R1919	Sub. Code
	464101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Applied Geology

PHYSICAL GEOLOGY AND GEOMORPHOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option

1. The upper mantle layer which has a mixture of three parts of ultramafic rocks and 1 part of basalt are known as (CO1, K2)

   (a) Pyrolite (b) Peridodite

   (c) Pegmatite (d) Granitic

2. The two plate margins meet a common plate boundary is called (CO1, K2)

   (a) Plate boundary

   (b) Plate margin

   (c) Conservative boundary

   (d) Destructive boundary

3. Isostatic theory state the concept of "different crystal blocks of equal density and unequal thickness known as (CO2, K3)

   (a) AIRY's theory

   (b) PARTT's theory

   (c) HEISKANEN'S theory

   (d) All the above

4. A series of inter connected mountains are called (CO2, K1)

(a) Range (b) System

(c) Chain (d) Zone

5. Ventifacts with three smooth surface are known as (CO3, K2)

(a) Einkanter (b) Driekanter

(c) Zwinkanter (d) Zengen

6. Which one of the following Aeolian lakes (CO3, K3)

(a) Chilka lake (b) Pulicat lake

(c) Lunar lake (d) Dhands

7. In the fluvial environment, width of the valley is greater than the river is known as (CO4, K2)

(a) Strath (b) Playas

(c) Wadies (d) Sciogas

8. Streams which flow in the opposite direction to the original course is termed (CO4, K2)

(a) Obsequent (b) Subsequent

(c) Insequent (d) Resequent

9. A large elongated depression formed by the convergence of two or more sink holes is known as (CO5, K3)

(a) doline (b) sink

(c) uvala (d) cavern

10. Which element is abundant in sea water? (CO5, K3)

(a) Sodium (b) Magnesium

(c) Chlorine (d) Sulphur

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each

11. (a) Write an account of Relative – Age dating method. (CO1, K4)

Or

(b) Distinguish between convergent and divergent plate boundaries with example. (CO1, K4)

12. (a) Discuss in detail positive volcanic features with an example. (CO2, K5)

Or

(b) Describe Marine transgression and regression. (CO2, K4)

13. (a) Explain principles of geomorphology. (CO3, K4)

Or

(b) What are the tectonic landforms? Discuss and its impact over environment. (CO3, K5)

14. (a) Classify the different drainage pattern with sketch. (CO4, K4)

Or

(b) Discuss about river migration and it impact over environment. (CO4 K5)

15. (a) How the sand dunes developed in arid region? (CO5, K4)

Or

(b) Write about Geomorphic features of Tamilnadu. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each

16. (a) Discuss palaeo – magnesium and continental drift. (CO1, K5)

Or

(b) Describe Island arc systems. (CO1, K5)

17. (a) Discuss Mountain building activity. (CO2, K4)

Or

(b) Write an account of volcanoes, types, resources and hazards. (CO2, K5)

18. (a) What are the weathering process write in detail with sketches. (CO3, K4)

Or

(b) Explain Denudational landforms and it geomorphic process. (CO3, K5)

19. (a) Brief about life cycle of River system with an illustrations. (CO4, K4)

Or

(b) Write note on Coastal zone process and its development of landforms. (CO4, K5)

20. (a) What are the groundwater induced landforms developed and its types. (CO5, K5)

Or

(b) Describe the major Geomorphic units of India. (CO5, K4)

R1920

Sub. Code
464102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Applied Geology

ADVANCED CRYSTALLOGRAPHY AND MINERALOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. A crystal form exhibit one face only is called (CO1, K2)

   (a) prism (b) pinnacoid

   (c) pedion (d) dome

2. In the following crystal systems which one has all closed forms. (CO1, K2)

   (a) monoclinic (b) triclinic

   (c) cubic (d) trigonal

3. Sea hourse twin is the characteristics of (CO2, K3)

   (a) calcite (b) staurolite

   (c) aragonite (d) flourite

4. The R.I. of the canada balsam is (CO2, K1)

   (a) 1:486 (b) 1.540

   (c) 1.560 (d) 1.650

5. Tourmaline shows pleochroism due to the phenomenon of (CO3, K2)

(a) Refraction (b) Reflection

(c) Dispertion (d) Absorption

6. An example six membered ring structure of the following is (CO4, K3)

(a) Tourmaline (b) Albite

(c) Axinite (d) Beryl

7. The occurance of "play of clour" due to (CO3, K3)

(a) Low dispersion (b) Low interference

(c) High dispersion (d) High interference

8. Specific gravity of mineral olivine is (CO4, K3)

(a) 3.2 – 4.3 (b) 3.5 – 4.8

(c) 4.2 – 4.9 (d) 2.2 – 2.8

9. Chemical composition of mineral enstaite is (CO5, K1)

(a) $Mg\ SiO_3$ (b) $Mg - FeSiO_2$

(c) $Fe - MgSiO_3$ (d) $FeSiO_3$

10. The simplest form of all the crystallographic projection is (CO5, K2)

(a) Gnomonic projection

(b) Stereographic projection

(c) Spherical projection

(d) Orthographic projection

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Explain law of interfacial angle. (CO1, K4)

Or

(b) Write note on Gnomonic projection. (CO1, K5)

12. (a) Write short note on thermal analytical techniques and its importance. (CO2, K5)

Or

(b) Braggs law and powder method explain. (CO2, K4)

13. (a) What are the optical properties of minerals under polarization? (CO3, K5)

