Question Booklet No.: Question Booklet Series: **A**

ENTRANCE TEST - 2025

School of Earth & Environmental Sciences

Geoinformatics

Total Questions: 60 **Roll No.** | | | | | | |

Time Allowed: 70 Minutes

Important Instructions for Candidates:

1. Candidates shall compulsorily use only **blue/ black ball point pen**. In no case gel/ink pen or pencil should be used.
2. Compulsorily write your **roll number** in the space provided at the top of this page of the question booklet.
3. Fill up the necessary information in the spaces provided on OMR Answer sheet including **Question Booklet Number** and **Question Booklet Series**.
4. OMR Answer sheet has an original copy and a candidate's copy glued beneath it at the top. While making entries in the original copy, candidate should ensure that the **two copies are aligned properly** so that the entries made in the original copy against each item are exactly copied in the candidate's copy.
5. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
6. **Choose only one correct/most appropriate response** for each question among the options A, B, C and D and darken the circle of the appropriate response completely. Incompletely darkened circle is not correctly read by the OMR scanner and no complaint to this effect shall be entertained.
7. **Do not darken more the one circle of option for any question. A question with more than one darkened response shall be considered wrong.**
8. **There will be negative marking for wrong answers. Each wrong answer will lead to deduction of 0.25 marks per wrong answer from the score.**
9. Only those candidates who obtain positive score in Entrance Test shall be eligible for admission.
10. Do not make any stray mark on the OMR sheet as this may lead to errors while scanning.
11. OMR answer sheet must be handled carefully and it should not be folded or mutilated, as in such case it will not be properly evaluated by the machine.
12. No Electronic gadgets including calculators, mobiles, smart watches, blue tooth etc. shall be permitted inside the examination hall.
13. Rough work, if any, should be done on the blank sheets provided with the question booklet.
14. Ensure that the OMR Sheet is signed by the Examinee as well as by the invigilator.
15. At the end of the examination, fold the OMR Sheet along the crease on the top and tear off the top strip to separate the Original OMR Sheet from the Duplicate Copy.
16. Hand over the Original OMR answer sheet to the invigilator and retain the candidate's copy of OMR, Question Booklet and Admit card for your reference.
17. If any of the information in the response Sheet/Question Paper has been found missing or not mentioned as stated above, the candidate is solely responsible for that lapse.
18. Any deficiency on the OMR shall be the responsibility of the candidate himself/herself.

1. Gymnosperms and Angiosperms are together called as:
   A. Spermatophyta
   B. Sporophyta
   C. Dermitophyta
   D. Embryophyta

2. Which of the following minerals is essential for chlorophyll synthesis?
   A. Iron
   B. Zinc
   C. Magnesium
   D. Calcium

3. The main function of stomata is:
   A. Water absorption
   B. Food transport
   C. Gas exchange
   D. Mineral uptake

4. The uptake of minerals from soil by roots is primarily done via:
   A. Osmosis
   B. Active transport
   C. Diffusion
   D. Capillarity

5. ROM is a type of:
   A. Volatile memory
   B. Secondary memory
   C. Temporary memory
   D. Non-volatile memory

6. An interpreter differs from a compiler because it:
   A. Requires hardware
   B. Translates all code at once
   C. Translates line-by-line
   D. Generates object code

7. The geological time scale is divided into:
   A. Epochs and Ages only
   B. Eras and Centuries
   C. Eons, Eras, Periods, Epochs
   D. Periods and Eons only

8. Folds in rocks are caused by:
   A. Tensional forces
   B. Erosional forces
   C. Compressional forces
   D. Volcanic activity

9. Chemical weathering is most active in:
   A. Cold and dry climates
   B. Hot and humid climates
   C. Desert regions
   D. Glacial regions

10. Which of the following sensors would be most suitable for night-time imaging?
    A. Optical sensors
    B. Thermal infrared sensors
    C. Panchromatic sensors
    D. UV sensors

11. A GIS database stores data in what two basic formats?
    A. Graphic and audio
    B. Vector and raster
    C. Image and animation
    D. Text and code

