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**M.Sc. (Semester-I) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)
Mineralogy**

Day & Date: Monday, 13-02-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question no. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Multiple choice questions.

10

- 1) In uniaxial mineral when extraordinary ray has high refractive index than ordinary ray the mineral is _____.
a) Optically Balanced b) Optically negative
c) Optically positive d) None of these
- 2) Which of the following is belongs to Garnet Group mineral _____.
a) Hornblende b) Pyrope
c) Lepidolite d) Plagioclase
- 3) _____ of the following is not polymorphs.
a) Quartz and cristobalite Simple
b) Diamond and graphite
c) Albite & orthoclase
d) Both a & b
- 4) In which crystal Structure axis $a = b \neq c$ _____.
a) Orthorhombic b) Cubic
c) Tetragonal d) Hexagonal
- 5) Which of the following is anisotropic mineral?
a) Spinel b) Gypsum
c) Garnet d) Both a & c
- 6) Which of the following is opaque mineral under microscope _____.
a) Pyrite b) Halite
c) Diamond d) None of these
- 7) The ability of specific mineral to crystalize more than one structure is _____.
a) Paragenesis b) Isomorph
c) Polymorph d) None of these
- 8) In which of the following system no region of stability for second polymorph under any condition _____.
a) Monotropic b) Isomorph
c) Enantiotropic d) None of these
- 9) Ionic substitution is depending on _____.
a) Ion size b) Crystal structure
c) Ion charge d) All of these

- 10) _____ is the symmetrical three-dimensional structural arrangements of atoms, ions or molecules (constituent particle) inside a crystalline solid as points.
- a) Crystal structure
 - b) Crystal edge
 - c) Crystal lattice
 - d) Crystal face

B) Fill in the blanks or write true or false.**06**

- 1) _____ projection is a method used in crystallography and structural geology to depict the angular relationships between crystal faces and geologic structures.
- 2) _____ is a term used in optical mineralogy and petrology, which describes when cross-polarized light dims, as viewed through a thin section of a mineral in a petrographic microscope.
- 3) Microcline shows _____ twinning.
- 4) Orthoclase mineral belongs to feldspar group (True/False).
- 5) Paragenesis is the time sequence of mineral deposition. (True/False)
- 6) XRD refers for X Ray Determination (true/False)

Q.2 Answer the following**16**

- a) Write note on stereographic projection.
- b) Define Uniaxial & Biaxial mineral and write difference between them.
- c) Define isotropism and anisotropism and name of 2 minerals having these properties.
- d) Write short note on Bragg's law.

Q.3 Answer the following.**16**

- a) Write a note on tetragonal system.
- b) Discuss the carbonate group mineral.

Q.4 Answer the following.**16**

- a) Write a note on epidote group mineral.
- b) Define extinction, explain how it finds and write note on its types with fig.

Q.5 Answer the following.**16**

- a) Write a detail note on bonding in mineral.
- b) Write detail note on pyroxene group.

Q.6 Answer the following.**16**

- a) Write detail note on refractive index, relief & birefringence.
- b) Write a detail note on crystal symmetry and write number of crystal symmetries for cubic system.

Q.7 Answer the following.**16**

- a) Define Isomorphism, polymorphism & write note on monotropic system & enantiotropic system.
- b) Write detail note on amphibole group mineral.

B) Fill in the blanks OR write True or False. 06

- 1) The tillite beds of Lower Gondwana's are deposited directly from _____ either terrestrially on land or in the glaciomarine realm.
- 2) The most common rock of the Vindhyan supergroup is _____.
- 3) The most widely used data in seismic stratigraphy is _____.
- 4) The land covered by water from all sides is called as Island.
(True/False)
- 5) Craton, the stable interior portion of a continent characteristically composed of ancient crystalline basement rock. (True/False)
- 6) Papaghni group of rocks in Cuddapah Supergroup are oldest in age.
(True/False)

Q.2 Answer the following. 16

- a) Kurnol Group
- b) Evolution of Peninsular Gneissic complex
- c) Palaeozoic succession of spiti
- d) Extinction

Q.3 Answer the following. 16

- a) Write full note on sequence and chemo stratigraphy.
- b) Explain in detail Eastern Ghat mobile belt of India.