Or

(b) Explain Becke line method. (CO3, K4)

14. (a) Distinguish between metalic and non metalic minerals. (CO4, K4)

Or

(b) Discuss the physical properties of silicate minerals. (CO4, K5)

15. (a) Explain in detail Feldspan group of mineral. (CO5, K4)

Or

(b) Describe Clay minerals. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Write about crystal systems and symmetry classes. (CO1, K5)

Or

(b) Describe sterographic projection with neat sketches. (CO1, K4)

17. (a) Write an account of twining and zoning. (CO2, K5)

Or

(b) Explain the electron microscope and its mineral logical application. (CO2, K4)

18. (a) Discuss in detail optical accessories and its uses. (CO3, K4)

Or

(b) How do you determine sign of elongation and distinguish between the uniaxial and biaxial applications. (CO3, K5)

19. (a) Write note on olivine group and its physical and chemical properties. (CO4, K5)

Or

(b) Discuss about Aluminosilicates and its economic importance. (CO4, K5)

20. (a) Describe the mica group of minerals and its properties. (CO5, K5)

Or

(b) Write note on non-silicate group and its properties. (CO5, K5)

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R1921	Sub. Code
	464103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Applied Geology

STRATIGRAPHY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which stratigraphic method primarily focuses on the study of rock layers and formations? (CO1, K2)

   (a) Lithostratigraphy

   (b) Biostratigraphy

   (c) Chronostratigraphy

   (d) Magnetostratigraphy

2. What is the primary purpose of the Modern Stratigraphic Code? (CO1, K2)

   (a) Establishing geological scales

   (b) Standardizing time nomenclature stratigraphy

   (c) Analyzing a genetic properties of rocks

   (d) Studying the chemical composition of fossils in stratigraphy

3. Which of the following series belongs to the Precambrian formations in India? (CO2, K1)

(a) Vindhyan

(b) Dharwar

(c) Cuddapah

(d) Salt Range

4. In the context of Indian geology, which system is associated with the Cambrian period? (CO2, K1)

(a) Vindhyan system

(b) Delhi system

(c) Salt range system

(d) Aravalli system

5. Which geological formation in India is associated with the Triassic period? (CO3, K3)

(a) Siwalik Formations

(b) Deccan Traps

(c) Triassic of Spiti

(d) Jurassic of Kutch

6. What is a significant geological feature associated with the Cretaceous deposits of Trichinopoly? (CO3, K3)

(a) Tertiary Deposits

(b) Deccan Traps

(c) Siwalik formations

(d) Quaternary deposits

7. What is the approximate age of the Deccan Traps? (CO4, K1)

(a) Jurassic (b) Cretaceous

(c) Paleogene (d) Neogene

8. What is the primary geological structure associated with the Gondwana Basin? (CO4, K1)

(a) Deccan Traps

(b) Gondwana super group

(c) Himalayan Orogeny

(d) Glacial Deposits

9. Primary focus of lithostratigraphy (CO5, K2)

(a) Studying fossils

(b) Correlating evolutionary trends

(c) Analysing rock layers

(d) Investigating sequence stratigraphy

10. Which stratigraphic approach involves the classification of organisms and their use in correlation? (CO5, K1)

(a) Lithostratigraphy

(b) Biostratigraphy

(c) Chronostratigraphy

(d) Sequence stratigraphy

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) Explain the Principles of Stratigraphy and Discuss the Significance of Lithostratigraphy in Geological Studies. (CO1, K2)

Or

(b) Compare and Contrast Biostratigraphy and Chronostratigraphy in the Context of Stratigraphic Analysis. How Do These Approaches Contribute to Understanding Geological Time? (CO1, K3)

12. (a) Outline the Stratigraphy of the Cambrian Period in the Salt Range of India. (CO2, K4)

Or

(b) Relate the Proterozoic Period in India and how Do These Formations Provide Insights into Earth's History and Ancient Environments? (CO2, K5)

13. (a) Express the Formation and Geological Impact of the Deccan Traps in India. (CO3, K6)

Or

(b) Classify and Compare the Siwalik Formations with Tertiary and Quaternary Deposits In India. (CO3, K5)

14. (a) Explain the Distribution, Succession and Classification of the Gondwana Super Group. (CO4, K4)

Or

(b) Describe the Himalayan Orogeny, Focusing on its Geological Significance and Implications for the Indian Subcontinent. (CO4, K4)

15. (a) Explain the Geological Time Units and Lithostratigraphic Units in the Context of Lithostratigraphy. (CO5, K3)

Or

(b) Discussing its role in Determining Geological time Periods. Provide Examples of Lithostratigraphic Units and their Significance in Stratigraphic Analysis. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Outline the Key Concepts of Magnetostratigraphy and Chemostratigraphy. How Do These Stratigraphic Methods Help in Unraveling Earths History and Environmental Changes? (CO1, K3)

Or

(b) Relate the Modern Stratigraphic Code and Nomenclature to the Principles of Stratigraphy. Discuss the Importance of a Standardized System in Geological Sciences. (CO1, K5)

17. (a) Explain the Geological Evolution of India during the Precambrian Era, Focusing on the Dharwar and Bundelkhand Series. How Have These Formations Contributed to India's Geological Heritage? (CO2, K4)

Or

(b) Express the Geological Features of the Delhi System in India. Classify and Compare the Precambrian and Proterozoic. (CO2, K4)

