

(6 pages)

Reg. No. :

Code No. : 6225

Sub. Code : PGEM 41

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Fourth Semester

Geology – Core

METAMORPHIC PETROLOGY

(For those who joined in July 2017-2020 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Which is not the operational factors of metamorphism
 - (a) Chemically Active fluids
 - (b) Density
 - (c) Temperature
 - (d) Pressure

2. What is Gibbs phase rule for general system
- (a) $P=C-1-F$ (b) $P = C+ 1-F$
(c) $P+F=C-2$ (d) $P+F=C+2$
3. The zone concept in metamorphism was proposed by _____
- (a) Grubermann and Becke
(b) Barrow
(c) Tilley
(d) Eskola
4. Barrovian metamorphic zones are generally easy to recognize in _____ rocks
- (a) Pelitic
(b) Hornfels
(c) Gneissic
(d) Garnetiferous gneiss
5. Metamorphic facies are defined by
- (a) The condition of temperature and pressure
(b) A single dominant rock type
(c) Peculiar textures and structures of the rock types
(d) Critical mineral assemblages

6. In the triangular ACF diagrams of metamorphic facies, the alphabet "A" represents
- (a) Al_2O_3
 - (b) $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3 - \text{Na}_2\text{O}$
 - (c) $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$
 - (d) $\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3 + \text{Na}_2\text{O} + \text{K}_2\text{O}$
7. Gneissic rocks that are metamorphosed sediments are described as _____.
- (a) Orthogneisses (b) Paragneisses
 - (c) Augen gneisses (d) Phyllonites
8. Metamorphic textures of argillaceous rocks are described as
- (a) Blasto-psephitic (b) Blasto-psammitic
 - (c) Blasto-pelitic (d) Blasto-porphyric
9. Migmatite is an example of _____.
- (a) Strongly foliated rocks
 - (b) Weakly foliated rocks
 - (c) Non foliated rocks
 - (d) None

10. The Eclogite rock chiefly consisting of _____.
- (a) Garnet and Pyroxene
 - (b) Garnet and Mica
 - (c) Olivine and Pyroxene
 - (d) Pyroxene and Mica

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain contact metamorphism.
- Or
- (b) Explain Gibb's phase rule.
12. (a) Explain granulose structure.
- Or
- (b) Write a short note on metamorphic grades.
13. (a) Write a short note on concept of metamorphic facies.
- Or
- (b) Write a short note on granitisation.

14. (a) Give a short note on cataclastic metamorphism

Or

(b) Briefly discuss metamorphism effect on acid igneous rocks.

15. (a) Give a short note on palingenesis.

Or

(b) Briefly explain orogenesis and metamorphism.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Write an essay on metamorphism and metamorphic rocks.

Or

(b) Discuss in detail about agents and kinds of metamorphism.

17. (a) Detailed account on classification of metamorphic rocks.

Or

(b) Explain metamorphic textures with sketch.

18. (a) Explain concept of Eskola metamorphic facies.

Or

(b) Detailed account on metamorphic differentiation.

19. (a) Describe cataclastic metamorphism and their effect on argillaceous rocks.

Or

(b) Describe contact metamorphism and their effect on carbonate rocks.

20. (a) Describe origin of eclogites.

Or

(b) Give an outline about magmatic emplacements and orogenesis.

(6 pages)

Reg. No. :

Code No. : 6572

Sub. Code : ZGEM 11

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Geology – Core

DYNAMIC GEOLOGY AND GEOMORPHOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. _____ are formed when lithosphere plates begin to move towards each other.
(a) Ridges (b) Trenches
(c) Basins (d) Mountains
2. _____ is a large elongated trough of subsidence.
(a) Island Arc (b) Geosyncline
(c) Trench (d) Ridge

3. The temperature for igneous rocks to acquire thermal remnant magnetism is _____
- (a) Melting point (b) Boiling point
(c) Curie temperature (d) Dew point
4. _____ are huge structures that form following voluminous eruptions during which part of a magma chamber drains and the mountain's summit collapses into the vacated space below.
- (a) Dome (b) Calderas
(c) Cinder cones (d) Basalt plateaus
5. The concept of plate tectonics is clearly understood from _____
- (a) Pacific ocean (b) Atlantic ocean
(c) Arctic ocean (d) Indian ocean
6. One of the most important causes for flooding is _____
- (a) Land use in the flood plain
(b) Change in agriculture patterns
(c) Glaciations
(d) Failure of monsoon
7. Deposition of sediments on either side of the river valleys leads to form _____
- (a) Flood plain (b) Alluvial deposits
(c) Natural levees (d) Mud flats

8. A stream channel having sinuosity index > 1.5 is defined as _____
- (a) Straight (b) Meandering
(c) Braided (d) Anastomizing
9. Who postulated the concept of geomorphological cycle of erosion?
- (a) W.M. Davies (b) Wooldridge
(c) Kober (d) Holmes
10. Which one of the following groups of topographical features is the product of erosional process?
- (a) Moraine, Barchan, Pinnacle, Wave-built platform
(b) Cirque, Arete, Playa, Stack
(c) Eskers, Fjords, V-shaped valley, Seifs
(d) Levees, Stalagmites, Monadnocks, Drumlins

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 250 words.

