

**Total Pages—18 PG/IVS/GEOG/403(A<sub>1</sub>,A<sub>2</sub>,C<sub>1</sub>,  
C<sub>2</sub>,D<sub>1</sub>,D<sub>2</sub>,E<sub>1</sub>,E<sub>2</sub>)/25**

**MA/M. Sc. 4th Semester Examination, 2025**

**GEOGRAPHY**

**PAPER – GEOG-403 (A<sub>1</sub>,A<sub>2</sub>,C<sub>1</sub>,C<sub>2</sub>,  
D<sub>1</sub>,D<sub>2</sub>,E<sub>1</sub>,E<sub>2</sub>)**

*Full Marks : 50*

*Time : 2 hours*

**Answer all questions**

*The figures in the right hand margin indicate marks*

*Candidates are required to give their answers in  
their own words as far as practicable*

**PAPER – GEOG-403 A<sub>1</sub>**

*(Advanced Geomorphic Techniques)*

**GROUP – A**

**Answer any two questions : 2 × 2**

*( Turn Over )*

1. What is hydraulic radius ?
2. Define sub-critical flow.
3. What is meant by Froude number ?
4. Define rating curve.

**GROUP - B**

Answer any **two** questions :  $4 \times 2$

5. Write the properties of suspended load of a natural channel.
6. Assess the importance of inundation estimates for effective management of flood.
7. Examine the limitations in geomorphic application of Manning's equation.
8. How do you estimate stream power ?

( 3 )

**GROUP - C**

Answer any **one** question :  $8 \times 1$

9. Critically explain the techniques of absolute rock-dating.
10. Illustrate the field methods of estimating stream velocity.

**PAPER - GEOG-403 A<sub>2</sub>**

*(Applied Geomorphology)*

**GROUP - A**

Answer any **two** questions :  $2 \times 2$

1. Define EMP.
2. Why is soil piping prominent along Western Ghats ?
3. Define command area.

( 4 )

4. What is contour trench ?

**GROUP - B**

Answer any two questions :  $4 \times 2$

5. Assess the importance of geomorphology in effective management of flood under different confinement pattern.
6. Why is process-form relationship important in planning for coastal erosion management ?
7. How does regional geomorphology control ground water recharge and discharge ?
8. How do you apply geomorphology in integrated river basin management to address water scarcity ?

**GROUP - C**

Answer any one question :  $8 \times 1$

9. Elucidate the role of geomorphologists for EIA with special reference to large-scale intervention on river.
10. Examine the geomorphic considerations for dam site selection citing suitable examples.

[ Internal Assessment – 10 Marks ]

**PAPER – GEOG-403 C<sub>1</sub>**

**(Urban Geography and Regional Planning)**

*(Theoretical Bases of Regional Planning)*

**GROUP – A**

Answer any two questions :                      2 × 2

1. Mention the role of propulsive industries in regional development.
2. Define 'polarization' in the context of economic development.

3. Define 'spread' and 'backwash effect' in the context of Myrdal's theory.
4. How does Hirschman's Unbalanced Growth Theory differ from Balanced Growth Theory?

GROUP - B

Answer any two questions : 4 × 2

5. Explain how the forward and backward linkage relates to unbalanced growth.
6. Account for the key principles of E.A.J. Johnson's "growth centre approach" to agropolitan development.
7. Make a comparison between Johnson's growth centre model and Rondinelli's model on decentralization.
8. Differentiate the concept of *economic space* from *geographic space*.

( 7 )

**GROUP - C**

**Answer any one question : 8 × 1**

9. Discuss the relevance of Myrdal's Circular Cumulative Causation theory in the context of contemporary global development.
10. Give an account of the regional environmental issues in Purba and Paschim Medinipur Districts.

**PAPER - GEOG-403 C<sub>2</sub>**

*(Planning for Urban Development)*

**GROUP - A**

**Answer any two questions : 2 × 2**

1. What is Gentrification ?
2. What is meant by 'multi-modal transport' ?

3. What are the main objectives of the AMRUT initiative?
4. Mention the key features of a 'Smart City'.

**GROUP - B**

Answer any two questions : 4 × 2

5. How did the 74th Constitutional Amendment strengthen urban local governance in India?
6. Discuss the key provisions of the Real Estate (Regulation and Development) Act (RERA), 2016.
7. Summarize the key objectives and components of PMAY in improving urban housing policy.
8. Comment on the importance of metro railways as a mass transit system.

GROUP – C

Answer any **one** question :  $8 \times 1$

9. Differentiate between inter and intra regional Planning. Discuss the application of Intra-regional planning in Indian context.
10. Explain the types of urban transportation system and their significance in city planning.