18. (a) Explain the Geological Significance of the Triassic Deposits in Spiti, Emphasizing the Key Features and Fossil Assemblages. (CO3, K5)

Or

(b) Relate the Jurassic Deposits of Kutch and Compare them with the Cretaceous Deposits of Trichinopoly. (CO3, K3)

19. (a) Outline the Structure of the Gondwana Basin, Highlighting its Significance in the Context of Paleogeography and Climate. How Did the Gondwana Super Group Contribute to the Geological Evolution of the Indian Subcontinent? (CO4, K3)

Or

(b) Relate the Formation and Age of the Deccan traps, along with Associated Sedimentary Formations. Discuss the Geological Processes that Led to the Development of Deccan Traps and their Impact on the Surrounding Landscape. (CO4, K3)

20. (a) Relate Fossils and Stratigraphy in the Realm of Biostratigraphy. Classify Different Types of Organisms Used in Biostratigraphy and Explore Evolutionary Trends. (CO5, K3)

Or

(b) Express the Principles and Units of Sequence Stratigraphy. Compare Sequence Stratigraphy with Traditional Lithostratigraphy, Highlighting the Methods and Applications of Sequence Stratigraphy in Geological Studies. (CO5, K4)

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R1922	Sub. Code
	464104

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Applied Geology

PALAEONTOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following rocks is often associated with pillow lava? Identify it. (CO1, K1)

   (a) Radiolarian chert (b) Fossiliferous limestone

   (c) Andesite Basalt (d) Ignimbrite

2. The correct order of cyclic sedimentation in Gondwana is (CO2, K2)

   (a) Coal, Sandstone and Shale

   (b) Shale, Coal and Ironstone

   (c) Sandstone, Shale and Coal

   (d) Shale, Sandstone and coal

3. Trilobites extinct at (CO2, K1)

   (a) End of Cretaceous (b) End of Permian

   (c) End of Jurassic (d) Middle Permian

4. If the organism possesses the ability to swim, it is referred to as (CO2, K2)

(a) Planktonic (b) Benthonic

(c) Sessile (d) Nektonic

5. The geological age of Olenellus (CO2, K1)

(a) Middle Cambrian (b) Upper Cambrian

(c) Lower Cambrian (d) Middle Jurassic

6. Conodonts are composed of (CO3, K1)

(a) Calcareous (b) Siliceous

(c) Phosphatic (d) Sulphates

7. The genus Globotruncana is a marker fauna of (CO2, K2)

(a) Jurassic (b) Silurian

(c) Cretaceous (d) Miocene

8. The dinosaurs dominated the _____ period (CO1, K1)

(a) Precambrian (b) Palaeozoic

(c) Mesozoic (d) Cenozoic

9. The most common fossils in the rocks of the last 500 million years are (CO2, K2)

(a) Vertebrate bones

(b) Vertebrate teeth

(c) Invertebrate shells

(d) Leaves

10. Palynology is the study of (CO3, K3)

(a) Pollen and Spores (b) Microfossils

(c) Trace fossils (d) Porifera

Part B

$(5 \times 5 = 25)$

Answer **all** the questions not more than 500 words each.

11. (a) Classify the deep sea vent theory. (CO2, K2)

Or

(b) Write a brief note on mass extinction. (CO2, K2)

12. (a) Express a short account on the Tertiary flora of the India. (CO2, K2)

Or

(b) Interpret in detail the Bird-Archaeopteryx. (CO2, K2)

13. (a) Compare the controls and causes on the eustatic sea level rise. (CO3, K3)

Or

(b) Evaluate the environmental significance of microfossils. (CO3, K3)

14. (a) Write a note on ostracods and their morphological characters. (CO3, K4)

Or

(b) Examine the methods used in the collection and separation of microfossils from unconsolidated rocks. (CO3, K3)

15. (a) Illustrate the morphological characteristics of conodonts. (CO4, K5)

Or

(b) Outline the geological distribution and habitat of Bryozoa. (CO2, K4)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Define biostratigraphy and how it is used to determine absolute age. (CO1, K4)

Or

(b) Explain why more fossils are found in marine organisms than in land organisms. (CO1, K4)

17. (a) Elaborate on the evolution and distribution of elephants. (CO2, K4)

Or

(b) Illustrate the taxonomy, morphology, age and distribution of Trilobites. (CO2, K4)

18. (a) Describe the paleocurrent analysis to identify the paleoclimate condition. (CO3, K5)

Or

(b) Write an essay on the paleo-monsoonal pattern of the Indian subcontinent. (CO3, K4)

19. (a) Describe the morphology, classification, geological history and Paleoecology of Foraminifera. (CO5, K4)

Or

(b) Discuss the morphology, classification, and geological history of Bryozoa in detail. (CO4, K4)

20. (a) Write a detailed account of the morphology and age of Radiolaria and their significant role in paleontological studies. (CO3, K3)

Or

(b) Outline the morphology, distribution and evolutionary history of Pteropods. (CO3, K4)

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R1923	Sub. Code
	464501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Applied Geology

Elective – NATURAL HAZARDS AND MANAGEMENT

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following is not a part of disaster management cycle. (CO1, K2)