Q.4 Answer the following. 16

- a) Write down Stratigraphy and formation of Gondwana rocks.
- b) Write a detailed account on Cretaceous of Tiruchirappalli.

Q.5 Answer the following. 16

- a) Write note on Pleistocene glaciation.
- b) Discuss in detail Structure, Stratigraphy & Tectonic evolution of Vindhyan Basin.

Q.6 Answer the following. 16

- a) Write a full note on Geological Time scale.
- b) Discuss the formation of Himalayas.

Q.7 Answer the following. 16

- a) Discuss in detail Stratigraphy, classification and evolution of the Siwlaik group.
- b) Discuss in detail lithology, geology, and structural characteristics Dharwar craton.

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**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)**

Sedimentary and Metamorphic Petrology

Day & Date: Wednesday, 15-02-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question no. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) Which of the following groups of sedimentary rocks represent the correct order to decreasing abundance?
 - a) Mud rock → Sandstone → Limestone
 - b) Sandstone → Mud rock → Limestone
 - c) Limestone → Sandstone → Mud rock
 - d) Mud rock → Limestone → Sandstone
- 2) Oil and gas are found mainly in _____.
 - a) Quartzite and dolomite
 - b) Sandstone and limestone
 - c) Mudstone and siltstone
 - d) Chert and Gypsum
- 3) Slate is characterized by tendency to break into even parallel sheets due to the parallel alignment of the flat crystal faces of _____.
 - a) Garnet and Kyanite
 - b) Sillimanite and biotite
 - c) Chlorite and biotite
 - d) Quartz and epidote
- 4) The sedimentary layer having thickness is <1 cm is called as _____.
 - a) Bed
 - b) Lamination
 - c) Stratum
 - d) Both a and c
- 5) The granulite facies are characterized by _____.
 - a) high pressure high temperature
 - b) low pressure low temperature
 - c) high pressure low temperature
 - d) low pressure high temperature
- 6) Sedimentary grains exhibit very fine skewness of _____.
 - a) -0.10 to -0.30
 - b) +0.10 to -0.10
 - c) -0.10 to +0.30
 - d) -0.30 to -1.00
- 7) Orogenic metamorphism is the type of metamorphism associated with _____.
 - a) Convergent plate boundary
 - b) Divergent plate boundary
 - c) Transform plate boundary
 - d) none of the above
- 8) Diatoms are _____.
 - a) Calcareous deposit
 - b) Siliceous deposit
 - c) Phosphate deposit
 - d) carbonaceous deposit

- 9) Bedding in sedimentary rock is _____ whereas lamination is thinner than 1 cm.
- a) thicker than 1 cm b) thicker than 2 cm
c) thicker than 1 m d) None of these
- 10) The ripple index of wave-formed ripples is generally around _____.
- a) 7 b) 4
c) 3 d) 2

B) Fill in the blanks OR write True or False.**06**

- 1) Rock formed by process of solid-state crystallization of preexisting rock is called _____.
- 2) The _____ gradient is defined as the increase in temperature with depth in the Earth.
- 3) In sieve analysis Phi values for grains coarser than one millimetre are negative, while those for grains finer than one millimetre are positive (True/False).
- 4) Grain size gives information about nature of source rocks, mode and strength of transportational medium, sorting, depositional history of sediments and tectonics of depositional basin (True/False).
- 5) The processes that break a rock or minerals into small pieces without altering its composition are called as _____ weathering.
- 6) _____ pressure is the pressure increases with depth due to the weight overlying rock in all directions.

Q.2 Write a short note on:**16**

- a) Fabric
- b) Discuss any four criteria of recognize the top of a bed by primary structures
- c) Metasomatism
- d) Gneissose and Schistose structures

Q.3 Answer the following.**16**

- a) Discuss on basin tectonics in details.
- b) Write a note on contact metamorphic process.

