional quad tree method that divides raster into a hierarchy of quadrants.**
 - Appeared in: W24 (Q4c, 07 marks)
- 16. **Write a short note on data quality standards in GIS.**
 - Appeared in: W24 (Q4a-OR, 03 marks)
- 17. **What is spatial interpolation? Explain Global methods of interpolation.**
 - Appeared in: W24 (Q4c-OR, 07 marks)
- 18. **List various analytical tools used in QGIS software for delineation of watershed.**
 - Appeared in: S23 (Q3a, 03 marks)
- 19. **Draw the Flow chart showing the methodology for GIS data processing.**
 - Appeared in: S23 (Q3b, 04 marks)
- 20. **Explain the use of Arc SWAT tool used in ArcGIS software.**
 - Appeared in: S23 (Q3c, 07 marks)
- 21. **Write the process of downloading DEM in ArcGIS.**
 - Appeared in: S23 (Q3a-OR, 03 marks)
- 22. **Describe various types maps used in GIS.**
 - Appeared in: S23 (Q3b-OR, 04 marks)
- 23. **Explain in detail the following: (1) Quadrant count analysis (2) nearest neighbour analysis.**
 - Appeared in: S23 (Q3c-OR, 07 marks)
- 24. **Explain various object-based data models.**
 - Appeared in: S23 (Q4a, 03 marks)
- 25. **Write a note on methods of transformations used in GIS.**
 - Appeared in: S23 (Q4c, 07 marks)
- 26. **Explain conical map projection with neat sketches.**
 - Appeared in: S23 (Q4a-OR, 03 marks)
- 27. **What do you mean by database? Explain Database Management System.**
 - Appeared in: S23 (Q4b-OR, 04 marks)
- 28. **Explain various non-spatial database models.**
 - Appeared in: S22 (Q4b, 04 marks)
- 29. **Explain Map Design Controls in GIS output.**
 - Appeared in: S22 (Q3b, 04 marks)
- 30. **What do you understand by map? Differentiate between topographic and cadastral map.**
 - Appeared in: S22 (Q3b-OR, 04 marks)
- 31. **Describe briefly properties and classification of map projections.**
 - Appeared in: S22 (Q3c-OR, 07 marks)
- 32. **Explain various co-ordinate systems in GIS.**
 - Appeared in: S22 (Q4c, 07 marks)
- 33. **What do you mean by modelling in GIS?**
 - Appeared in: S22 (Q4a-OR, 03 marks)
- 34. **Explain data accuracy and Data redundancy.**
 - Appeared in: S24 (Q5c, 07 marks)
- 35. **Enlist all the types of data errors. Explain any three.**
 - Appeared in: S24 (Q5c-OR, 07 marks)
- 36. **What is map scale? Describe the types of map scales.**

- Appeared in: S25 (Q3a-OR, 03 marks)
- 37. **Write a note on azimuthal projections.**
 - Appeared in: S25 (Q4a, 03 marks)
- 38. **Discuss various Digital Elevation file formats.**
 - Appeared in: S25 (Q4a-OR, 03 marks)
- 39. **List and explain elements of Raster Data Model.**
 - Appeared in: W24 (Q3b-OR, 04 marks)
- 40. **Explain in detail about Projection File and Predefined coordinate Systems with an example.**
 - Appeared in: W24 (Q3c-OR, 07 marks)
- 41. **Explain coverage data structures of point, line and polygon.**
 - Appeared in: W24 (Q3b, 04 marks)

Unit 4: GIS Modeling Approaches in Project Management

Repeated Questions:

1. **Differentiate between DEM and TIN.**
 - Appeared in: W22 (Q5b, 04 marks), S22 (Q4a, 03 marks), S24 (Q4b, 04 marks), W23 (Q4a, 03 marks), W24 (Q5b, 04 marks)
2. **Write a short note on Triangulated Irregular Network (TIN).**
 - Appeared in: W22 (Q5c, 07 marks), S25 (Q5b, 04 marks), W24 (Q5b, 04 marks)
3. **What is a GIS Interface?**
 - Appeared in: W22 (Q5a, 03 marks), W23 (Q5a, 03 marks), S24 (Q4a-OR, 03 marks), S25 (Q5a, 03 marks)
4. **What is GIS post processing? / Write a note on GIS post-processing and output generation.**
 - Appeared in: W22 (Q5c-OR, 07 marks), S22 (Q5c-OR, 07 marks), W23 (Q5a, 03 marks), S24 (Q4c, 07 marks), W24 (Q5a, 03 marks)
5. **Explain the use of GIS as a decision-making tool with an example.**
 - Appeared in: W23 (Q5b, 04 marks), S24 (Q4b-OR, 04 marks), S23 (Q5a, 03 marks)
6. **Write a note on dynamic visualization in GIS modelling.**
 - Appeared in: S24 (Q4c-OR, 07 marks), S23 (Q4c-OR, 07 marks), S22 (Q4c-OR, 07 marks), S25 (Q5c, 07 marks), W24 (Q5c, 07 marks)
7. **Describe various types of buffers of reclassification process.**
 - Appeared in: W22 (Q5c, 07 marks), S22 (Q5c, 07 marks)

Other Important Questions:

1. **Explain the buffer in any feature class (Point, Line, and Polygon) and also explain its uses.**
 - Appeared in: W23 (Q5c, 07 marks)
2. **Elaborate the sentence “The growth of GIS has changed in the modern period of civil engineering project development”.**
 - Appeared in: W23 (Q5c-OR, 07 marks)
3. **What do you mean by Digital Surface Model (DSM)?**
 - Appeared in: W23 (Q5a-OR, 03 marks)
4. **Enlist various spatial analyst tool commands used in ArcGIS.**
 - Appeared in: W23 (Q4b, 04 marks), S24 (Q4a, 03 marks)
5. **State various input datasets required for Terrain Modelling. Give process steps for watershed delineation.**
 - Appeared in: W23 (Q4c, 07 marks)
6. **Briefly describe properties and classification of map projections.**
 - Appeared in: W23 (Q4c-OR, 07 marks)
7. **Explain the criteria for decision making in GIS modelling.**
 - Appeared in: S23 (Q5a, 03 marks)
8. **Explain various data sources for GIS.**
 - Appeared in: S23 (Q5b, 04 marks)
9. **Write the procedure of TIN analysis in GIS.**
 - Appeared in: S23 (Q5c, 07 marks)
10. **Discuss the applications of GIS in water resources.**
 - Appeared in: S23 (Q5a-OR, 03 marks)

11. **Differentiate between DTM and DEM.**
 - Appeared in: S23 (Q5b-OR, 04 marks)
12. **Explain how the digital terrain model is analyzed in GIS.**
 - Appeared in: S23 (Q5c-OR, 07 marks)
13. **Give the overview of web-GIS interface.**
 - Appeared in: S22 (Q4b, 04 marks)
14. **Briefly describe the features of ESRI ArcScene environment.**
 - Appeared in: S22 (Q5a, 03 marks)
15. **Explain the use of digital elevation model.**
 - Appeared in: S22 (Q5b-OR, 04 marks)
16. **Explain the concept and features of Triangular Irregular Networks (TIN).**
 - Appeared in: W24 (Q5b, 04 marks)
17. **Write a note on decision making in GIS modelling.**
 - Appeared in: W24 (Q5c, 07 marks)
18. **Write a note on: USGS DEMs.**
 - Appeared in: W24 (Q5a-OR, 03 marks)
19. **List various internet sources of Digital Elevation Model (DEM).**
 - Appeared in: S25 (Q5a-OR, 03 marks)
20. **Outline a number of different methods for calculating slope from a DEM.**
 - Appeared in: S25 (Q5b-OR, 04 marks)
21. **Design an algorithm that calculates slope and aspect from a triangulated irregular network (TIN) model.**
 - Appeared in: S25 (Q5c-OR, 07 marks)
22. **Describe the process to obtain the DEM of the required topography.**
 - Appeared in: W24 (Q4b-OR, 04 marks)