12. What supports streamflow during non-storm periods?
    A. Base-flow
    B. Surface flow
    C. Interflow
    D. Storm-flow

13. Total water storage change is estimated using:
    A. Altimeters
    B. Lidars
    C. GRACE
    D. Radar

14. Turbid water as compared to clear water has:
    A. More reflectance
    B. Less reflectance
    C. Similar
    D. None of the above

15. Which of the following equations relates speed of light (c) in free space with wavelength (λ) and frequency (f)?
A. $c=\lambda / f$
B. $c=\lambda + f$
C. $c=\lambda \times f$
D. $c=\lambda - f$

16. Assume that G, R, NIR are reflectance in Green, Red and Near Infrared regions. Then equation for NDWI is given by:
A.(NIR-R)/(NIR+R)
B.(G-NIR)/(G+NIR)
C.(G-R)/(G+R)
D.(NIR-G)/(NIR+G)

17. Hydrosphere extends in troposphere upto:
A. 0-5 km in troposphere
B. 5-10 km in troposphere
C. 10-15 km in troposphere
D. None of the above

18. The runoff from a basin of area 500Km^2 is 150 Mm^3 and the rainfall in the basin is 750 mm. what is the runoff coefficient.
A. 0.2
B. 0.57
C. 0.5
D. 0.4

19. Hydrology cycle states that
A. Total in flow - total out flow= constant
B. Subsurface inflow = subsurface outflow
C. Inflow into basin = outflow from the basin
D. Mass inflow - mass outflow = change in mass storage

20. Isopleths are curves of equal
A. Pressure
B. Temperature
C. Snowfall
D. Evapotranspiration

21. The purpose of a current meter is to measure:
A. Rainfall intensity
B. Wind speed
C. Stream velocity
D. Water pH

22. The lag time on a hydrograph is:
A. The time taken for a flood to recede
B. Time between peak rainfall and peak discharge
C. Time needed for evaporation to occur
D. Time taken by base flow to reach the ocean

23. Which of the following pollutants is primarily associated with acid rain?
A. Carbon dioxide (CO_2)
B. Nitrogen oxides (NOx) and sulphur dioxide (SO_2)
C. Methane (CH_4)
D. Chlorofluorocarbons (CFCs)

24. Which of the following is an example of a non-point source of pollution?
A. A factory's discharge pipe
B. A vehicle exhaust
C. Agricultural runoff
D. A sewage treatment plant

25. In Jammu and Kashmir, the main source of energyis:
A. Coal
B. Hydro-power
C. Solar power
D. Geothermal energy

26. Which of the following mineral resources is abundant in Jammu and Kashmir?
A. Coal
B. Gold
C. Limestone
D. Oil

27. The main factor influencing the flora and fauna distribution in Jammu and Kashmir is:
A. Elevation and temperature
B. River systems
C. Human settlements
D. Soil composition

28. The endocrine system in animals is primarily responsible for:
A. Coordinating body movements
B. Producing hormones to regulate bodily functions
C. Transporting nutrients
D. Breaking down food particles in the stomach

29. Which biome is known for its permafrost and short growing seasons?
A. Desert
B. Tundra
C. Savanna
D. Temperate forest

30. The Kashmir stag (Hangul) is found in the forests of Jammu and Kashmir and is an example of:
A. An endangered species
B. A common species
C. An extinct species
D. A migratory species

31. Light travels fastest in:
A. Vacuum
B. Water
C. Air
D. Glass

32. The phenomenon of bending of light when it passes from one medium to another is called:
A. Diffraction
B. Reflection
C. Refraction
D. Dispersion

33. Which of the following electromagnetic waves has the shortest wavelength?
A. Radio waves
B. Microwaves
C. X-rays
D. Gamma rays

34. According to Newton's Law of Universal Gravitation, the force between two masses is:
A. Directly proportional to the distance between them
B. Inversely proportional to the square of the distance between them
C. Directly proportional to the square of the distance between them
D. Independent of the masses

35. In spectroscopy, the separation of light into its constituent colors is called:
A. Reflection
B. Absorption
C. Diffraction
D. Dispersion

