

**Total Pages—17 PG/IIIS/GEOG/303(A₁,A₂,C₁,
C₂,D₁,D₂,E₁,E₂)/24**

M. Sc. 3rd Semester Examination, 2024

GEOGRAPHY

**PAPER – GEOG-303 (A₁,A₂,C₁,C₂,
D₁,D₂,E₁,E₂)**

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-303 A₁

(Advanced Geomorphology Special Paper)

(Process Geomorphology-1)

GROUP – A

(Turn Over)

(2)

Answer any **two** questions : 2×2

1. Define geomorphic threshold citing suitable example.
2. What is meant by boundary condition ?
3. Define safety factor.
4. Define fall velocity.

GROUP – B

Answer any **two** questions : 4×2

5. Briefly describe the principles of open channel flow.
6. How does a river work under different boundary conditions ?
7. How does a river respond to landuse change ?
8. Illustrate the mechanism of drainage network development after Horton.

(3)

GROUP – C

Answer any **one** question : 8×1

9. Elucidate the nature of erosion, transportation and deposition in the open channel following shields diagram.
10. Describe the down-stream trend of fluvial forms and processes.

PAPER – GEOG-303 A₂

(Special Paper : Process Geomorphology-II)

GROUP – A

Answer any **two** questions : 2×2

1. What is a Pingo ?
2. Define Anthropocene.
3. What is land reclamation ?

(4)

4. Define Etchplanation.

GROUP – B

Answer any **two** questions : 4×2

5. Write a short note on Eustatic change.
6. Compare between supra-glacial and sub-glacial drift.
7. Make an outline of the peri-glacial processes in shaping the landform of high altitude and high latitude area.
8. Mention the need for the conservation of Geomorphosites.

GROUP – C

Answer any **one** question : 8×1

9. Explain the processes involved in the long term evolution of landform with reference to development of planation surfaces.

10. Discuss the role of man as active geomorphic agent in modification of natural forms and processes of the floodplains and delta plains of the Ganga basin.

[Internal Assessment – 10 Marks]

PAPER – GEOG-303 C₁

(Urban Geography and Regional Planning)

(*Foundation of Urban Geography*)

GROUP – A

Answer any two questions : 2 × 2

1. What is meant by the term 'Conurbation' ?
2. Differentiate between Statutory Towns and Census Towns.
3. What are the two primary causes of Gentrification ?

(6)

4. Explain two key objectives of the New Town Policy in India.

GROUP – B

Answer any **two** questions : 4×2

5. Discuss the key characteristics of metropolitan areas in India.
6. Explain, how different city sub-systems shape the National Urban System.
7. How does suburban sprawl act as a challenge to smart growth in terms of its environmental and social impacts ?
8. Discuss four inclusive strategies for promoting sustainable urban development.

GROUP – C

Answer any **one** question : 8×1

9. Explain, how the key drivers of urbanization in India have influenced the trends and patterns of urban development since independence.
10. How did Ebenezer Howard's Garden City principles contribute to the development of sustainable urban planning ?

PAPER – GEOG-303 C₂

(Contemporary Urban Issues)

GROUP – A

Answer any **two** questions : 2 × 2

1. What is meant by Social stratification in a city ?
2. What is the city's ecological footprint ?
3. What is the difference between urban renewal and urban redevelopment ?

(8)

4. Define urban canopy layer.

GROUP – B

Answer any **two** questions : 4×2

5. How does the multiplier effect operate in the context of basic and non-basic urban economic activities ?
6. Explain the impact of urban canyons on the city's microclimate.
7. Identify the causes and consequences of homelessness on the urban socio-economic conditions.
8. How does AMRUT address urban basic service gaps in smaller cities ?

GROUP – C

Answer any **one** question : 8×1

9. What are the key objectives of the Smart Cities Mission and how effectively has it addressed urban development challenges across Indian cities ?
10. Critically discuss the role of JNNURM in reshaping urban development in India.

[Internal Assessment – 10 Marks]

PAPER – GEOG-303 D₁

(Physical Basics of Remote Sensing)

GROUP – A

Answer any two questions : 2 × 2

1. Differentiate reflectivity from emissivity.
2. What is atmospheric opacity ?
3. How does radiant temperature differ from kinetic temperature ?