Q.4 Answer the following.**16**

- a) Write a brief note on Hornfels facies of rocks.
- b) Describe types of physical weathering.

Q.5 Answer the following.**16**

- a) Write a note on metamorphic processes.
- b) Write a note on sphericity and roundness measurement of sedimentary rocks.

Q.6 Answer the following.**16**

- a) Write a note on role of pressure, temperature and chemically active fluids in formation of metamorphism rocks.
- b) Write a note on regional metamorphism.

Q.7 Answer the following.**16**

- a) Write a brief note on marginal marine deposition environment of sedimentary rocks.
- b) Write a brief note on classification of sedimentary rocks with examples.

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**M.Sc. (Semester-I) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)
Geochemistry**

Day & Date: Thursday, 16-02-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question No.1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose the correct alternative.

10

- 1) The atomic number of an element is determined by the _____.
 - a) Number of electrons in its outermost shell
 - b) Number of protons in its nucleus
 - c) Diameter of its most common Isotope
 - d) Number of neutrons plus electrons in its nucleus
- 2) To which of the following groups do most minerals in the Earth's crust belong?

a) Oxides	b) Halides
c) Carbonates	d) Silicates
- 3) When an atom loses or gains electrons, it becomes a(n): _____.

a) Isotope	b) Neutron
c) Proton	d) Ion
- 4) Which of these fundamental forces is not involved in the structure of the atom?

a) Gravity	b) Electromagnetism
c) Strong nuclear force	d) None of the above
- 5) The two most abundant elements in the Earth's crust are: _____.

a) Nickel and zinc	b) Nitrogen and carbon
c) Oxygen and silicon	d) Chlorine and iron
- 6) Trace elements are those which are generally having concentration _____.

a) Less than 500 ppm	b) Less than 100 ppm
c) Less than 1000 ppm	d) More than 1000 ppm
- 7) Some minerals form solid solutions between different chemical components. This is because solid solutions, relative to mechanical mixture of the components, have: _____.
 - a) Higher free energy
 - b) Lower free energy
 - c) Higher covalency of bonding
 - d) Lower covalency of bonding
- 8) The lattice energy of an ionic crystal depends on the: _____.
 - a) Electrostatic forces between ions of opposite charge
 - b) Inter-nuclear repulsive forces
 - c) Tendency of the ions in the crystals
 - d) Both (a) and (b)

- 9) Geochemical processes operate only because of: _____.
- Presence of various chemical on the earth's crust
 - Water circulation system
 - A flow of energy from a higher to a lower potential or intensify
 - High pressure in the crust
- 10) The fastest planet in the solar system is: _____.
- Neptune
 - Mercury
 - Venus
 - Jupiter

B) Fill in the blanks.

06

- _____ is the earth's sister planet.
- Different elements with the same neutron number but with different values of atomic Weight and protons are known as _____.
- In Harker variation diagrams generally the concentrations of an element or oxide are plotted (on the vertical axis) against: _____.
- In AFM diagram "A" refer to _____.
- _____ proposed the steady state theory.
- The density of universe continued to _____ as it expands.

Q.2 Answer the following.

16

- Explain in detail ionic and covalent bonds.
- Write a short note on Ionic substitution in crystals.
- Explain types of thermodynamic systems.
- Radioactive decay.

Q.3 Answer the following.

16

- Explain various theories of formation of Universe.
- Describe various radioactive dating techniques.

Q.4 Answer the following.

16

- Explain in detail the Cosmic abundance of elements.
- Add a note on gain and losses during evolution of atmosphere.

Q.5 Answer the following.

16

- Explain in detail the average composition of Igneous rocks.
- What are geochemical cycles?

Q.6 Answer the following.

16

- Explain in detail the Hydrological cycle.
- Write a note on principles of Geochemistry.

Q.7 Answer the following.

16

- Write a note on Solar System.
- Composition of Crust.

