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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Mineralogy (MSC19101)

Day & Date: Wednesday, 19-07-2023
 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) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) _____ is measure of the bending of a ray of light when passing from one medium into another.
 - a) Index of refraction
 - b) Relief index
 - c) Index of reflection
 - d) None of the these
- 2) If the velocity of ordinary ray is greater than that of extraordinary ray the mineral is _____.
 - a) Optically Balanced
 - b) Optically negative
 - c) Optically positive
 - d) None of the these
- 3) _____ is the colours produced when the analyser is inserted on a thin-section microscope.
 - a) Interference color
 - b) Pleochroism
 - c) Index color
 - d) All of these
- 4) Which of the following is belongs to Epidote Group mineral?
 - a) Hornblend
 - b) Zoisite
 - c) Lepidolite
 - d) Plagioclase
- 5) Which of the following mineral is isotropic?
 - a) Halite
 - b) Calcite
 - c) Apatite
 - d) Both b and C
- 6) Which of the following is mineral belongs to garnet group?
 - a) Pyrope
 - b) Grossular
 - c) Both a & b
 - d) None of these
- 7) _____ is an optical phenomenon in which a substance has different colors when observed at different angles, especially with polarized light.
 - a) Interference color
 - b) Pleochroism
 - c) Both a & b
 - d) None of these
- 8) In which crystal structure two horizontal axis have same length and third vertical axis have different length _____.
 - a) Orthorhombic
 - b) Cubic
 - c) Tetragonal
 - d) Hexagonal
- 9) _____ of the following are polymorphs.
 - a) Quartz and cristobalite Simple
 - b) Diamond and graphite
 - c) Both a & b
 - d) None of these

- 10) Which of the following is not a type of twinning in minerals?
- a) Simple twinning
 - b) Cross hatched twinning
 - c) Single hatched
 - d) None of these

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

- 1) _____ is define as imaginary plane which passes through the center of a crystal can divides it into two equal portions which are exactly the mirror images of each other.
- 2) _____ is a technique for analyzing the atomic or molecular structure of minerals.
- 3) A mineral which transmits no light through a thin section under a microscope is called as Mineral.
- 4) Crystal lattice is the symmetrical three-dimensional structural arrangements of atoms, ions or molecules (constituent particle) inside a crystalline solid as points (True/False).
- 5) a axis \neq b axis \neq c axis is refers to tetragonal system. (True/False)
- 6) Anisotropic minerals are minerals that have the same properties in all directions. (True/False)

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

- a) Explain isotropic & anisotropic minerals with example of each.
- b) Define polymorphism and pseudo morphism.
- c) Write a note on ionic substitution & its types.
- d) Write a note on uniaxial & biaxial minerals.

Q.3 Answer the following.**a) Write a detail note on x ray diffraction.****08****b) Write a detail note on concept of light under microscope.****08****Q.4 Answer the following.****a) Write a detail note on Olivine group.****08****b) Write a detail note on Mica group.****08****Q.5 Answer the following.****a) Write a note on types of crystal symmetry and explain it for isometric system.****08****b) Write a detail note on types and causes twinning.****08****Q.6 Answer the following.****a) Write a detail note on types of bonding in mineral formation.****08****b) Write in detail about epidote group mineral.****08****Q.7 Answer the following.****a) Write a detail note on silicate structures.****08****b) Write a note on common optical properties of minerals.****08**

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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Indian Stratigraphy (MSC19102)