   (a) Mitigation (b) Preparedness

   (c) Response (d) Rehabitation

2. Which cause forest fire in nature among the following. (CO1, K2)

   (a) Hunting (b) Electric spark

   (c) Lightening (d) Industrial development

3. Which one of the satellite for weather forecasting? (CO2, K2)

   (a) INSAT (b) RISAT

   (c) LANDSAT (d) CAROSAT

4. The international Tsunami information centre is located in (CO2, K3)

   (a) Goa, India (b) Tokya, Japan

   (c) Indoneisa (d) Honoluu, Hawai

5. The most harmful element for the ozone layer is (CO3, K3)

(a) N_2O (b) CFC

(c) CO_2 (d) CH_4

6. Ozone depletion has bean observed maximum in the (CO3, K2)

(a) The equator (b) North pole

(c) South pole (d) Tropic cancer

7. The structure which protects the shore line ostructing of littoral current is (CO4, K3)

(a) Groynes (b) Seawalls

(c) Boulders (d) Revertments

8. NDMA (National Disaster Management Authority) is headed by (CO4, K2)

(a) President

(b) Prime Minister

(c) Minister for Environment

(d) Home Minister

9. UNDEP stands for (CO5, K3)

(a) United Nations Educational Programme

(b) United Nations Environment Programme

(c) United Nations Earthscience Programme

(d) United Nations Eco-Protection Programme

10. Bhopal Gas tragedy was happened in (CO5, K3)

(a) 1981 (b) 1982

(c) 1983 (d) 1984

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Define natural disasters. (CO1, K3)

Or

(b) Explain in detail about the drought and its consequences. (CO1, K4)

12. (a) What are the uses of weather forecasting satellites? (CO2, K3)

Or

(b) Write an account of historical flood data and its utilization. (CO2, K3)

13. (a) What are the major water pollutants and explain? (CO3, K4)

Or

(b) Discuss about global warming and climate change. (CO3, K4)

14. (a) Describe the sea walls and grains and its applications. (CO4, K3)

Or

(b) Discuss about coastal zone regulations. (CO4, K3)

15. (a) Write note on mitigation of soil erosion prone areas in Tamil Nadu. (CO5, K4)

Or

(b) Discuss types forest fire and its impact over the surface features. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Describe different types of landslides and it mitigation measures. (CO1, K3)

Or

(b) Discuss in detail about chemical disasters and its impact over. (CO1, K4)

17. (a) Role of remote sensing and GIS technology for disaster management. (CO2, K3)

Or

(b) Write an account of uses of Thermal data and how to moniter the forest fire monitering. (CO2, K4)

18. (a) Discuss disaster mitigation cycle and Indian scenario. (CO3, K4)

Or

(b) Write an account of seismic belt and India's Seismic risk zones. (CO3, K4)

19. (a) Write an account of Land-ocean interaction. Explain. (CO4, K3)

Or

(b) What are the Bio shields and its impact over cost? (CO4, K4)

20. (a) Role of UNDP for Disaster Management? (CO5, K3)

Or

(b) Role of NIDM for prevention and mitigation for management policies. (CO5, K4)

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R1924

Sub. Code
464301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Applied Geology

GEOPHYSICS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following questions by choosing the correct option.

1. The inner core is most likely composed of : (CO1, K2)

   (a) Silicon (b) Oxygen

   (c) Sulfur (d) Iron

2. The boundary that separates the crust from the mantle is called : (CO1, K2)

   (a) The crust-mantle boundary

   (b) The lithosphere

   (c) The motto

   (d) All of these

3. The S-wave shadow zone is evidence that (CO2, K1)

   (a) The outer core is liquid

   (b) The outer core is composed of iron and nickel oxides

   (c) The inner core is solid

   (d) It is very hot near the core

4. With increasing travel time, the difference in arrival times between the P and the S waves (CO2, K1)

(a) Increases (b) Decreases

(c) Stays constant (d) None of the above

5. Who developed the procedure used to measure the size of an earthquake? (CO1, K2)

(a) Charles Richter (b) Edward Sheridan

(c) James Hutton (d) Art Smith

6. How long does it take a P-wave to travel through the Earth? (CO2, K1)

(a) 1 minute (b) 5 minutes

(c) 10 minutes (d) 20 minutes

7. Which of the following is a hard magnetic material? (CO1, K2)

(a) Nickel iron alloy (b) Iron silicon alloy

(c) Iron (d) Ferrite

8. At the magnetic equator, the inclination of the total magnetic field is (CO2, K1)

(a) 90 Degree (b) 60 Degree

(c) 45 Degree (d) 0 Degree

9. Radioactive substances do not emit (CO1, K2)

(a) Electron (b) Helium nucleus

(c) Positron (d) Proton

10. The half-life of a radioactive element depends on (CO1, K1)

(a) Amount of element present

(b) Temperature

(c) Pressure

(d) Nature of element

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Explain the geological and geophysical investigations. (CO3, K2)

Or

(b) Write a short note on the field procedures carried out using the self-potential method. (CO2, K2)

12. (a) Write a short note on the earth's gravitational field. (CO3, K3)

Or

(b) Explain the density variation in the interior of the earth. (CO3, K4)

13. (a) Discuss the seismic waves and their type. (CO3, K3)

Or

(b) Discuss the seismic reflection methods for oil exploration. (CO3, K4)

14. (a) Write a note on magnetic anomalies. (CO3, K3)

Or

(b) How paleomagnetism helps to interpret the normal and reverse polarities? (CO3, K4)

15. (a) Write a short note on ionizing radiation. (CO3, K2)

Or

(b) Make a short note on radioactive decay and measure radioactive materials. (CO3, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Write an essay on the resistivity methods and field procedures. (CO3, K3)