11. (a) Write an essay on Geomagnetism time scale.
- Or
- (b) Write notes on causes and mechanism of plate movement?

12. (a) Explain how island arcs are formed

Or

(b) What are trenches? Explain the types of trenches.

13. (a) What is endogenic and exogenic forces? explain with examples.

Or

(b) Write an account the development of geomorphic concepts.

14. (a) Explain landforms created by volcanism.

Or

(b) Write about landforms formed by groundwater.

15. (a) Give a short note on the Deccan Plateau.

Or

(b) Explain quantitative geomorphology.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain with suitable examples the theory of geomagnetism and its application in geotectonics.

Or

- (b) Describe in detail characteristics, types and causes of motions of lithosphere plates.

17. (a) Give an account on origin and distribution of sub marine canyons.

Or

- (b) Write an essay on seafloor spreading— theory, evidence and mechanism.

18. (a) Explain with suitable diagram various isostasy hypothesis.

Or

- (b) Give a detailed note on the geomorphic subdivisions of India.

19. (a) Describe the erosional and depositional land forms produced by wind. Give Indian examples.

Or

- (b) Compare the geomorphic features along the Eastern and Western coast of India.

20. (a) Write an essay on application of geomorphology.

Or

- (b) "Development of landforms is mainly governed by either tectonics or climate." Justify the statement giving suitable examples.

(7 pages)

Reg. No. :

Code No. : 6573

Sub. Code : ZGEM 12

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Geology – Core

ADVANCED PALAEOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. During Phanerozoic _____ major mass extinctions were witnessed.
 - (a) Four
 - (b) Five
 - (c) Six
 - (d) Two

2. _____ is identified on the basis of abundance of a fossil.
- (a) Acme biofacies (b) Acme bioherm
(c) Acme biozone (d) Acme biotope
3. Lamellibranchs are aquatic animals and they are most abundant in _____.
- (a) Abyssal (b) Bathyal
(c) Shallow water (d) Below CCD level
4. _____ period is sometimes referred as 'Age of Trilobites'.
- (a) Devonian (b) Permian
(c) Carboniferous (d) Cambrian
5. The first land plants developed in the _____ interval.
- (a) Silurian-Devonian
(b) Ordovician-Silurian
(c) Silurian-Carboniferous
(d) Carboniferous-Permian

6. On the basis of the distribution pattern of _____ proto-Atlantic or Iapetus Ocean was reconstructed.
- (a) Ammonites (b) Brachiopods
(c) Trilobite (d) Cephalopods
7. The Graptolites are found only in the _____.
- (a) Permian rocks
(b) Cretaceous rocks
(c) Lower Paleozoic rocks
(d) Devonian rocks
8. The genus *Equus* referred to mammalian fauna of _____.
- (a) Camel (b) Giraffe
(c) Horse (d) Sabertoothed cat
9. The first appearance of calcareous foraminiferal test is noticed in _____.
- (a) Silurian (b) Devonian
(c) Triassic (d) Jurassic

10. The main classification of ostracods are based on _____.

- (a) Valve shape only
- (b) Valve shape and hinge
- (c) Valve shape, details of hinge and muscle scars
- (d) Muscle scars and hinge

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write a short note on the Types of Fossils.

Or

(b) Write note on principles of structural changes.

12. (a) Explain an account on the Tertiary flora of India.

Or

(b) Briefly discuss the evolution of *Homo sapiens*.

13. (a) Write a detailed account on the geological distribution and paleoecology of Graptolites.

Or

(b) Present a detailed account on the Equine Evolution.

14. (a) Enumerate a detailed account on the micropaleontological techniques.

Or

(b) Explain the detailed morphology of Spores.

15. (a) Explain environmental significance of microfossils.

Or

(b) Describe the morphology of Diatoms, with a note on their classification and ecology.

PART C — (5 × 8 = 40 marks)

Answer ALL the questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe the morphology and the evolution of Trilobites with neat sketches.

Or

(b) Write a detailed account on the Proboscidean Evolution.

17. (a) Explain the Gondwana plant fossils with a note on the paleoclimatic conditions during Gondwana period.

Or

- (b) Write a detailed account on the classification and ecology/paleoecology of Foraminifera.

18. (a) Write a detailed account on the morphology, geological distribution and paleoecology of Bryozoans.

Or

- (b) Give a detailed account on the classification and geological distribution of Conodonts.

19. (a) Explain the detailed morphology of Spores and Pollen grains add a note on significance in oil industry.

Or

- (b) Enumerate the detailed account on the classification, paleoecology and paleoceanography of Radiolaria.

20. (a) Explain the detailed functional morphology of Cephalopods with a note on ammonite evolution.