Day & Date: Thursday, 20-07-2023
 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) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) The stratigraphic boundary demarcating the Archaean rocks from Closepet granite is termed as _____.
 a) Non-conformity b) Disconformity
 c) Angular Unconformity d) Eparchaeon Unconformity
- 2) The sediments of the 'Dharwar Super-group' were deposited over a basement of:
 a) Slates and phyllites
 b) Marbles and Conglomerates
 c) Sargur Schists and Peninsular Gniessic complex
 d) Basalts and conglomerates
- 3) The oldest group of Cuddapah Super-group is:
 a) Papaghni Group b) Nallamalai Group
 c) Chitravati Group d) Kurnool Group
- 4) The Vindhyan system lies unconformably on the:
 a) Kurnool rocks b) Deccan rocks
 c) Cuddapah rocks d) Bijawar group rocks
- 5) The age of Tillite beds of Gondwana is _____.
 a) Lower Permian b) Middle Jurassic
 c) Upper Carboniferous d) Proterozoic
- 6) The correct chronological sequence (older to younger) of the Precambrian stratigraphic units listed below is _____.
 a) Sargur Group, Chitradurga Group, Alwar Group, Kaimur Group
 b) Chitradurga Group, Sargur Group, Kaimur Group, Alwar Group
 c) Sargur Group, Alwar Group, Chitradurga Group, Kaimur Group
 d) Sargur Group, Chitradurga Group, Kaimur Group, Alwar Group
- 7) During which geological time Dinosaur was flourish on earth?
 a) Proterozoic b) Permian
 c) Jurassic d) Tertiary
- 8) An extinction event or mass extinction is a widespread and rapid decrease in biodiversity on Earth. Such an event first observed during _____ period.
 a) Neoproterozoic b) Palaeogene
 c) Tertiary d) Ordovician

- 9) Analysis of stratigraphic thickness is carried out with the help of ____.
- a) Isopach maps b) Lithostratigraphic map
c) Geological map d) Structural map
- 10) The Lilang Group in Spiti is considered the Indian type area for the ____.
- a) Permian b) Jurassic
c) Triassic d) Cretaceous

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

- 1) Who introduced the term Gondwana?
- 2) Which formation of Saucer group is more important for manganese ore _____.
- 3) Which of the following geological time intervals witnessed the first appearance of skeleton organism in the earth's history?
- 4) Lonar crater in Buldhana district, Maharashtra was formed by Meteoritic impact. (True/False)
- 5) The land covered by water from all sides is called as Peninsula. (True/False)
- 6) Cenozoic is the youngest era in Geological time scale. (True/False)

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

- a) Sargur Schist
- b) Indravati basin
- c) Flora and fauna of Gondwana
- d) Iron ore series

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

- a) Write down Stratigraphy, classification and evolution of the Siwlaik group.
- b) Discuss in detail Achaean - Proterozoic boundary in India.

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

- a) Discuss in detail Structure, Stratigraphy & Tectonic evolution of Cuddapah Basin.
- b) Write in detail the evolution of Himalayas.

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

- a) Write an essay on Deccan Trap.
- b) What are the principles and concept of Litho, Bio and Chrono Stratigraphy?

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

- a) Explain in detail Tectonic sub-divisions of India.
- b) Discuss in detail stratigraphy and depositional environment of Mesozoic rocks of Kachchh.

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

- a) Write a note on Trans- Himalayan and Karakoram granite batholiths.
- b) Write a full note on Geological Time scale.

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**M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY**

Sedimentary and Metamorphic Petrology (MSC19103)

Day & Date: Friday, 21-07-2023
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) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) Which of the following is the smallest megascopic structure in a sedimentary sequence?

a) Lamination	b) Bed
c) Stratum	d) None of the above
- 2) Diatoms are _____.

a) Calcareous deposit	b) Siliceous deposit
c) Phosphateic deposit	d) Carbonaceous deposit
- 3) Metamorphic rock shows alternative dark and light colour band known as _____.

a) Slate	b) Schist
c) Gneiss	d) Marble
- 4) _____ is rock beneath the Earth's surface experiences equal pressure exerted on it from all directions because of the weight of the overlying rock.

a) Lithostatic pressure	b) Directive pressure
c) Fluid pressure	d) None of the above
- 5) _____ involves the creation of new mineral crystals different from the protolith.

a) Phase change	b) Neocrystallization
c) Metamorphism	d) None of the above
- 6) 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
- 7) The clasts of sedimentary rock are between 5 mm and 10 mm in size, So the rock will be named as _____.

a) Shale	b) Sandstone
c) Conglomerate	d) Siltstone
- 8) What is the name of a rock that is composed largely of abundant mica flakes arranged in a parallel manner?

a) Gneiss	b) Schist
c) Shale	d) Slit

- 9) 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
- 10) In which metamorphic environment would geologist find a metamorphic aureole?
 a) Regional metamorphism b) Contact metamorphism
 c) Shock metamorphism d) Cataclastic metamorphism

B) Fill in the blanks OR Write True or False.