36. The study of the interaction of light with matter is known as:
A. Optics
B. Thermodynamics
C. Spectroscopy
D. Acoustics

37. The energy possessed by a body due to its motion is called:
A. Potential energy
B. Kinetic energy
C. Thermal energy
D. Chemical energy

38. The atomic number of an element is determined by the number of:
A. Protons
B. Neutrons
C. Electrons
D. Neurons

39. The reaction between hydrogen and oxygen to form water is an example of:
A. Combination reaction
B. Decomposition reaction
C.Displacement reaction
D. Redox reaction

40. Water has a high specific heat capacity because:
A. It has strong hydrogen bonds
B. It is a good conductor of heat
C. It has weak covalent bonds
D. It is a non-polar molecule

41. According to Charles's Law, when the temperature of a gas is increased, its volume:
A. Decreases
B. Remains constant
C. Increases
D. Decreases and then increases

42. Environmental flows refer to:
A. The natural flow of water across ecosystems
B. The movement of nutrients through food chains
C. The transport of energy between trophic levels
D. The flow of gases in and out of plants

43. The carbon cycle involves the movement of carbon between which of the following components?
A. Atmosphere, soil, and oceans
B. Only plants and animals
C. Only soil and atmosphere
D. Only the atmosphere and water bodies

44. What is the role of producers (plants) in an ecosystem's energy flow?
A. They consume energy and produce waste products
B. They convert solar energy into chemical energy through photosynthesis
C. They break down organic matter for energy
D. They are the primary consumers in the food chain

45. Which of the following is a result of excessive nitrogen in the environment due to human activity?
A. Reduced plant growth
B. Increased oxygen levels in water bodies
C. Eutrophication of water bodies
D. Depletion of the ozone layer

46. The primary component of the Earth's atmosphere is:
A. Nitrogen (78%)
B. Oxygen (21%)
C. Argon (0.93%)
D. Carbon dioxide (0.04%)

47. The layer of the atmosphere responsible for protecting Earth from harmful ultraviolet radiation is the:
A. Troposphere
B. Stratosphere
C. Mesosphere
D. Thermosphere

48. Which of the following human activities is the primary cause of increased carbon dioxide in the atmosphere?
A. Agriculture
B. Fossil fuel combustion
C. Deforestation
D. Industrial processes

49. Non-renewable energy resources include:
A. Biomass
B. Solar power
C. Coal
D. Geothermal energy

50. The Earth's atmospheric layers are divided based on changes in:
A. Temperature
B. Pressure
C. Humidity
D. Wind patterns

51. Kurtosis refers to:
A. The central value of a distribution
B. The relative height and sharpness of the central peak of the distribution
C. The spread of data values around the mean
D. The asymmetry of the distribution

52. Which of the following is a key assumption of regression analysis?
A. The data must be normally distributed
B. There must be a non-linear relationship between the variables
C. The residuals must have constant variance
D. The variables must be categorical

53. You are given the following data of 20 numbers:
17, 3, 25, 10, 7, 21, 13, 8, 12, 15, 5, 18, 23, 9, 20, 27, 32, 29, 30, 35
x = (Mean of the data) – (Median of the data). What is the value of x in this data set?
A. 17.95
B. 17.5
C. 0.45
D. 0.55

54. Let X and Y be two independent random variables with means μ_x, μ_y and variances $Var(x), Var(y)$ respectively. A new random variable is defined as Z = X + Y. What is the variance of Z?
A. $\mu_x Var(x) + \mu_y Var(y)$
B. $Var(x) + Var(y)$
C. $(Var(x))^2 + (Var(y))^2$
D. $(Var(x) + Var(y))^2$

55. In a dataset, the following statistical measures are known: Mean = 50, Mode = 40 and Standard Deviation = 10. Using Pearson's First Coefficient of Skewness, calculate the skewness of the distribution.
A. 0.5
B. -1.0
C. 1.0
D. -0.5