4. What is a black body in physics ?

GROUP – B

Answer any **two** questions : 4×2

5. Assuming a beam of light is travelling from a clear atmosphere at the top to a highly polluted atmosphere at the bottom, estimate the angle of refraction (θ_r) at the imaginary boundary between clean and polluted air. Use the following parameters to estimate the angle of refraction : n_1 (index of refraction at clean air) = 1; n_2 (index of refraction at polluted air) = 1.6, angle of incident (θ_i) at the imaginary boundary between two layers = 60° .
6. In reality, both small and large fire could occur at the same time. Thus, what would be an optimal wavelength in detecting the fire from space if the temperature of small and large fires are 400 K and 1500 K ?

7. State Planck's law of black body radiation.
8. Briefly describe the regression method in atmospheric correction.

GROUP – C

Answer any one question : 8×1

9. Illustrate the wave-particle nature of light with suitable graphics.
10. Write a difference between sun-synchronous, Geo-synchronous and geostationary orbits. Discuss the advantages, limitations and typical uses of satellites in each of these orbits.

PAPER – GEOG-303 D₂

(Photogrammetry, Aerial Photo and Satellite System)

(12)

GROUP – A

Answer any **two** questions : 2 × 2

1. What do you mean by orthorectification ?
2. What is photogrammetry ?
3. Write two conditions for stereoscopic vision.
4. Explain the significance of using a yellow filter in photography.

GROUP – B

Answer any **two** questions : 4 × 2

5. Discuss the factors causing distortion and displacement in aerial photography.
6. Write a short note on the applications of drone-based remote sensing.
7. Discuss the key differences between the Wishbroom and Pushbroom satellite imaging technique.

8. Explain the concept of IFOV and its role in determining the spatial resolution of remote sensing image.

GROUP – C

Answer any **one** question : 8×1

9. Write a brief note on the characteristic curve in an aerial photographic system and explain its significance.
10. Explain the concept of image parallax and discuss the factors that influence its measurement, providing examples and relevant equations.

[Internal Assessment – 10 Marks]

PAPER – GEOG-303 E₁

(Landscape Ecology with Metrics and Models)

(Theories in Landscape Ecology)

GROUP – A

Answer any **two** questions : 2×2

1. Explain the importance of the Spatio-temporal Scale in Landscape Ecology.
2. Differentiate landscape composition from landscape configuration.
3. What is Red Data Book ?
4. Mention the ecological characteristics of the Sink region with suitable examples.

GROUP – B

Answer any **two** questions : 4×2

5. Elucidate the role of the gradient concept in understanding and quantifying landscape structure.
6. How are the principles of Landscape Ecology applied in forest land management ?

7. Make a comparison between Equilibrium versus non-equilibrium concepts of landscapes.
8. Describe the salient features of the European school of landscape ecology.

GROUP - C

Answer any **one** question : 8 × 1

9. Critically discuss the importance of the Hierarchical model in landscape ecology.
10. Discuss the development of Conservation biology as a new paradigm in Biodiversity conservation.

PAPER — GEOG-303 E₂

(Metrics and Models in Landscape Ecology)

GROUP – A

Answer any **two** questions : 2×2

1. Define the term configuration in landscape ecology.
2. Differentiate Spatial heterogeneity from functional heterogeneity.
3. What is meant by Landscape Structure ?
4. What are Neutral Landscape Models ?

GROUP – B

Answer any **two** questions : 4×2

5. Explain the importance of corridors in species movement.
6. Explain the relation between Landscape fragmentation and habitat health with suitable examples.

7. Mention the utility of Shape Metrics.
8. Differentiate the Shannon Diversity Index from the Simpson Diversity Index.

GROUP – C

Answer any **one** question : 8 × 1

9. Give a brief account of the elements of Landscape in the light of the Patch-Corridor-Matrix model.
10. Distinguish between Aggregate Metrics and Diversity Metrics with suitable examples.

[Internal Assessment – 10 Marks]