Or

(b) Explain the application of electrical methods in mineral and petroleum exploration. (CO2, K3)

17. (a) What are the principles followed in gravity surveys and measurements? (CO3, K4)

Or

(b) Elaborate on the gravitational effects on subsurface bodies of the different shapes. (CO3, K3)

18. (a) Explain in detail the instruments and field procedures used in the seismic refraction method. (CO3, K4)

Or

(b) Narrate the sonic logging-time and depth sections. (CO3, K3)

19. (a) Write an essay on the magnetic susceptibility of rocks and the effects of simple shapes. (CO2, K3)

Or

(b) Distinguish the characteristics of magnetic surveys on land and in the ocean. (CO2, K3)

20. (a) Write a detailed account of the field procedures and interpretations employed in the radioactive survey. (CO3, K3)

Or

(b) Describe in detail the radiometric contamination of the environment. (CO3, K3)

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R1925

Sub. Code
464302

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Applied Geology

REMOTE SENSING AND GIS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Identify the correct statement about photographic scale (CO2, K2)

   (a) Photographic scale is independent of altitude during aerial photography

   (b) Photographic scale directly influences the accuracy of mapping measurements

   (c) Photographic is scale is solely determined by the camera type

   (d) Photographic scale has no impact on the distortion of aerial photos

2. Determine a key factor in selecting an appropriate stereoscope for aerial photo interpretation. (CO1, K1)

   (a) Weight and size of the stereoscope

   (b) Brand popularity

   (c) Availability of color options for lenses

   (d) Weather conditions during aerial photography

3. How does the atmospheric window impact remote sensing? (CO1, K1)

(a) It enhances data resolution

(b) It has no effect on remote sensing

(c) It allows certain wavelengths to reach Earths surface

(d) It absorbs all electromagnetic radiation

4. Which of the following objects has a distinct spectral signature used for identification in remote sensing? (CO2, K2)

(a) Transparent glass (b) White paper

(c) Soil (d) Plastic bag

5. In image classification, what is the main difference between supervised and unsupervised methods? (CO2, K2)

(a) Supervised uses prelabeled training data, while unsupervised does not

(b) Unsupervised requires manual intervention, while supervised is automated

(c) Both methods rely on the same classification algorithm

(d) Supervised is only applicable to high resolution images

6. Which satellite series is known for its contributions to Earth observation and monitoring, especially for environmental applications? (CO1, K1)

(a) LANDSAT (b) SPOT

(c) IRS (d) IKONOS

7. When might manual data entry be preferred over automated methods in GIS? (CO1, K1)

(a) For high speed processing

(b) For large scale data

(c) For maintaining data accuracy

(d) For rapid data conversion

8. Which data structure is more suitable for representing continuous spatial phenomena, such as temperature distribution? (CO2, K2)

(a) Point (b) Line

(c) Polygon (d) Raster

9. How does slope analysis contribute to geospatial data interpretation using DEMs? (CO1, K1)

(a) Identifying transportation routes

(b) Analyzing elevation changes

(c) Assessing vegetation density

(d) Measuring atmospheric conditions

10. What does RTK stand for in the context of GPS navigation? (CO1, K1)

(a) Real Time Kinematic

(b) Remote Tracking System

(c) Rapid Terrain Kinetics

(d) Robust Tracking Kit

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Evaluate the critical elements involved in flight planning for aerial photography. (CO3, K3)

Or

(b) Interpret the principles of stereoscopy and its relevance in photogrammetric data acquisition. (CO4, K4)

12. (a) Assess the Importance of Electromagnetic Radiation and Spectrum in Remote Sensing : Explain the role of electromagnetic radiation and spectrum in remote sensing. (CO3, K3)

Or

(b) Compare the Spectral Signatures of Soil, Rock. Water, and Vegetation in Remote Sensing : Analyze and compare the spectral signatures of different Earth objects such as soil, rock water and vegetation. (CO4, K4)

13. (a) Evaluate how the use of satellites enhances our ability to gather information about Earths surface. Consider different satellite platforms and their contributions to data acquisition. (CO3, K3)

Or

(b) Evaluate the importance of spectral, spatial, temporal and radiometric resolution in satellite remote sensing. (CO4, K4)

14. (a) Provide a comprehensive explanation of the components of Geographic Information Systems (GIS) and the fundamental data structures-point, line and polygon. (CO2, K2)

Or

(b) Evaluate the importance of raster and vector data structures in GIS. (CO4, K4)

15. (a) Provide a detailed explanation of the components and sources of error in Global Positioning System (GPS) observations. (CO2, K3)

Or

(b) Justine the application and usefulness of Real Time Kinematic (RTK) Navigation Systems in GPS mapping. (CO6, K6)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 word each.