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**M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)
Igneous Petrology**

Day & Date: Monday, 20-02-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7

Q.1 A) Choose correct alternative (MCQ). 10

- 1) Fractional crystallization is occur in _____.
 - a) Differentiation
 - b) Assimilation
 - c) Weathering
 - d) Dyke
- 2) CIPW Classification of rock based on _____.
 - a) Texture
 - b) Structure
 - c) Chemical composition
 - d) Mode of occurrence
- 3) _____ is the last mineral which crystallized in Bowen reaction series.
 - a) Hornblende
 - b) Olivine
 - c) Quartz
 - d) Calcite
- 4) Gabbro is _____ rock.
 - a) Acidic
 - b) Basic
 - c) Intermediate
 - d) Over saturated
- 5) Slow cooling favored the _____ grain size.
 - a) Coarse
 - b) Medium
 - c) Fine
 - d) Cobble
- 6) Andesites on an average are intermediate in composition between ____
 - a) Syenites and gabbro
 - b) Basalt and gabbro
 - c) Rhyolites and Trachyte
 - d) Anorthosite and Trachyte
- 7) Why basalt is fine grained that Gabbro?
 - a) Basalt formed from quick cooling of magma
 - b) Basalt formed from slow cooling of magma
 - c) Gabbro formed from quick cooling of magma
 - d) Formed at high temperature
- 8) Mafic igneous rocks contain more amounts of _____ as compared to felsic igneous rock.
 - a) Quartz
 - b) Aluminum
 - c) Pink feldspar
 - d) Iron
- 9) Find texture odd one out:
 - a) Granitic
 - b) Non-clastic
 - c) Poikilitic
 - d) Porphyritic
- 10) Lamprophyres are:
 - a) Metamorphic rock
 - b) Plutonic rock
 - c) Hypabyssal rock
 - d) Volcanic rock

- Q.1 B) Fill in the blanks OR Write true/false -** **06**
- a) If the silica percentage is less than 45 %, then it is called as ultramafic rocks. (True/False)
 - b) Igneous rocks are formed when hot and molten magma/lava crystallizes and solidifies. (True/False)
 - c) Rhyolite is a volcanic equivalent of Granite. (True/False)
 - d) Dolerite is a _____ igneous rock.
 - e) Dunite is a monomineralic rock contain _____ mineral.
 - f) Sill is a _____ igneous body.
- Q.2 Answer the following.** **16**
- a) Albite-Orthoclase phase system
 - b) Brief note on Rhyolitic magma
 - c) MORB
 - d) Temperature of magma
- Q.3 Answer the following.** **16**
- a) Write a note on Lunar basalt.
 - b) Write an full account on diopside-anorthite system.
- Q.4 Answer the following.** **16**
- a) Discuss various textures of Igneous rocks with neat diagram.
 - b) Write note on petrogenesis of alkaline rocks. Also give occurrence of alkaline rocks in India.
- Q.5 Answer the following.** **16**
- a) What is Magmatic differentiation? Also describe the various processes of magma evolution.
 - b) Explain the petrogenesis and petrography of Granite and Granodiorite rocks.
- Q.6 Answer the following.** **16**
- a) Describe in detail the IUGS classification of igneous rocks.
 - b) Write a full note on Mantle metasomatism.
- Q.7 Answer the following.** **16**
- a) Describe in detail the origin and types of carbonatites.
 - b) Discuss in detail magmatism associated with plate tectonics.

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**M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov - 2022
(APPLIED GEOLOGY)
Structural Geology and Tectonics**

Day & Date: Tuesday, 21-02-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

- Instructions:** 1) Q. No. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.**10**