[ Internal Assessment – 10 Marks ]

PAPER – GEOG-403 D<sub>1</sub>

*(Advanced Remote Sensing)*

GROUP – A

Answer any **two** questions from the following :

1. What do you mean by resampling ?  $2 \times 2$
2. Which instrument is used for collecting spectral signatures from ground ?

3. Differentiate between the types of LIDAR returns mentioning their role in LIDAR data interpretation.
4. What are the applications of SRTM ?

**GROUP - B**

Answer any two questions from the following :

4 × 2

5. What are sources of noise in satellite imagery ?
6. Highlight the applications of hyperspectral data.
7. Explain how differential interferometry can be used alongside microwave remote sensing to assess changes in topography.
8. What is microwave remote sensing and how does it differ from optical remote sensing ?

GROUP – C

Answer any one question from the following :

- 8 × 1
9. Differentiate between hyperspectral and multi-spectral remote sensing. What is signature separability index ? 6 + 2
10. How do histogram equalization and contrast stretching enhance the visual quality of images ? What are the differences between low-pass and high-pass filtering and how do they affect the image ? 4 + 4

PAPER – GEOG-403 D<sub>2</sub>

*(Advanced GIS and Applications of Remote Sensing)*

GROUP – A

Answer any two questions : 2 × 2

1. What is semi-variance statistics ?
2. Why inverse distance is been taken as weight in the IDW interpolation ?
3. If  $n_x$  and  $n_y$  are 30m and 20m, calculate the slope in degree.
4. Write an SQL query to select all polygons from a land use dataset where land cover = 'Forest' and area > 500 hectares.

**GROUP - B**

Answer any two questions :  $4 \times 2$

5. Find the majority class from the following landcover matrix using  $3 \times 3$  kernel window

1	1	2	2	1
1	1	2	2	2
2	1	2	3	2
4	4	2	2	3
4	3	4	2	1

6. What is the role of DEMs in flood risk and watershed modeling ?
7. Describe how time-series satellite data are used for crop phenology monitoring.
8. Briefly describe the estimation process of water depth using LiDAR over the lake surface.

**GROUP – C**

Answer any one question :  $8 \times 1$

9. Explain the physical principles behind remote sensing-based soil moisture estimation. Discuss the advantages and limitations of active microwave remote sensing methods for surface soil moisture retrieval.
10. Describe the rainfall estimation process from VIS/IR and microwave sensing satellites.

**[ Internal Assessment – 10 Marks ]**

**PAPER – GEOG-403 E<sub>1</sub>**

*(Landscape Ecology and Dynamics)*

**GROUP – A**

Answer any two questions :      2 × 2

1. How does landscape ecology contribute in understanding global change ?
2. What are the potential impacts of climate change on biodiversity ?
3. Define Landscape sensitivity.
4. Mention the drivers of landscape pattern formation with emphasis on the Forest landscape.

**GROUP – B**

Answer any two questions :      4 × 2

5. What are the potential benefits of urban green spaces and their role in supporting biodiversity and ecosystem services ?
6. Explain the role of urban planning in shaping landscape patterns within the cities.
7. Briefly outline the scaling issues in landscape analysis.
8. What type of GIS techniques are applied for measuring the composition and configuration of the landscape ?

**GROUP – C**

**Answer any one question :                      8 × 1**

9. Discuss different models used for Landscape analysis from species perspective, with special reference to contour and Pattern-based landscape models.

10. Give an account of the patterns of landscape change in the Urban areas, focusing on urban sprawl and congestion.

**PAPER – GEOG-403 E<sub>2</sub>**

*(Spatial Analysis, Landscape Modeling and Services)*

**GROUP – A**

Answer any two questions :      2 × 2

1. What is the environmental marker ? Give a proper example.
2. Explain the role of fieldwork in landscape ecology.
3. Mention the tools used for connectivity analysis in ArcGIS software.
4. How are forest ecosystem services hampered by forest degradation ?

**GROUP - B**

Answer any two questions :  $4 \times 2$

5. Technological advances may eventually allow complex spatial simulations to be easily performed by GIS software-justify the statement with the STELLA model.
6. Make a comparison between landscape composition and configuration metrics used in landscape analysis.
7. Examine the role of bio-monitoring in assessing landscape sensitivity.
8. State the importance of Fractal Geometry in landscape analysis.

**GROUP - C**

Answer any one question :  $8 \times 1$

9. Discuss the pros and cons of the CA-Marcov model for urban change detection and prediction.
  
10. Elucidate the use of the DPSIR-based model for natural resource management with suitable examples.

**[ Internal Assessment – 10 Marks ]**

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