Or

- (b) Describe in detail the morphological characteristics of Ostracoda with a neat diagram.
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(7 pages)

Reg. No. :

Code No. : 6574

Sub. Code : ZGEM 13

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Geology – Core

STRUCTURAL GEOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. There are two end-member varieties of faults: dip-slip and strike-slip. The displacement along a strike-slip fault is _____ to the strike of the fault
(a) Orthogonal (b) Perpendicular
(c) Parallel (d) Diverse

2. Though many beds are upright others are not. For example, an overturned bed is one that has been rotated more than _____ degrees
 - (a) 70
 - (b) 180
 - (c) 60
 - (d) 90

3. A dip-slip fault consists of the dipping fault surface and hanging and footwall blocks. The hanging wall block lies _____ the dipping fault surface
 - (a) Above
 - (b) Below
 - (c) Beyond
 - (d) Under

4. What do you call a three dimensional surface separating Earth material of differing aspect?
 - (a) Prism
 - (b) Contact
 - (c) Tension
 - (d) Curves

5. In a dip-slip fault, if the hanging wall block moved up relative to the footwall block, then the fault is classified as a _____
 - (a) Uphold
 - (b) Reverse
 - (c) Inverse
 - (d) Forward

6. In a dip-slip fault, if the hanging wall block moved down relative to the footwall block, then the fault is classified as a _____
- (a) Unusual (b) Irregular
(c) Standard (d) Normal
7. Which of the following is not a stress term?
- (a) Mega Pascal (b) Pascal
(c) Kilo bars (d) Kilometers
8. Structures that closely resemble planes are common features of the crust of planet Earth. Examples include beds, joints, and faults. The attitude of a plane is expressed by its _____ and _____
- (a) Strike and fault (b) Strike and dip
(c) Structure and dip (d) Fault and dip
9. What term best describes a surface across which there has been perceptible displacement?
- (a) joints (b) fractures
(c) cracks (d) faults

10. Folds are either anticlines or synclines. Many large hydrocarbon reservoirs occur with the cores of anticlines while adjacent synclines may contain the source of such material. Folds are _____ distortions of rock bodies
- (a) curvilinear (b) straight
(c) concave (d) kilometers

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Give a short note on true thickness and vertical thickness and their mutual relations.

Or

- (b) Discuss the concept of dip and strike of planes.

12. (a) Explain the mechanical properties of rocks.

Or

- (b) Give an account on the Mohr Circle.

13. (a) Define and explain geometry and mechanics of folding.

Or

- (b) Explain briefly the minor fold-origin and relation to major structure.

14. (a) Give a brief introduction on joints and their classification and significances.

Or

- (b) Describe the normal, thrust and slip faults with neat sketches.

15. (a) Explain in detail on the Petro fabrics along with their field and laboratory technique.

Or

- (b) Give a brief account on principles and phase of structural analysis.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Give an account on GPS and their uses in Geological Mapping.

Or

- (b) Write notes on the relation between width of outcrop, thickness and dip of a bed.

17. (a) Write an essay on physical properties of rocks. Add a note on their brittleness, plastic and elastic properties.

Or

- (b) Give a brief account on Lineation - types and relation to history.

18. (a) Explain with suitable diagram various classification and types of folds and mechanics of similar folding.

Or

- (b) Write notes on:

- (i) Salt intrusion and salt domes
- (ii) Unconformities and their types.

19. (a) Describe in details on mechanics of faulting with reference to stress and stress ellipsoids.

Or

- (b) Write an essay on origin and significance of different types of minor structures within shear zone.

20. (a) Describe in details on structural analysis of areas of multi-deformation D1, D2 and D3.

Or

- (b) Give a brief account on application of stereographic projection in the solving of structural problem.
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(6 pages)

Reg. No. :

Code No. : 6575

Sub. Code : ZGEE 11

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Geology

INDIAN STRATIGRAPHY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. _____ era is also known as the Age of Mammals
 - (a) Mesozoic
 - (b) Cenozoic
 - (c) Paleozoic
 - (d) All of the above

2. Dinosaur were living during
 - (a) Proterozoic
 - (b) Palaeozoic
 - (c) Mesozoic
 - (d) Cenozoic

3. The stabilization of Dharwar and Central Indian provinces was formalized by the emplacement of
(a) Newer dolerite (b) Closepet granite
(c) Champion gneiss (d) Peninsular gneiss
4. Rich Manganese deposit observed in _____ of Saucer group of Central India
(a) Sitasaong Formation
(b) Lohangi Formation
(c) Mansar Formation
(d) Chorbaoli Formation
5. The concept of continental rift was very well evidence in which of the following super group?
(a) Dharwar (b) Cuddaph
(c) Vindhyan (d) Gonwana
6. Coal mines in Jharkhand are located at _____
(a) Jharia (b) Jamshedpur
(c) Ranchi (d) Lohardaga
7. The Shivalik range was formed in which of the following period?
(a) Eozoic (b) Pliocene
(c) Mesozoic (d) Cenozoic

8. Which of the following is not part of Himalayan Ranges?
(a) Pir Panjal Range (b) Dhauladhar Range
(c) Zaskar Range (d) Aravalli Range
9. _____ constitute the basic unit of biostratigraphic classification
(a) Stage (b) Series
(c) Zone (d) All of the above
10. During a marine regression, in which each stratum is succeeded laterally by progressively younger units is called as _____
(a) clino form
(b) erosional truncation
(c) apparent truncation
(d) lapout

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Write a note on homotaxis.