- 1) True dip measured _____.
 - a) In a vertical plane that strikes at right angle to the strike of the bedding.
 - b) In a horizontal plane that strike at right angle to the strike of the bedding.
 - c) In a vertical plane that strikes at $<90^\circ$ to the strike of the bedding.
 - d) In a horizontal that strike at $>90^\circ$ to the strike of the bedding.
- 2) _____ the line which lies along the highest points in a folded layer.
 - a) Hinge line
 - b) Trough line
 - c) Axial surface
 - d) Crest line
- 3) Which of the following fold has horizontal axial plain?
 - a) Chevron fold
 - b) Symmetrical fold
 - c) Recumbent fold
 - d) Homocline fold
- 4) The lithospheric plate's slides past one another and that the plates neither gain nor lose surface areas called _____.
 - a) Constructive plate margin
 - b) Destructive plate margin
 - c) Conservative plate margin
 - d) All of the above
- 5) Most common characteristic drainage pattern of the Deccan trap is _____.
 - a) Radial
 - b) Dendritic
 - c) Trellis
 - d) None
- 6) Eparchean unconformity separates _____.
 - a) Archaean from Proterozoic
 - b) Triassic from Jurassic
 - c) Tertiary from Quaternary
 - d) Carboniferous from Permian

- 7) In chevron fold _____
 - a) Crest is broad and flat
 - b) Hinges are sharp and angular
 - c) Axes plunges directly down the dip of axial plain
 - d) Limbs are nearly horizontal having less than 5
- 8) In _____ unconformity layers on either sides of the boundary are nearly horizontal.
 - a) Angular
 - b) Disconformity
 - c) Buttress
 - d) None of the above
- 9) The line of intersection of the axial plane with the bedding plane of the fold is called as _____.
 - a) Limb
 - b) Axis of fold
 - c) Hinge of the fold
 - d) Plunge of the fold
- 10) The mechanism of fracturing in the rock is strongly controlled by _____.
 - a) Intragranular cracks
 - b) Trasgranular cracks
 - c) Intergranular cracks
 - d) All of the above

B) Fill in the blanks or write true/ false

06

- 1) In a stratified rock some joints may present essentially parallel to the bed planes they referred as _____.
- 2) _____ are structures in which the beds dip away from a central point.
- 3) _____ are fractures in bedrock along which movement has occurred.
- 4) In _____ fault the hanging-wall block has moved down relative to the footwall.
- 5) The theory of plate tectonics has evolved from Herry Hess's concept of sea floor spreading. (True/ False)
- 6) Divergent boundaries are called the destructive zones because in these zones the new crust is continuously created. (True/ False)

Q.2 Write a short note on:

16

- a) Lineation
- b) Difference between anticline and syncline folds
- c) Transform plate boundary
- d) Strike and dip of the bed

Q.3 Answer the following.

16

- a) Describe fault classification based on its net slip.
- b) Write a note on shear zone mylonites.

Q.4 Answer the following.

16

- a) What is fold? Draw neat sketches and discuss Ramsay's classification of fold based on dip isogon.
- b) What are joints? Explain the process of formation of the joints.

- Q.5 Answer the following.** **16**
- a) Explain the evidences and mechanism of sea floor spreading.
 - b) Give an account of behavior of minerals and rocks under deformation condition.
- Q.6 Answer the following.** **16**
- a) What is significant of stress markers in quantification of deformation?
 - b) Give detail account on lineaments and its importance during the tectonic studs.
- Q.7 Answer the following.** **16**
- a) Describe different types of unconformities and discuss the criteria for their recognition in the field.
 - b) Write a note on what are the evidences of active tectonics in Himalaya.

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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)
Climatology & Oceanography**

Day & Date: Monday, 13-02-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagrams wherever necessary.

Q.1 A) Choose the correct alternative. 10

- 1) Which of the following factor(s) affect(s) the distribution of insolation.
 - a) Angle of incidence b) Distance between the earth and sun
 - c) Duration of sunshine d) All of the above
- 2) Which one of the following oceans has greater percentage of continental shelf area
 - a) Pacific b) Atlantic
 - c) Indian d) Arctic
- 3) The longest day or night at 49° latitude will be of
 - a) 13 hours b) 16 hours
 - c) 18 hours d) 20 hours
- 4) The average slope of continental shelf is about
 - a) 15° b) 40°
 - c) 20° d) 1°
- 5) Electromagnetic radiation from the sun reach the earth's surface in about
 - a) 8 minutes b) 18 minutes
 - c) 10 minutes d) 12 minutes
- 6) When the diameter of invisible dust particles suspended in the air and the molecules of atmospheric gases is shorter than the wavelength of the solar radiation waves, there occurs.
 - a) Diffuse reflection b) Albedo
 - c) Scattering d) Absorption
- 7) The deepest part of the ocean lies in
 - a) Central pacific b) South - west pacific
 - c) Northern pacific d) South - east pacific
- 8) The average density of the earth and sun respectively are
 - a) 2.5 and 4.5 b) 4.0 and 0.5
 - c) 3.42 and 2.65 d) 5.52 and 1.41
- 9) Points on the earth's elliptical orbit at which earth is nearest to the sun is called
 - a) Perihelion b) Perigee
 - c) Apogee d) Aphelion