56. A researcher wants to study the opinions of students in a university. The university has 1000 students divided into 5 different branches. The researcher decides to randomly select 50 students from each branch to ensure all branches are represented proportionally. Which sampling method is the researcher using?
A. Simple Random Sampling
B. Systematic Sampling
C. Stratified Sampling
D. Probability Sampling

57. Solve for y in the equation:
$\log_{10}(3y+7) = 3$
A. 332
B. 331
C. 339
D. 313

58. Find the 5th term of the Harmonic Progression if its reciprocal Arithmetic Progression has a first term 1 and common difference 1.
A. 1/5
B. 1/4
C. 1/6
D. 1/3

59. If one root of the equation $x^2 + 6x + k = 0$ is twice the other, find the value of k.
A. 6
B. 8
C. 10
D. 12

60. Which of the following matrices does not have an inverse?
A. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
B. $\begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$
C. $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$
D. $\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$

Sr. No. 081

ENTRANCE TEST-2024

SCHOOL OF EARTH & ENVIRONMENTAL SCIENCES

GEOINFORMATICS

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series **A**

Roll No. : | | | | | | |

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SEAL

1. Which one is not a characteristic of a Database Management System ?

(A) Structured data

(B) Redundancy of data

(C) Access, modification and retrieval of data

(D) Controlled data sharing

2. Which one of the following is not a computer networking device ?

(A) Modem

(B) Router

(C) Switch

(D) Ping

3. Which one is the correct combination ?

(A) SPSS, MATLAB, R

(B) Photoshop, Ubuntu, Paint

(C) Erdas, ENVI, Powerpoint

(D) Python, Java, Raster

4. $(1011)_2 + (10001)_2 =$

(A) 11012

(B) 11011

(C) 11100

(D) 11010

5. Arrange the parts of the interior of the Earth in ascending order of thickness.

(A) Crust, Mantle, Outer Core, Inner Core

(B) Inner Core, Outer Core, Mantle, Crust

(C) Crust, Inner Core, Outer Core, Mantle

(D) Crust, Mantle, Inner Core, Outer Core

6. The Kashmir Valley comprises rocks ranging in age from Salkhala to Recent. The Salkhala is of :

(A) Cambrian Age

(B) Pre-Cambrian Age

(C) Devonian Age

(D) Ordovician Age

7. Which one of the following is not a minor plate ?

(A) Arabian

(B) Fuji

(C) Nazca

(D) Antarctica

8. The following is topographic evidence of the rejuvenation of a river :

(A) Change in valley slope

(B) Valley cut within a valley

(C) River terrace

(D) Incised meanders

9. Land Capability Classification has been developed by :

(A) National Remote Sensing Agency

(B) Indian Council of Agricultural Research

(C) United States Department of Agriculture

(D) National Bureau of Soil Survey & Land Use Planning

10. The downward translocation of humus, clay particles, mineral oxides, and calcium carbonate from an upper horizon to a lower horizon of soil is called :

(A) Salinization

(B) Illuviation

(C) Transpiration

(D) Eluviation

11. Badland topography is a result of :

(A) Tectonism

(B) Erosion

(C) Cultivation

(D) Siltation

12. Which one of the following practices hampers soil conservation ?

(A) Overgrazing

(B) Contour farming

(C) Terrace farming

(D) Strip Cropping

13. The following electromagnetic band pairs are used for Normalized Difference Vegetation Index (NDVI) Calculation :

(A) Green and Red

(B) Red and Blue

(C) NIR and Green

(D) Red and NIR

14. Which of the following is a topographic map's largest scale?

(A) 1:25,000

(B) 1:50,000

(C) 1:100,000

(D) 1:250,000

15. Which one of the following systems uses the vector and raster data ?

(A) Remote Sensing System

(B) Geographic Information System

(C) Global Positioning System

(D) Both (A) and (B)

16. The LISS-IV sensor was first introduced with :

(A) CARTOSAT

(B) SENTINEL

(C) RESOURCESAT

(D) SPOT

17. The portion of the discharge of a stream contributed by groundwater seepage is called :

(A) Base flow

(B) Interflow

(C) Surface runoff

(D) Lag

18. Which parameters are used to construct hydrographs ?

(A) Stream discharge vs Time

(B) Time vs Area

(C) Distance vs Time

(D) Stream discharge vs Area

19. Which is not an instrument to measure rainfall ?

(A) Rain gauge

(B) Tipping bucket

(C) Hypsometer

(D) Udometer

20. The landform created during overbank flooding, when sand and silt are deposited next to the channel, creating belts of higher land on either side of the channel, is called :