Or

- (b) Write an account on sequence stratigraphy.

12. (a) Write a brief account on Precambrian rocks of Dharwars.

Or

- (b) Explain the Kishangarh Nepheline Syenites.

13. (a) Briefly describe the stratigraphic importance of Cuddalore Sand stone.

Or

- (b) Write an account on the stratigraphy of Upper Vindhyan rocks.

14. (a) Write notes on stratigraphy and structure of Siwalik group.

Or

- (b) Explain K-T Boundary.

15. (a) Explain the Prograding with neat sketch.

Or

- (b) How the fossils are used to analyze the Palaeo environment?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain various litho, bio and chrono stratigraphic correlations.

Or

- (b) Discuss about Archaean group of rocks and about the existence of life during it.

17. (a) Distribution, stratigraphic succession and economic importance of Aravalli super

Or

- (b) Write an essay on lithology, distribution, tectonics and economic importance of the Precambrian rocks in India.

18. (a) Write an essay on classification of Cuddaph super group.

Or

- (b) Explain in detail about lithology, life and economic importance of Gondwana land.

19. (a) Discuss the boundary problems between Precambrian and the Cambrian formation of India.

Or

- (b) Describe about Classification, distribution, life and age of Deccan traps.

20. (a) Elucidate the seismic profile for stratigraphic subsurface.

Or

- (b) Describe the different kinds of biostratigraphic units.
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(6 pages)

Reg. No. :

Code No. : 6578

Sub. Code : ZGEM 21

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Geology — Core

MINERAL SCIENCES

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. The highest degree of symmetry is shown by _____ and the lowest degree of symmetry is shown by _____ respectively.
 - (a) Cubic system and Triclinic system
 - (b) Cubic system and Monoclinic system
 - (c) Hexagonal system and monoclinic system
 - (d) Tetragonal system and monoclinic system

2. The Isometric system is characterised by
 - (a) 3 axes of 4 fold symmetry
 - (b) 4 axes of 3 fold symmetry
 - (c) 2 axes of 4 fold symmetry
 - (d) 6 axes of 5 fold symmetry
3. Tetragonal system is characterised by
 - (a) Plane of symmetry
 - (b) Axis of symmetry
 - (c) Centre of symmetry
 - (d) All the above
4. The crystal form which do not have either plane or centre of symmetry are known as
 - (a) Hemihedral form
 - (b) Hemi-morphic form
 - (c) Enantiomorphic form
 - (d) Tetrahedral form
5. Mark the correct statement about the “Law of constancy of Interfacial-angle”
 - (a) The interfacial-angles of crystals of a particular mineral remain always constant
 - (b) The atomic structure of the crystals of a particular mineral is fixed
 - (c) The position of faces of the crystals of a particular mineral is equal
 - (d) All are correct

6. Which mineral is not crystallised in Orthorhombic system
- (a) Sulphur (b) Staurolite
(c) Augite (d) Andalusite
7. The variety of garnet having maximum density is
- (a) Pyrope (b) Andradite
(c) Grassularite (d) Almandine
8. Pleochroism in gems is caused by
- (a) Diffraction
(b) Dispersion
(c) Absorption of different wavelengths of light in different direction
(d) None of the above
9. A refractometer can be used to measure
- (a) Refractive index (b) Birefringes
(c) Optic sign (d) All the above
10. Optically anisotropic minerals differ from isotropic minerals by
- (a) Having low critical angles
(b) Being able to polarize light
(c) Having high critical angle
(d) None the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Briefly describe crystalline and amorphous forms.

Or

- (b) Explain interfacial angle.

12. (a) Define twinning with examples.

Or

- (b) Describe about stereographic projections.

13. (a) Describe about the chemical bonds and its types.

Or

- (b) What is exsolution and its types with examples?

14. (a) What is the hemimorphic forms?

Or

- (b) Describe about Olivine group of minerals.

15. (a) Define polarization.

Or

(b) What is extinction? How can we determine the extinction angle?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Give note on symmetry elements.

Or

(b) Describe about the major laws of crystallography.

17. (a) Briefly mention about the axial characteristics of six crystal systems.

Or

(b) Define XRD, its principles and applications.

18. (a) Write brief about the imperfections and irregularities of crystals.

Or

(b) Write the structural classification of silicate minerals. (Figures are important)

19. (a) Describe briefly about the Pyroxene and amphibole group of minerals regarding its silicate structure.

Or

- (b) Write the chemical, physical and optical properties of framework silicate group of minerals.

20. (a) Explain Birefringes and how can we determine Birefringes color from color chart.

Or

- (b) What are the most important properties of light and explain through different definition and figures?