- 10) Density of sea water depends on
a) Temperature b) Pressure
c) Salinity d) All of the above

B) Fill in the blanks OR write true/ false **06**

- 1) Relatively windless areas along the equator are called the _____, or the horse latitudes.
- 2) The prevailing winds of the mid-latitudes are called the _____.
- 3) The _____ effect causes prevailing winds to blow diagonally rather than along strict north-south or east-west lines.
- 4) Streams of warm or cold water moving through the oceans are called _____.
- 5) _____ temperature and _____ salinity makes surface water become high in density and sink, spreading and forming deep currents.
- 6) Deep ocean currents are _____ driven.

Q.2 Answer the followings **16**

- A. Define climatology and describe its nature and scope
- B. Discuss the factors which cause variation in salinity of ocean and sea
- C. Write a note on 1) Density of ocean water 2) Continental margins
- D. Give a brief note on La-Nino

Q.3 Answer the followings. **16**

- A. What is atmosphere? Describe its composition.
- B. Give an account of horizontal distribution of temperature.

Q.4 Answer the followings. **16**

- A. Explain the types of oceanic current.
- B. Discuss the general relief features of the ocean floor.

Q.5 Answer the followings. **16**

- A. Explain the solar radiation- Terrestrial Radiation and its relationship.
- B. Explain the physical properties of sea water.

Q.6 Answer the followings. **16**

- A. Give an account of Equatorial Trough and Inter Tropical Convergence Zone.
- B. Write a note on 1) Indian monsoon 2) Indian dipole.

Q.7 Answer the followings. **16**

- A. Explain Three-Cell Model of the General Circulation.
- B. Describe Origin and evolution of the Indian Ocean.

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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov - 2022
(APPLIED GEOLOGY)
Mineral Exploration**

Day & Date: Tuesday, 14-02-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.**10**

1. Electrodes spacing is equal in _____ arrangement.
 - a) Wenner
 - b) Schlumberger
 - c) both Wenner and Schlumberger
 - d) none of these
2. The unit of resistivity is _____.
 - a) Nutron
 - b) Ohm
 - c) Ohm-m
 - d) Volt
3. Which of the following rock has the highest magnetic susceptibility value?
 - a) Talc
 - b) Limestone
 - c) Gabbro
 - d) Shale
4. Which of the following logging method is not used to detect porosity?
 - a) Sonic
 - b) Self potential
 - c) Neutron
 - d) Gamma-gamma
5. Diamond drilling can be used to bore hole in _____.
 - a) Horizontal direction
 - b) Vertical direction
 - c) Both horizontal and vertical direction
 - d) None of these
6. Currently lithium is extracted only from _____.
 - a) Anorthosites
 - b) Syenites
 - c) Granites
 - d) Pegmatites
7. Geological sampling is defined as _____ fraction of the bulk.
 - a) Recoverable
 - b) Representative
 - c) Resource
 - d) Reserve
8. Gravity survey is useful for find the mineral deposits because _____.
 - a) many ore bodies are denser than the surrounding rock.
 - b) many ore bodies are located close to gravitational nodes.
 - c) ores generate a smaller gravitational field than the surrounding rock.
 - d) ores produce cracks in the surrounding rock that generate inverse gravitational fields.
9. The galmi flora is geobotanical indicators for _____.
 - a) Radioactive minerals
 - b) Gallium deposits
 - c) Sulphide deposits
 - d) None of the above

