

International Institute of Information Technology, Hyderabad

GSDM Monsoon 2024 Quiz-1

Date: 27/08/2024

1. What do you mean by the areal extent of the drought? [2 marks]
2. List out the various types of droughts and describe them. [3 marks] *KS, Ch...*
3. What do you mean by the Goodness of fit of a statistical model? Describe 2 such tests. [5 marks]
4. Explain vector and raster data. Also list out the steps to perform watershed delineation using DEM data. [7 marks]
5. Define: [2 marks]
 - a. Watershed
 - b. Elevation
6. Explain point based watershed delineation and area based watershed delineation. [4 marks]
7. How is watershed analysis useful in drought management? [2 marks]

prediction

no diag

International Institute of Information Technology Hyderabad
MID Examination - Monsoon 2024
Geospatial Technology for Disaster Risk Modelling

Date: 20/09/2024

Total Marks: 60

Answer All Questions

Calculator is allowed in the Exam

- for in prob dist (gamma)
→ getting a normal dist which
gives near SPI to 0.
1. Explain the steps involved in the development of standardised procedure of a drought index. [10M]
 2. Discuss the Flow direction D8 method used in the watershed delineation process. [5 M]
 3. A catchment area has a time of concentration of 20 minutes and an area of 20 hectares. Estimate peak discharge corresponding to a return period of 30 years. Assume a runoff coefficient of 0.25. The intensity and duration frequency of the storm in the area can be expressed by $i = \frac{KT^x}{(D+A)^n}$, where i = intensity (cm/h) T = return period in years, D = duration of storms in hours, $K = 6.93$, $x = 0.189$, $A = 0.50$ and $n = 0.878$. [10 M]
 4. What is watershed delineation and how it can be useful for the geospatial drought disaster assessment? [5 M]
 5. What are the types of droughts and variables involved and explain any one drought index in brief with its geospatial application context. [10M]
 6. Differentiate between Vector and Raster geospatial data. [5M]
 7. How to handle the missing geospatial data and explain briefly any one method. [5M]
 8. Explain in brief about any one remote sensing-based index which can be useful for the drought modelling validation. [5M]
 9. What is hydrograph and how it changes under urbanization? [5M]
- hydrog. comp.
- 901

Vertical

International Institute of Information Technology Hyderabad
END Sem Examination - Monsoon 2024
Total Marks 100

Subject: Geospatial Technology for Disaster Risk Modelling

Date: 28/11/2024

Instructions:

- Need to answer all the questions.
- Assume the required data for the problems in a practical mode of sense.
- Calculator is allowed for solving problems.

- emissivity?
radiance → temp brightness*
1. What is the physical basis/principle in active fire detection in contextual fire algorithms. What are the primary wavelength bands used to detect active fire? (2M)
2. What are the pros and cons of geostationary vs polar sun synchronous satellites with respect to disaster response. In the context of (a) local (b) regional and (c) national forest fire monitoring, which of the above satellite and sensor options would you choose and why? (5M)
- 26000 km → 24 hrs*
3. What is spectral signature of an earth feature? Illustrate with a figure, the spectral signatures of (a) healthy vegetation (b) water (c) soil and (d) crown fire or burned area. (5M)
4. What are the advantages of synthetic aperture radar (SAR) data over optical data in the context of disaster monitoring. List the disasters which can be monitored by SAR data (5M)
- flood, dry land*
5. In fire danger rating (FDR)
- List the static and dynamic variables used (2.5M)
 - Explain how each variable determines fire danger (2.5M)
6. Explain any spectral index used for burned area delineation with details on the spectral bands used. Discuss the pros and cons of the index with respect to different study areas / forest types. (5M)
- WBR ✓*
7. What is Essential Climate Variable (ECV)? What are the 3 fire disturbance ECVs. Give examples of satellite sensors / products that are used for fire disturbance ECVs. (5M)
- calc phenomenon → Burned Area*
8. Explain the four sensor characteristics (resolutions). List your order of priority that you feel best suits for burn area delineation with reasons. (8M)
- SP → Spectral → Temp, Radiom*
9. What is Hydrograph? What is the impact of urbanization on Hydrological Cycle and Hydrograph? (10M)

$$Q = CIA$$

10. A watershed area of 11000 square Kilometres has a storm for about 60 minutes. Estimate peak flood discharge of the watershed corresponding to a return period of 50 years. Assume a runoff coefficient of 0.25. The intensity and duration frequency of the storm in the area can be expressed by $i = \frac{KT^x}{(D+A)^n}$, where i = intensity (cm/h) T = return period in years, D = duration of storms in hours, $K = 6.93$, $x = 0.189$, $A = 0.50$ and $n = 0.878$. [10 M]

11. Name any five geospatial disasters. Explain how Geospatial Technology with Machine Learning and web-based DSS tools can help to map, monitor, manage and mitigate any given disaster (Hint: pick any one disaster and explain). [10 M]

12. What are the water related disasters? What geospatial technologies (e.g. watershed delineation, interpolations), data (e.g. DEM) and models (e.g. rational formula) can be used for better manage, monitor and mitigate water related disasters. [10 M]

13. Explain the general structure of drought index formulation with one drought indicator as example. [Hint: explain all statistical methods involved]. [10M]

14. Explain the following:

[5X2=10M]

- (a) Vector and Raster Data
- (b) Goodness-of-fit-tests in Drought Index formulation
- (c) Rational Formula for estimating the flood peak discharge
- (d) Inverse-distance spatial interpolation
- (e) Types of Droughts and sequential occurrence of various droughts