(6 pages)

Reg. No. :

Code No. : 6579

Sub. Code : ZGEM 22

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Geology — Core

MARINE GEOSCIENCES

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following does not an example of Continental ocean?
 - (a) Baltic ocean
 - (b) Yellow sea
 - (c) Arabian sea
 - (d) None of the above

2. At what plate boundary setting is the ocean floor deepest?
- (a) Divergent
 - (b) Continent-continent collision
 - (c) Subduction
 - (d) Transform
3. How many different marine sediment types do we distinguish?
- (a) 2 (b) 3
 - (c) 4 (d) 5
4. On the whole, what is the most important mechanism of transporting continental lithogenous sediments to the ocean?
- (a) Wind
 - (b) Flowing water
 - (c) Glaciers and icebergs
 - (d) Gravity (mass flows)
5. What part of a tidal cycle has minimal current?
- (a) Ebb tide (b) Slack tide
 - (c) Flood tide (d) Lunar tide

6. Movement of water through oceans
 - (a) Current
 - (b) Tide
 - (c) Wave
 - (d) Upwelling
7. Carbon dioxide and seawater combine to form
 - (a) Calcium carbonate
 - (b) Carbon monoxide
 - (c) Carbonic acid
 - (d) None of the above
8. Biological oceanography refers to
 - (a) Physical processes in ocean
 - (b) Life in ocean
 - (c) Physical processes in ocean
 - (d) Physical and chemical processes
9. Which is the most input of water waste causing marine pollution?
 - (a) Pesticides
 - (b) Pipes directly discharge into the sea
 - (c) Death of aquatic organisms
 - (d) Climatic conditions

10. What percentage of ocean surface is covered by coral reefs?
- (a) 0.1% (b) 1%
(c) 10% (d) 0.01%

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write short note on continental shelf.

Or

- (b) Explain the concepts of sea floor spreading.

12. (a) Write short note on side scan sonar.

Or

- (b) Write short note on deep sea deposit of glauconites.

13. (a) Briefly describe about beach nourishment.

Or

- (b) Sort note on principles of wave forecasting.

14. (a) Discuss about major element of sea water.

Or

- (b) Write note on ionic interaction of sea water.

15. (a) Discuss about the territorial sea.

Or

(b) Give an account on the India's exclusive economic zone.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Write an essay on the formation of oceanic crust and destruction of oceanic lithosphere.

Or

(b) Describe in detailed notes on : (i) Continental margin (ii) Continental slope (iii) Abyssal plains.

17. (a) Write an essay on beach placers.

Or

(b) Write an essay on mineral resources of the ocean and the factors controlling their distribution.

18. (a) Write an essay on wave and their characteristics.

Or

(b) Give an elaborate the tides and their causes.

19. (a) Write an essay on classification of elements.

Or

(b) Give a detail note on biogeochemical processes in aerobic and anaerobic environments.

20. (a) Explain in detail the various pollution in ocean environment.

Or

(b) Give a detail note on coastal zone regulations in India.

(6 pages)

Reg. No. :

Code No. : 6580

Sub. Code : ZGEM 23

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Geology — Core

ADVANCED HYDROGEOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Hydrograph is a graphical representation of
 - (a) Rainfall
 - (b) Surface run off
 - (c) Ground water flow
 - (d) Discharge flowing in water

6. Which of the following factors affects the permeability of soil?
- (a) Grain size
 - (b) Properties of pore fluid
 - (c) Void ratio of soils
 - (d) All the above mentioned
7. Porosity refers to
- (a) the shape of the particles
 - (b) the sorting of the particles
 - (c) % of pore space in a material
 - (d) % of cement in a material
8. What rock makes a good aquifer?
- (a) Limestone (b) Gravel
 - (c) Sandstone (d) Shale
9. The drawn down, corresponding to a steady discharge, are observed at a number of wells in
- (a) Pumping out test (b) Pumping in test
 - (c) All the above (d) None of the above

10. Which of the following is a natural source of contamination?
- (a) Organic matter (b) Petroleum
(c) Leachate (d) Septic system

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Briefly describe about the water bearing properties of rock.

Or

- (b) Explain Darcy's law using figure and mathematical application.

12. (a) Write the sub surface method for ground water detection.

Or

- (b) What are the different types of wells and its constructions?

13. (a) Write the applications of geophysical logging in ground water exploration.

Or

- (b) What is test drilling?

14. (a) What is a water balance model? Add notes on positive water balance.

Or

- (b) What is submarine groundwater discharge and how can it determine?

15. (a) What is the difference between fluorination and de-fluorination?

Or

- (b) Describe the major groundwater basins in Tamilnadu.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe briefly about the groundwater occurrence in all the major types of rock bodies with examples.

Or

- (b) Describe about the structural occurrence and distribution of ground water.

17. (a) Explain the application of remote sensing in ground water detection.

Or

(b) What is pump test and how can we determine the aquifer characteristics using pumping test?

18. (a) Write about groundwater budget estimation?

Or

(b) Write about groundwater models and their role in water management.

19. (a) What are the major issues due to the over exploitation of groundwater?

Or

(b) What is groundwater recharge and its types and methods?

20. (a) How mining affect the ground water and explain with the help of Neyveli issues?

Or

(b) What are the chemical characteristics of ground water use and industrial uses?