10. Geochemical anomalies are termed as 'significant' when _____.
- They are related to the ore body
 - They are unrelated to the ore deposit
 - Confirm ore deposit
 - None of the above

B) Fill in the blanks or write true/ false. 06

- Gravity is the attraction on one body due* to the mass of another body. (True/False).
- Gravitational acceleration (Gravity) is commonly expressed in unit of _____.
- The magnetic field is various from equator to pole are about _____.
- The gamma ray measures the natural radioactivity of the rock, and does not measure any hydrocarbon or water present in the rock. (True/False)
- Induced polarization (IP) method is only method that can indirectly detect disseminated _____ mineralization.
- _____ log records the diameter of the hole.

Q.2 Write a short note on. 16

- Cross sectional method of ore reserve estimation
- Geochemical dispersion
- Rock density
- Describe the different stages in mineral exploration

Q.3 Answer the following 16

- Write a brief note on Resistivity survey and its applications.
- How geochemical soil survey is carried out?

Q.4 Answer the following 16

- What do you mean by reduction of gravity data? Describe the correction to be applied to the gravity data.
- What are the different types of drilling techniques that are used in mineral exploration? Add a note on advantages of core drilling.

Q.5 Answer the following 16

- Explain the term: prospecting and exploration. Follow a targeted identification and investigation outline various geological steps of mineral exploration.
- Describe various types of sampling with their advantages and disadvantages.

Q.6 Answer the following 16

- Discuss various types of self-Potential methods.
- Discuss various types of Well Logging methods adapted for mineral exploration.

Q.7 Answer the following 16

- Write a note on various types of equipment's used for mineral exploration with their advantages and disadvantages.
- Discuss in detail geochemical prospecting for mineral exploration.

Seat No.	
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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)**

Engineering Geology & Rock Mechanics

Day & Date: Wednesday, 15-02-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Question No.1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) What is the maximum force expressed per unit area, which a stone can withstand without rupturing?
 - a) Shear strength
 - b) Tensile strength
 - c) Compression strength
 - d) Bending strength
- 2) Arch dams are best suitable for which site?
 - a) Flat lands
 - b) Plateaus
 - c) Narrow valleys
 - d) Very wide valley
- 3) Rocks are inherently which type of materials?
 - a) Isotropic
 - b) Anisotropic
 - c) Homogeneous
 - d) Non - Homogeneous
- 4) What is the required specific gravity for a good building stone?
 - a) Greater than 2.7
 - b) Less than 3
 - c) Greater than 3
 - d) Less than 2.7
- 5) The layer of soil in which topsoil is found?
 - a) Horizon A
 - b) Horizon B
 - c) Horizon C
 - d) Horizon D & R
- 6) What causes all types of Landslides?
 - a) Rain
 - b) Deforestation
 - c) Gravity
 - d) All the above
- 7) A solid barrier constructed at a suitable location across a river valley to impound water is called _____.
 - a) Reservoir
 - b) Dam
 - c) Bridge
 - d) Retaining wall
- 8) Churn drill is type of: _____.
 - a) Percussion drilling
 - b) Rotary drilling
 - c) Jet drilling
 - d) None of these
- 9) Tunnels associated with hydropower generation are called _____.
 - a) Energy tunnels
 - b) Power tunnels
 - c) Generation tunnels
 - d) Hydropower tunnels
- 10) Earthquake can be measured by the scale _____.
 - a) Kilo gram
 - b) Joule
 - c) Richter scale
 - d) None of the above

B) Fill in the blanks OR write True or False.**06**

- 1) The ore of aluminum is _____.
- 2) _____ is a volcanic igneous rock used for rubble, masonry, road metal, foundation work etc.
- 3) The level up to which the reservoirs shall be full of water is called _____.
- 4) The A and B Horizon together the true soil called as solum.
(True/false)
- 5) The Alamatti dam built on Bhima river (True/False).
- 6) The Instrument used for recording earthquake waves is Seismograph
(True/False).