(A) Backswamp

(B) Playa

(C) Bluff

(D) Levee

21. In the 2030 Agenda for Sustainable Development, the 7th Goal is :

(A) Zero Hunger

(B) Climate Action

(C) Affordable and Clean Energy

(D) Gender Equality

22. As per the latest Seismic Zonation map given by the Bureau of Indian Standards, Jammu and Kashmir falls under :

(A) Zone III and IV

(B) Zone IV and V

(C) Zone III and V

(D) Zone II and III

23. The host Country of World Environment Day 2024 was :

(A) The Kingdom of Saudi Arabia

(B) South Africa

(C) Brazil

(D) Geneva

24. The highest proportion of the total water used in the Country is in the following sector :

(A) Irrigation

(B) Industries

(C) Domestic Use

(D) Commercial

25. The most dominant forest cover of Jammu and Kashmir is :

(A) Lower or Siwalik Chir Pine Forest

(B) Western Mixed Coniferous Forest

(C) Moist Deodar Forest (Cedrus)

(D) West Himalayan Sub-Alpine Fir Forest

26. In which district Lignite is found in Jammu and Kashmir ?

(A) Doda

(B) Kulgam

(C) Kathua

(D) Kupwara

27. A line on a weather chart joining places of equal wind velocity is called :

(A) Isorhyme

(B) Isopach

(C) Isotach

(D) Isoneph

28. Karewas soil of Kashmir Valley is most suitable for cultivation of :

(A) Potato

(B) Saffron

(C) Coconut

(D) Groundnut

29. A variant of the sequence of nucleotides at a particular location, or locus, on a DNA molecule is called:

(A) Genotype

(B) Phenotype

(C) Chromosome

(D) Allele

30. A flower with radial symmetry is called :

(A) Actinomorphic

(B) Zygomorphic

(C) Ebracteate

(D) Epigynous

31. Which ecosystem has the maximum biomass ?

(A) Grassland ecosystem

(B) Pond ecosystem

(C) Forest ecosystem

(D) Lake ecosystem

32. Which one is not a form of transpiration in plants ?

(A) Radical transpiration

(B) Cuticular transpiration

(C) Lenticular transpiration

(D) Stomatal transpiration

33. In a neuron, Schwann Cells, Node of Ranvier and Myelin sheath are part of :

(A) Cell body

(B) Axon

(C) Dendrites

(D) All of the above

34. Which one is not true for Selva Forests ?

(A) Tall broad-leaved trees

(B) Change the colour of leaves during autumn

(C) Found in tropical rainforests

(D) Typical of the Amazon basin

35. The gaseous exchange in alveoli is a type of :

(A) Simple diffusion

(B) Osmosis

(C) Active transport

(D) Passive transport

36. The correct order of endocrine glands from head to toe of a human body is :

(A) Adrenal, Thyroid, Thymus, Pituitary

(B) Thymus, Pituitary, Pancreas, Adrenal

(C) Thyroid, Pancreas, Adrenal, Pituitary

(D) Pituitary, Thyroid, Thymus, Pancreas

37. In a manned satellite, people experience no gravity, and it is known as :

(A) Gravity-weight

(B) Gravitational weight

(C) Weightlessness

(D) Less-weight gravity

38. Which of the following proves that electromagnetic waves are transverse ?

(A) Reflection

(B) Diffraction

(C) Interference

(D) Polarisation

39. Which of the following statements is not true ?

(A) When an electric wire is heated, its resistance decreases

(B) Heating increases the collisions between free electrons and atoms in the wire

(C) Resistance can be calculated using Ohm's Law

(D) Metals have low resistivities

40. The rate of evaporation is inversely proportional to :

(A) Surface area

(B) Wind speed

(C) Humidity

(D) Temperature

41. An aqueous solution turns the red litmus solution blue. Excess addition of which of the following solutions would reverse the change ?