(6 pages)

Reg. No. :

Code No. : 6581

Sub. Code : ZGEE 21

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022

Second Semester

Geology

Elective – ADVANCED REMOTE SENSING AND GIS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The term Remote sensing was first used in a United States naval project in the year
 - (a) 1961
 - (b) 1962
 - (c) 1963
 - (d) 1964

2. Sun follows this type of orbit
 - (a) Heliocentric
 - (b) Galactocentric
 - (c) Geocentric
 - (d) Areocentric

3. IRS system was commissioned in
- (a) 1986
 - (b) 1987
 - (c) 1988
 - (d) 1989
4. NSIL incorporated on 6th March 2019 under the Companies Act.
- (a) 2013
 - (b) 2014
 - (c) 2015
 - (d) 2016
5. A digital image is a representation of a two dimensional image as a finite set of digital values. called picture elements
- (a) Image
 - (b) Digits
 - (c) Pixels
 - (d) Grid
6. Image classification techniques include unsupervised classification that can be done by
- (a) Software
 - (b) Human-guided
 - (c) Digitizing manually
 - (d) Not related to software

7. It is an organized collection of related data
- (a) Data
 - (b) Database
 - (c) Database System
 - (d) Relational DBMS
8. Topology relates to spatial data that consists of
- (a) Adjacency, Containment
 - (b) Containment, Connectivity
 - (c) Adjacency, Containment, Connectivity
 - (d) Adjacency, Connectivity
9. Network models are based on interconnecting logical components, of which the most important are Nodes that define
- (a) Start
 - (b) End
 - (c) Start and intersections
 - (d) Start, end and intersections

10. GIS takes data from maps that were made using different projections and combines them so all the information can be displayed using
- (a) one projection
 - (b) two projections
 - (c) three projections
 - (d) one and three projections

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain different types of Satellites.
- Or
- (b) Describe resolution in Microwave remote sensing.
12. (a) Describe Commercial Remote Sensing Satellites.
- Or
- (b) Explain Radar Imaging.
13. (a) Describe the steps to be followed for Digital Image Processing.
- Or
- (b) What is Image histogram? Explain its significance.

14. (a) Explain Vector data and its model.

Or

(b) Describe the application of GPS in Geology.

15. (a) Explain the application of GIS in natural resource management.

Or

(b) What is Neighbourhood Operations in Raster data analysis.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Elaborate on EMR and its properties.

Or

(b) Enumerate on different Sensor systems

17. (a) Elaborate on different elements of Visual image interpretation

Or

(b) Enumerate on IRS Series.

18. (a) Elaborate on Supervised image classification.

Or

(b) Enumerate on types and characteristics of Digital images.

19. (a) Elaborate on DEM and its importance.

Or

(b) Enumerate on Raster data.

20. (a) Elaborate on the application of GIS in geological mapping and groundwater exploration.

Or

(b) Enumerate on Vector data analysis.

Reg. No. :

Code No. : 6584

Sub. Code : ZGEM 31

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022

Third Semester

Geology - Core

IGNEOUS PETROLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The inaccessible heavy interior of the earth is known as
 - (a) Barysphere
 - (b) Lithosphere
 - (c) Asthenosphere
 - (d) Mesosphere

2. The mineral most abundantly present in the igneous rocks is
 - (a) Micas
 - (b) Titanium
 - (c) Iron
 - (d) Feldspars

3. In unicomponent magma, the temperature region where generation of crystals is rapid is called
 - (a) Lammelle
 - (b) Labile
 - (c) Eutectic
 - (d) Spondaneous
4. Composition of the liquid that forms is same as the composition of the solid is said to be
 - (a) Assimilation
 - (b) Congruent melting
 - (c) Partial melting
 - (d) Complete melting
5. Ophiolites appears in continental crust because of
 - (a) Collision
 - (b) Drifting
 - (c) Obduction
 - (d) Subduction
6. Alkali-Lime Index is also known as
 - (a) Allumina Index
 - (b) Peacock Index
 - (c) Calc Index
 - (d) Saturation Index
7. A common decomposition in basaltic rocks involve
 - (a) Oxidation of Fe
 - (b) Oxidation of Mg
 - (c) Hyderation of Fe
 - (d) Hydration of K
8. Pegmatite mainly contain
 - (a) Felspathoids
 - (b) Plagioclase feldspar
 - (c) Alkali feldspar
 - (d) Orthopyroxene
9. Lamprohyres generally occur as
 - (a) Batholiths
 - (b) Laccolith
 - (c) Plutons
 - (d) Dykes and sills
10. The worlds most spectacular assemblage of Bhusveld complex of South Africa contains
 - (a) Acid Igneous rocks
 - (b) Intermediate rocks
 - (c) Basic Igneous rocks
 - (d) Ultrabasic rocks

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain a note on volatile elements

Or

- (b) Explain how minerals are classified based on alumina saturation

12. (a) Enumerate unicomponent magma crystallization

Or

- (b) Explain solid solution with example

13. (a) What are oceanic islands. How they are formed

Or

- (b) Write a note on plume magmatism

14. (a) Appraise an account on granodiorite

Or

- (b) Explain petrography of keratophyre

15. (a) Organize general characteristics of Precambrian anorthosites

Or

- (b) Evaluate crystallization stage of pegmatite

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Discuss about mantle metasomatism and heterogeneities

Or

- (b) Evaluate Tyrrel classification of igneous rocks

17. (a) Explain phase rule and equilibrium in silicate system

Or

- (b) Explain anorthite-leucite-silica system with sketch.