16. (a) Assess the key properties of aerial photographs, including resolution, scale and distortion. (CO4, K4)

Or

(b) Explain the Role of Interpretation Keys and Elements in Remote Sensing: Describe the interpretation keys and elements used in remote sensing. (CO2, K2)

17. (a) Explain the significance of the electromagnetic radiation spectrum. (CO2, K2)

Or

(b) Interpret the spectral signatures of soil, rock water, and vegetation in remote sensing imagery?(CO4, K4)

18. (a) Compare and contrast the scanning and orbiting mechanics employed in satellite data acquisition. (CO4, K4)

Or

(b) Interpret the historical development and progress of remote sensing in India. (CO4, K4)

19. (a) Interpret the process of data conversion in GIS, including both vector to raster and raster to vector conversions. Explain the reasons for converting data between these structures and the impact of such conversions on GIS analysis. (CO4, K4)

Or

(b) Prioritize and compare different types data entry methods in GIS. Discuss the advantages and disadvantages of manual and automated data entry approaches and justify the selection of a particular method based on specific application requirements. (CO6, K6)

20. (a) Assess and explain the various applications of Digital Terrain Models (DTM) in geospatial data analysis. (CO4, K4)

Or

(b) Compare and contrast the visualization techniques of DEMs, such as contour maps and shaded relief maps. Determine how these methods aid in the interpretation of elevation data and their effectiveness in conveying spatial information. (CO4, K4)

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R1926	Sub. Code
	464303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Applied Geology

HYDROGEOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Hardness in water is typically Caused by the presence of : (CO2, K2)
   (a) Total dissolved solids (TDS)
   (b) Carbonate and bicarbonate
   (c) Calcium and magnesium ions
   (d) Phosphate

2. Water is present in the form of water within the lithosphere : (CO2, K2)
   (a) Liquid state only
   (b) Solid state only
   (c) Vapours state only
   (d) Both liquid and solid state

3. The permeability of a material is a measure of (CO1, K1)
   (a) Voids available in the material
   (b) Voids and solid particles are available in the material
   (c) Its capacity to retain water in the material
   (d) Its capacity to transmit water through interstices

4. The zone, which is found below the water table, is known as (CO2, K2)

(a) Zone of aeration (b) Zone of saturation
(c) Capillary zone (d) Vadose zone

5. Which one is known as fossil water? (CO1, K1)

(a) Juvenile water (b) Cosmic water
(c) Plutonic water (d) Meteoric water

6. Stalactites and stalagmites found in caves are composed of (CO2, K2)

(a) Calcite (b) Alkali Feldspar
(c) Silica (d) Quartz

7. Which one of the following features is shown in the sign of Karst? (CO2, K2)

(a) Sinkholes
(b) Speleothems
(c) Cones of depression
(d) Artesian wells

8. The water that has infiltrated into the earth is known as (CO1, K1)

(a) Surface water (b) Groundwater
(c) Run off Water (d) Stream

9. Influent streams are : (CO2, K2)

(a) More common in arid regions
(b) More common in humid regions
(c) Only found in areas of permafrost
(d) Sinkhole

10. Excessive pumping in relation to recharge can cause _____ (CO2, K2)

(a) The water table to decline
(b) Cone of depression
(c) The well to go dry
(d) All of these

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Explain the principles and objectives of hydrogeology. (CO3, K3)

Or

(b) Give a short note on permeability. (CO3, K4)

12. (a) Briefly explain the flooding. (CO3, K3)

Or

(b) Write about the prevention and control of seawater intrusion. (CO3, K3)

13. (a) Explain the necessity of the pumping test. (CO2, K2)

Or

(b) Discuss the objectives of the pumping test and its methods. (CO3, K3)

14. (a) Give a short note on springs and seepages. (CO3, K2)

Or

(b) Explain the drilling techniques and well construction. (CO3, K3)

15. (a) Write a note on water pollution. (CO2, K2)

Or

(b) Write a short note on the trace element's presence in groundwater. (CO3, K4)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Write a detailed account of the aquifer types with suitable examples. (CO3, K4)

Or

(b) Distinguish the characteristics of porosity, permeability and specific retention. (CO2, K3)

17. (a) Elaborate on the groundwater recharge methods. (CO3, K4)

Or

(b) Describe in detail the characteristics of seawater intrusion into the coastal basin and islands. (CO3, K4)

18. (a) Write an essay on the methodology and the necessity of the pumping test. (CO2, K2)

Or

(b) Describe the pump test in flowing wells using Theims, Jacob's and Chow's methods. (CO3, K4)

19. (a) Elaborate on the Wenner and Schlumberger methods for the identification of groundwater. (CO3, K3)

Or

(b) Discuss the depth-sounding curving cumulative curving and inverse slope methods of interpretation. (CO3, K4)

20. (a) Write an essay on the types of water pollution and controlling methods. (CO3, K4)

Or

(b) Write a detailed account of the ground water quality. (CO2, K3)

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R1927

Sub. Code
464304

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Applied Geology

GEOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. How does geochemical mobility of ions contribute to the geochemical cycle? (CO1, K1)
   (a) It accelerates weathering processes
   (b) It hinders sedimentation
   (c) It facilitates volcanic eruptions
   (d) It slows down erosion

2. Which Earth sphere is primarily associated with the biosphere in terms of geochemical composition? (CO2, K2)
   (a) Lithosphere (b) Hydrosphere
   (c) Atmosphere (d) Geosphere

3. Interpret the impact of water in magmas on the geochemical characteristics of volcanic rocks. (CO2, K2)
   (a) It increases viscosity
   (b) It enhances mineral stability
   (c) It decreases melting temperatures
   (d) It accelerates magma solidification

4. Explain the significance of geochemical keys and pathfinder elements in mineral exploration. (CO2, K2)

(a) They are indicators of specific mineral deposits

(b) They contribute to mineral stability

(c) They control magma composition

(d) They determine the melting point of rocks

5. Explain the concept of first order decay and growth equation in isotope geochemistry. (CO1, K1)

(a) It describes the exponential decrease or increase in isotope abundance over time