Q.2 Answer the following.**16**

- a) Silting of reservoir.
- b) Give uses of Building stone.
- c) Diamond core drilling.
- d) Write the Moh's scale of Hardness.

Q.3 Answer the following.**16**

- a) Give an account on the geological condition for construction of dams.
- b) What is the use of remote sensing in engineering geology?

Q.4 Answer the following.**16**

- a) What is meant by Earthquake? What are the effects of Earthquake?
- b) Explain the Permeability of rock.

Q.5 Answer the following.**16**

- a) Explain the soil profile and give classification of soil.
- b) Discuss various types of reservoirs.

Q.6 Answer the following.**16**

- a) Geophysical method for the selection of Engineering sites.
- b) RMI Analysis.

Q.7 Answer the following.**16**

- a) Explain the mass movement.
- b) Seismic zones of India.

Seat No.	
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**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022
(APPLIED GEOLOGY)
Fuel Geology**

Day & Date: Tuesday, 21-02-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any Three questions from Q.No.3 to Q.No.7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) Which of the following is the most suitable reservoir rock?
 - a) Sandstone with poorly sorted angular grain.
 - b) Shale
 - c) Sandstone with well sorted rounded grain.
 - d) Black shale
- 2) Majority of world's coal resources are restricted to the following geological time period:
 - a) Triassic
 - b) Permo-carboniferous
 - c) Carboniferous-Ordovician
 - d) Eocene
- 3) The oil-bearing formation in Digboi Oil Field is:
 - a) Tipam
 - b) Kalol
 - c) Panna
 - d) Barail
- 4) The reservoir rock of Bombay High Oil Field is:
 - a) Sandstone
 - b) Limestone
 - c) Shale
 - d) Clay
- 5) Petroleum and Natural gas are chiefly composed of:
 - a) Hydrogen
 - b) Hydrogen & Carbon
 - c) Nitrogen
 - d) Oxygen
- 6) Umra uranium deposits are located in:
 - a) Orissa
 - b) West Bengal
 - c) Rajasthan
 - d) Bihar
- 7) Rank of coal means:
 - a) The water content in the coal.
 - b) The degree of maturation.
 - c) The presence of SO₂ in the coal.
 - d) None of these.
- 8) Uranium minerals are generally associated with:
 - a) Chemical water
 - b) Iron ores
 - c) Organic matter
 - d) Calcareous rocks
- 9) Which among the following is not a renewable source of energy?
 - a) Coal energy
 - b) Solar energy
 - c) Hydro-power
 - d) Geothermal energy

- 10) The rocks having _____ is most suitable reservoir for petroleum
- High porosity high permeability
 - High porosity low permeability
 - Low porosity low permeability
 - Low porosity high permeability

B) Fill in the blanks or write True/ False.**06**

- Traps that are formed chiefly as a result of folding and faulting are called Structural traps. (True/ False).
- Coke coal is almost pure form of carbon. (True / False)
- Fossil fuels can be made in the laboratory. (True / False)
- Process of separation of different constituents from petroleum is called _____.
- _____ is the richest oil deposits in India
- CH₄ is a main constituent in _____.

Q.2 Write a short note on.**16**

- Elements of petroleum exploration.
- Coal Bed Methane (CBM).
- Grade and types of coal.
- Uranium exploration in India.

Q.3 Answer the following.**16**

- Write brief note on geological and geographical coal deposits in India.
- Write full note on coal carbonization, coal combustion and coal gasification.

Q.4 Answer the following.**16**

- Write a note on structural and stratigraphic Petroleum Traps.
- Write brief note on non- conventional energy resource in India.

Q.5 Answer the following.**16**

- Give an account of petroliferous basins of India.
- Write a brief note mineralogy and geochemistry of thorium radioactive minerals.

Q.6 Answer the following.**16**

- Write note on principles and methods of exploration for radioactive mineral deposits.
- Write note on classification of coal based on physical properties and chemical parameters.

Q.7 Answer the following.**16**

- Write a note on Coal seam.
- Write note on Origin of coal.