18. (a) Discuss chemical characteristics of igneous rocks in mid oceanic ridges

Or

- (b) Discuss chemical characteristics of igneous rocks in active continental margins.

19. (a) Describe classification and petrography of syenite

Or

- (b) Discuss petrographical characteristics of peridotite

20. (a) Describe petrogenesis of carbonatites

Or

- (b) Describe petrogenesis of alkaline rocks.
-

(6 pages)

Reg. No. :

Code No. : 6585

Sub. Code : ZGEM 32

M.Sc. (CBCS) DEGREE EXAMINATION
NOVEMBER 2022

Third Semester

Geology – Core

SEDIMENTARY PETROLOGY

(For those who joined in July 2021 onwards)

Time : 3 hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which rock is present in the majority on the surface of Earth?
 - (a) Igneous rocks
 - (b) Sedimentary rocks
 - (c) Metamorphic rocks
 - (d) No class of rock is termed so

2. Which of the following is responsible for creating sedimentary rocks?
- (a) Erosion
 - (b) Weathering and lithification
 - (c) Precipitation
 - (d) All of the above
3. Lamination is structure formed in which type of sedimentary rock.
- (a) Fine grained (b) Medium grained
 - (c) Coarse grained (d) Nothing in particular
4. The structure most prevalent to clastic rock is _____
- (a) Nodular Structure (b) Geode Structure
 - (c) Concretionary (d) Lamination
5. Deposition takes place in which conditions?
- (a) Ordinary pressure and temperature
 - (b) High temperature and low pressure
 - (c) High pressure and low temperature
 - (d) High pressure and high temperature

6. The process not associated with diagenesis is _____
- (a) Sediments get gradually converted to cohesive material
 - (b) Sediments get gradually converted to hard material
 - (c) Decaying occurs basically
 - (d) Might occur due to pressure or cementing material
7. The rate of chemical weathering is increased by acids. The most common natural acid on the Earth's surface is _____
- (a) Nitric
 - (b) Hydrochloric
 - (c) Carbonic
 - (d) Sulfuric
8. What would increase the rate of chemical weathering?
- (a) High temperatures and greater rainfall increase the rate of chemical weathering.
 - (b) Low temperatures and greater rainfall increase the rate of chemical weathering.
 - (c) High temperatures and lesser rainfall increase the rate of chemical weathering.
 - (d) Low temperatures and lesser rainfall increase the rate of chemical weathering.

9. What are the factors affecting sedimentation?
- (a) Concentration, particle size
 - (b) Temperature, particle size
 - (c) Pressure, concentration
 - (d) Pressure, particle size
10. Translational sliding is quite common in slopes made up of _____
- (a) Rocks
 - (b) Cohesive soils
 - (c) Rocks and non-cohesive soils
 - (d) Rocks and cohesive soils

PART B — (5 × 5 = 25 marks)

Answer ALL questions, Choosing either (a) or (b)
Each answer should not exceed 250 words.

11. (a) Explain about fluvial deposits and processes.

Or

- (b) What is sediment dispersal?

12. (a) Write note on particle size in sieve analysis.

Or

- (b) What is frequency distribution and its types?

13. (a) What are the stages of sedimentary rock formation?

Or

- (b) Classification of Mud rocks.

14. (a) What are Teri sands of Tamil Nadu.

Or

- (b) Describe the Sieve Analysis.

15. (a) What was the original plan to manage reservoir sedimentation behind dams?

Or

- (b) How does reservoir sedimentation affect the different water storage uses of the reservoir pool?

PART C — (5 × 8 = 40 marks)

Answer ALL Questions, Choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Explain about the depositional environment and facies of glacial system.

Or

- (b) How sedimentary facies and provenance relate with paleoclimatic interpretation?

17. (a) Describe paleo environment and explain what are the advantages and application of paleo environmental studies.

Or

- (b) "Sedimentary rocks are porous and permeable" Elucidate the sentence with proper example and figures.

18. (a) Enumerate classification of sandstone.

Or

- (b) What are the three sedimentary environments and explain.

19. (a) Explain about sedimentary basins and sedimentation.

Or

- (b) Write the physical and chemical conditions of sedimentation.

20. (a) How do droughts and floods affect reservoir sedimentation and water supply?

Or

- (b) What are the effects of sedimentation and why should we care? What happens to the river channel downstream of dams?

(6 pages)

Reg. No. :

Code No. : 6586

Sub. Code : ZGEM33

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Third Semester

GEOLOGY - Core

RESEARCH METHODOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. In order to pursue the research, which of the following is priorly required?
 - (a) Developing a research design
 - (b) Formulating a research question
 - (c) Deciding about the data analysis procedure
 - (d) Formulating a research hypothesis

2. The conclusions/findings of which type of research cannot be generalized to other situations?
 - (a) Casual comparative research
 - (b) Historical research
 - (c) Descriptive research
 - (d) Experimental research

3. The last stage of research process is
 - (a) Review of literature
 - (b) Report writing
 - (c) Analysis
 - (d) Interpretation of data