(b) It determines the absolute age of rocks

(c) It measures the fractionation of isotopes in minerals

(d) It calculates the decay time of isotopes

6. Select the isotopic systematics commonly used for dating ancient minerals in Earth's crust. (CO1, K1)

(a) Carbon isotopes

(b) Oxygen isotopes

(c) Uranium Thorium Lead

(d) Sulphur isotopes

7. Select the term that refers to an abnormal concentration of elements indicative of potential mineralization. (CO1, K1)

(a) Primary dispersion

(b) Background values

(c) Geochemical anomaly

(d) Secondary dispersion

8. Which type of dispersion pattern is associated with the original concentration of elements in the bedrock? (CO2, K2)

(a) Primary dispersion

(b) Secondary dispersion

(c) Geochemical anomaly

(d) Background values

9. Choose the geochemical parameter commonly measured using instrumentation in environmental analysis. (CO2, K2)

(a) Species diversity (b) Air pressure

(c) pH level (d) Wind speed

10. Select the correct environmental compartment covered in a hydrogeochemical survey. (CO2, K2)

(a) Atmosphere

(b) Marine environment

(c) Fluvial environment

(d) Groundwater

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Assess the geochemical structure and composition of the Earth, emphasizing the key elements and compounds that contribute to its makeup. (CO3, K3)

Or

(b) Interpret the distribution patterns of elements within the geosphere, highlighting factors influencing their presence and concentrations. (CO4, K4)

12. (a) Interpret the factors influencing mineral stability and discuss the compositional changes that minerals undergo in response to various geological processes. (CO2, K2)

Or

(b) Assess the geochemical characteristics of different water bodies, including river water, seawater, seafloor hydrothermal systems, groundwater, and lakes. (CO4, K4)

13. (a) Compare the processes of radioactive decay and determine the decay time of isotopes. Discuss the significance of these processes in understanding geological time scales. (CO4, K4)

Or

(b) Explain the systematics of the Potassium Argon and Uranium Thorium lead isotopic systems. (CO4, K4)

14. (a) Compare and evaluate the primary and secondary dispersion patterns in ecological systems. (CO4, K4)

Or

(b) Interpret the concepts of primary and secondary dispersion patterns in exploration geochemistry. Discuss how these patterns contribute to the understanding of mineral deposits and exploration strategies. (CO4, K4)

15. (a) Assess the influence of environmental geochemistry on both the atmosphere and aquatic environments, including marine, fluvial, lacustrine, and aerosol components. (CO3, K3)

Or

(b) Explain the importance and applications of lithogeochemical, hydrogeochemical, and biogeochemical surveys in understanding environmental geochemistry. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 word each.

16. (a) Compare the geochemical affinity of elements and their classification within the Earths composition. (CO3, K3)

Or

(b) Interpret the geochemistry of the geosphere, lithosphere, hydrosphere, biosphere, and atmosphere. (CO4, K4)

17. (a) Interpret the characteristics of magma and discuss the process of melting in rocks. Explore the geochemical implications of magma composition and its relationship to rock melting. (CO2, K2)

Or

(b) Assess the distribution patterns of trace components between rocks and melts. Explain how geochemical processes influence the partitioning of these trace elements. (CO2, K2)

18. (a) Assess the concept of isotope fractionation and examine the processes of isotope exchange between minerals and water. (CO4, K4)

Or

(b) Interpret the applications of carbon, oxygen, and sulfur isotopes in geochemistry. (CO4, K4)

19. (a) Discuss the characteristics of geochemical anomalies and the importance of geochemical sampling in identifying anomalies. (CO3, K3)

Or

(b) Assess the principles and techniques involved in designing and implementing geochemical exploration surveys. (CO3, K3)

20. (a) Compare the geochemical characteristics of marine, fluvial, lacustrine, and aerosol environments. (CO4, K4)

Or

(b) Prioritize and discuss the applications of geochemical instrumentation in environmental analysis. (CO3, K3)

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R1928	Sub. Code
	464503

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Applied Geology

Elective — PETROLEUM GEOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following theories addresses the origin of oil and gas by emphasizing the transformation of organic matter over geological time? (CO2, K2)

   (a) Inorganic theory

   (b) Organic theory

   (c) Stratigraphic theory

   (d) Combination theory

2. Choose the correct statement regarding reservoir rocks: (CO2, K1)

   (a) Porosity and permeability are inversely related

   (b) Porosity refers to the ability of a rock to transmit fluids

   (c) Permeability is a measure of the space within the rock that can hold fluids

   (d) Reservoir rocks have low porosity and high permeability

3. Select the correct statement regarding reservoir pressure measurement: (CO2, K1)

   (a) Reservoir pressure is always constant throughout the life of a reservoir

   (b) Reservoir pressure measurement is not crucial for hydrocarbon recovery

   (c) Reservoir pressure is typically measured using bottomhole pressure gauges

   (d) Reservoir pressure measurements are irrelevant for reservoir management

4. Choose the accurate statement about geothermal gradients: (CO2, K2)

   (a) Geothermal gradients are not influenced by the composition of subsurface rocks

   (b) Measurement of geothermal gradients is mainly performed at the surface

   (c) Geothermal gradients provide information about temperature variations with depth