(A) Baking powder

(B) Lime

(C) Ammonium hydroxide solution

(D) Hydrochloric acid

42. An isolated system :

(A) is one in which mass within the system is not necessarily constant

(B) cannot transfer either energy or mass to or from the surroundings

(C) is a region of constant mass, and only energy is allowed through the closed boundaries

(D) is a specified region where the transfer of energy and mass takes place

43. Which one of the following statements is not true ?

(A) An oxidation process always needs the presence of oxygen

(B) When a reactant loses electrons during a reaction, it is called oxidation

(C) When a reactant accumulates electrons during a reaction, it is called reduction

(D) In a redox reaction, reduction and oxidation occur simultaneously

44. Which of the following pairs represents isobars ?

(A) $^{3}He_{2}$ and $^{4}He_{2}$

(B) $^{24}Mg_{12}$ and $^{25}Mg_{12}$

(C) $^{40}K_{19}$ and $^{40}Ca_{20}$

(D) $^{40}K_{19}$ and $^{39}K_{19}$

45. The amount of energy, as it is transferred from one trophic level to another in an ecosystem :

(A) Remains constant

(B) Decreases

(C) Increases

(D) Has no definite relationship

46. Which of the following are ecological services ?

(A) O_2 fixation, CO_2 release and pollution

(B) Nitrogen fixation and pollution

(C) CO_2 fixation, O_2 release and pollination

(D) CO_2 fixation, fertilization and the release of sodium

47. Respiration and photosynthesis are central to the following :

(A) Nitrogen cycle

(B) Phosphorous cycle

(C) Carbon cycle

(D) Sulphur cycle

48. Which basin in the Indian Himalayas has the maximum number of glaciers ?

(A) Shyok

(B) Tista

(C) Chenab

(D) Indus

49. The formation of fronts is possible due to :

(A) Convergence of contrasting air masses

(B) Divergence of contrasting air masses

(C) Convergence of similar air masses

(D) Divergence of similar air masses

50. Which one of the following statements is not true ?

(A) Climate change is real and human activities are the main cause

(B) Rising sea level is a direct impact of climate change

(C) CO_2 is a more powerful pollutant than Methene with Global Warming potential

(D) The concentration of Greenhouse gases in the Earth's atmosphere is directly linked to the average global temperature on Earth

51. Which of the following is a non-renewable source of energy ?

(A) Hydal

(B) Solar

(C) Sea Wave

(D) Fossil Fuels

52. The coldest region of the atmosphere :

(A) Troposphere

(B) Thermosphere

(C) Stratosphere

(D) Mesosphere

53. If the mean of a dataset is 50 and the standard deviation is 10, what is the coefficient of variation ?

(A) 2%

(B) 10%

(C) 20%

(D) 50%

54. Among these, which sampling is based on equal probability ?

(A) Probability sampling

(B) Stratified random sampling

(C) Systematic sampling

(D) Simple random sampling

55. Kurtosis is a measure of the tailedness of a distribution. Distributions with high kurtosis (or fat tails) are called :

(A) Mesokurtic

(B) Leptokurtic

(C) Platykurtic

(D) Hypokurtic

56. A trend line that shows the most accurate relationship between x and y describes :

(A) Linear regression

(B) No correlation

(C) Clusters

(D) Line of best fit

57. The 21st term of Arithmetic Progression, whose first two terms are – 3 and 4, is :

(A) 17

(B) 137

(C) 143

(D) –143

58. $\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ 2 & -3 & 0 \end{bmatrix}$ is an example of :

(A) Skew symmetric matrix

(B) Null matrix

(C) Symmetric matrix

(D) Identity matrix

59. $y(2y + 3) = y^2 + 1$ is a :

(A) Quadratic equation

(B) Cubic equation

(C) Linear equation

(D) Rational equation

60. If $(1/8\ !) + (1/9\ !) = (x/10\ !)$, $x = ?$

(A) 72

(B) 100

(C) 90

(D) 81