4. In which of the following reporting format is formally prescribed?
 - (a) Doctoral level thesis
 - (b) Conferenced of researchers
 - (c) Workshops and seminars
 - (d) Symposia

5. A text taken from a source is placed in a research report without providing reference is called as:
 - (a) Plagiarism
 - (b) Popularism
 - (c) Perfectionism
 - (d) Post referencism

6. APA style, MLA style, Chicago Manual, Blue book, OSCOLA are famously known as
- (a) Citation manuals
 - (b) Directories
 - (c) Abbreviation manuals
 - (d) Handbooks
7. The scattering of white light into consequent colours is called as:
- (a) Diffraction
 - (b) Interference
 - (c) Dispersion
 - (d) Reflection
8. How is relief shown on topographic maps?
- (a) Layer colors and spot heights
 - (b) Contour lines and spot height
 - (c) Contour lines only
 - (d) Hachures and shadings
9. Absorption spectrum results when an electron in an atom undergoes a transition from
- (a) Higher energy level to a lower one
 - (b) Lower energy level to higher one
 - (c) Intermediate levels
 - (d) All of the mentioned

10. The microscope is particularly useful in the study of brief ringent materials such s crystals and stained non-crystalline substances.
- (a) Scanning electron microscope
 - (b) Petrological microscope
 - (c) Polarizing microscope
 - (d) Ore microscope

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) What are the criteria for a good research?
- Or
- (b) How to identify research gaps and include them in your thesis.
12. (a) Explain the data collection methods in research.
- Or
- (b) What is the role of abstract in research paper?
13. (a) How to critically evaluate the quality of a research article.
- Or
- (b) What do you meant by impact factors and citation index of research articles?

14. (a) Why is it important to do a literature review in research?

Or

- (b) Describe trilinear diagram and its uses.

15. (a) Write a short note on heavy mineral separators.

Or

- (b) Explain the parts of a polarising microscope.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Discuss the various research design involved in research methodology.

Or

- (b) Write an essay on different types of research methods.

17. (a) Explain the steps and mechanics of writing a thesis.

Or

- (b) Explain the techniques of data representation.

18. (a) Explain the use of digital library and online resources in research.

Or

- (b) What is Plagiarism? How to avoid Plagiarism in research papers?

19. (a) What is wind rose diagram? Explain the construction and use of wind rose diagram.

Or

- (b) Explain the geophysical survey that is widely used for groundwater exploration.

20. (a) Explain the principles and applications of EPMA.

Or

- (b) Explain the principles and applications of ICP-MS.
-

(6 pages)

Reg. No. :

Code No. : 6587

Sub. Code : ZGEE31

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Third Semester

Geology - Core

Elective — FUEL AND APPLIED GEOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Petroleum is found in _____.
(a) Core of earth (b) In seas
(c) In air (d) Crust of the earth
2. Paraffins are by product of
(a) Coke (b) Petroleum
(c) Gasoline (d) Kerosene

3. Journey of oil from the source to a reservoir rock is
 - (a) Migration
 - (b) Permeability
 - (c) Movement
 - (d) Trapping

4. Which of the following is an excellent reservoir rock
 - (a) Clay
 - (b) Limestone
 - (c) Siltstone
 - (d) Sandstone

5. Parrot coal is a variety of
 - (a) Bituminous coal
 - (b) Lignite
 - (c) Anthracite
 - (d) Peat

6. Strip mining is a method of
 - (a) Underground mining
 - (b) Shallow opencast mining
 - (c) Horizon mining
 - (d) Long wall mining

7. Which one of the following clay is used in rotary drill?
- (a) Kaolinite
 - (b) Bond
 - (c) Fire clay
 - (d) Bentonite
8. Which type of log used for porosity determination?
- (a) Resistivity
 - (b) Density
 - (c) Gamma
 - (d) Temperature
9. Confined compressive strength of building stone determined using
- (a) Universal testing machine
 - (b) Unique testing machine
 - (c) United testing machine
 - (d) Uniaxial testing machine
10. Which of the following is widely used as road stones?
- (a) Basalt
 - (b) Granite
 - (c) Quartzite
 - (d) Dolerite

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Summarize applications of fuel industry.

Or

(b) Explain current theory of petroleum origin.

12. (a) Describe the physical properties of petroleum.

Or

(b) Explain the reserves and their types.

13. (a) Explain sedimentological characteristics of coal bearing strata.

Or

(b) Write a note on room and pillar mining method.

14. (a) Write a note on ore sampling.

Or

(b) Write a note on cable tool drilling.

15. (a) Explain why rocks considered as foundation material.

Or

(b) Explain principles of electrostatic separators.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Evaluate role of geologists in energy sector.

Or

(b) Evaluate organic matter sources and petroleum transformation process.

17. (a) Describe occurrence and properties of petroleum.

Or

(b) Discuss in detail about reservoir traps and their types.

18. (a) Explain origin of kerogen and coal.

Or

(b) Discuss techniques and methods of coal microscopy.

19. (a) Discuss various underground mining methods.

Or

(b) Explain various method of petroleum formation evaluation.

20. (a) Discuss in detail about engineering properties of rocks.

Or

(b) Discuss in detail about geological and engineering considerations of tunnels project.