   (d) Geothermal gradients have no impact on reservoir recovery techniques

5. Select the correct statement about VSP (Vertical Seismic Profile) data acquisition: (CO2, K2)

   (a) VSP is a method used in surface level seismic exploration

   (b) VSP provides information only about horizontal subsurface structures

   (c) VSP involves placing seismic sensors at the surface to record reflections

   (d) VSP involves placing seismic sensors in a wellbore to record reflections

6. Choose the accurate statement regarding Gravity and Magnetic exploration methods: (CO2, K2)

(a) Gravity and Magnetic methods are primarily used for surface level exploration only

(b) Magnetic exploration is more effective than Gravity exploration in identifying subsurface structures

(c) Both Gravity and Magnetic methods rely on the measurement of subsurface pressure variations

(d) Gravity and Magnetic methods provide information about subsurface density and magnetic properties

7. Choose the accurate statement regarding geochemical methods for source rock characterization: (CO1, K1)

(a) Geochemical methods cannot provide information about source rock composition

(b) Geochemical methods involve the use of light to characterize source rocks

(c) Geochemical methods analyze the chemical composition of rocks to understand their potential for hydrocarbon generation

(d) Optical methods are more effective than geochemical methods in assessing source rock maturation

8. Select the correct statement about the carbon cycle: (CO1, K1)

(a) The carbon cycle is not influenced by human activities

(b) Human activities have no impact on hydrocarbon reservoirs

(c) The carbon cycle involves the movement of carbon only within living organisms

(d) Human activities can alter the carbon cycle and impact hydrocarbon reservoirs

9. Choose the correct statement regarding the monitoring of drilling wells: (CO1, K1)

(a) Monitoring of drilling wells is unnecessary for drilling operations

(b) Monitoring involves only the measurement of drilling speed

(c) Monitoring includes the assessment of various parameters to ensure safe and efficient drilling

(d) Monitoring is only applicable during the initial phase of drilling

10. Select the accurate statement about exploration policy and project management of oil wells: (CO2, K2)

(a) Exploration policy has no impact on project management

(b) Project management is not relevant to the exploration phase of oil wells

(c) Exploration policy outlines the technical details of drilling operations

(d) Project management involves planning, executing, and closing drilling projects in a systematic manner

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Evaluate the role of structural, stratigraphic, and combination traps in trapping hydrocarbons. Provide examples and discuss the geological conditions that lead to the formation of each type of trap. (CO2, K2)

Or

(b) Explain the concept of Geo Technical Order (GTO) and its significance in the exploration and extraction of oil and gas. How does GTO contribute to the understanding of petroleum basins in India? (CO2, K2)

12. (a) Explain the methods used to measure reservoir pressure and assess their significance in the context of hydrocarbon reservoirs. (CO1, K1)

Or

(b) Evaluate the importance of geothermal gradients and the various techniques employed to measure them. How do geothermal gradients provide insights into subsurface conditions and influence reservoir behavior? (CO2, K2)

13. (a) Explain the principles and applications of seismic refraction and reflection methods in geophysical exploration. (CO3, K3)

Or

(b) Interpret the steps involved in the processing of seismic data. Evaluate the significance of data processing in enhancing the quality and interpretability of seismic images for geological exploration. (CO4, K4)

14. (a) Explain the carbon cycle and its role in the generation of hydrocarbons. Evaluate how human activities impact the carbon cycle and influence hydrocarbon reservoirs. (CO2, K2)

Or

(b) Interpret the origin, composition, and structure of organic matter in the context of hydrocarbon formation. Assess the factors influencing the accumulation of organic matter and its subsequent conversion into hydrocarbons. (CO2, K2)

15. (a) Evaluate the geological techniques employed at well sites and their significance in the exploration and extraction of oil. Explain how well site geological data contributes to decision making during drilling operations. (CO2, K2)

Or

(b) Explain the different drilling methods used in the oil industry and assess their suitability for various geological formations. Compare the advantages and challenges associated with conventional and advanced drilling techniques. (CO3, K3)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Assess the significance of the inorganic and organic theories in understanding the composition and origin of oil and gas. How do these theories contribute to our knowledge of the generation, migration and accumulation processes of hydrocarbons? (CO4, K4)

Or

(b) Compare and contrast the characteristics of reservoir rocks, focusing on porosity and permeability. How do these properties influence the storage and flow of oil and gas in subsurface formations? (CO3, K3)

17. (a) Compare different strategies for the recovery of hydrocarbons from reservoirs, considering both primary and enhanced recovery methods. (CO3, K3)

Or

(b) Interpret the sources of heat energy in the context of reservoirs and discuss their effects on reservoir dynamics. (CO3, K3)

18. (a) Assess the importance of migration in seismic data processing and its role in improving the accuracy of subsurface imaging. (CO5, K5)

Or

(b) Explain the process of seismic interpretation and discuss how geologists derive geological information from seismic data. (CO4, K4)

19. (a) Evaluate the significance of optical and geochemical methods in characterizing source rocks and assessing their maturation. Compare the strengths and limitations of these methods in providing insights into the potential for hydrocarbon generation. (CO3, K3)

Or

(b) Assess the processes involved in the accumulation of organic matter and the generation of hydrocarbons. (CO3, K3)

20. (a) Examine the classification and selection of drilling pits in the context of oil well drilling. Discuss the environmental and operational considerations that influence the choice of drilling pit type and location. (CO2, K2)

Or

(b) Assess the importance of well planning in the successful execution of drilling projects. Evaluate the factors considered in well planning and how they contribute to the efficiency and safety of drilling operations. (CO2, K2)

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