06

- 1) The ____ gradient is defined as the increase in temperature with depth in the Earth.
- 2) In Precambrian shield geothermal gradient within the Earth's surface is about 12 to 20° C/km. (True/False)
- 3) ____ gradient is the increase in pressure with increase in depth.
- 4) The main mineral produced in burial metamorphism is _____.
- 5) Most of the rocks in tropical regions are often covered by an extensive layer of a product of chemical leaching called _____.
- 6) Rock formed by process of solid-state crystallization of preexisting rock is called _____.

Q.2 Write a short note on:

16

- a) Diagenesis process of sedimentary rocks
- b) Sphericity
- c) Agents of metamorphic processes
- d) Hydrothermal metamorphism

Q.3 Answer the following.

16

- a) Describe the characteristics of eclogite facies metamorphism. Add a note on types of mineral assemblages of eclogite.
- b) Write a brief note on charnockites.

Q.4 Answer the following.

16

- a) With neat sketch, describe the depositional sedimentary structure, with emphasis on their applications in determining paleocurrent directions.
- b) Describe types of physical weathering.

Q.5 Answer the following.

16

- a) Write a note on metamorphic processes.
- b) Write a note on contact metamorphism.

Q.6 Answer the following.

16

- a) Discuss in details types of metamorphic textures with examples.
- b) Discuss phase rule and its applications on the phase diagrams.

Q.7 Answer the following.

16

- a) Write a brief note on marine deposition environment of sedimentary rocks.
- b) Write a brief note on metamorphic differentiation.

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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
GEOCHEMISTRY (MSC19108)

Day & Date: Saturday, 22-07-2023
 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) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

10

- 1) The Big-bang theory has been given for:
 - a) Origin of the Universe
 - b) Isostasy
 - c) Plate-tectonics
 - d) Earthquake
- 2) The fastest planet in the solar system is:
 - a) Neptune
 - b) Mercury
 - c) Venus
 - d) Jupiter
- 3) Elements concentrated in the metal are:
 - a) More electropositive
 - b) Less electropositive
 - c) Neutral
 - d) None of these
- 4) Some elements show affinity for more than one group because the distribution of any element is dependent to some extent on:
 - a) Temperature
 - b) Pressure
 - c) The chemical environment of the system as a whole
 - d) All the above
- 5) The geochemical character of an element is largely governed by the:
 - a) Number of protons in the nucleus
 - b) Number of neutrons in the nucleus
 - c) Electronic configuration of its atoms
 - d) All the above
- 6) Elements which readily form ions with an outermost 8-electron shell are:
 - a) Siderophile
 - b) Chalcophile
 - c) Lithophile
 - d) Atmophile
- 7) What is the average percentage of SiO₂ in the Igneous rocks:
 - a) 59.14%
 - b) 65.50%
 - c) 79.15%
 - d) 80.00%
- 8) Verve-clock method can be used for getting geologic-time from:
 - a) 0-100 yrs. only
 - b) 0-1,000 yrs. only
 - c) 0-10,000 yrs. only
 - d) 0-1,00,000 yrs. only
- 9) Chondrites are consisting primarily of:
 - a) Olivine only
 - b) Pyroxene only
 - c) Olivine and/or pyroxene
 - d) Iron and Nickle

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M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Igneous Petrology (MSC19201)

Day & Date: Wednesday, 19-07-2023
 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. (MCQ) 10

- 1) Why basalt is fine grained than 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
- 2) What is the essential mineral composition of Granite?
 - a) Quart + Augite + Plagioclase
 - b) Quartz + Feldspar
 - c) Augite + Plagioclase
 - d) Carbonate minerals
- 3) Basalt is _____ rock.
 - a) Sedimentary
 - b) Plutonic
 - c) Both igneous and metamorphic
 - d) Volcanic
- 4) Mafic igneous rocks contain more amounts of _____ as compared to felsic igneous rock.

a) Quartz	b) Iron
c) Aluminium	d) Pink feldspar
- 5) Andesitic rocks form in:
 - a) Continent-Continent collision
 - b) Ocean-Continent collision
 - c) Ocean-Ocean collision
 - d) Continental rift
- 6) Carbonatite is _____ rock?
 - a) Igneous rocks
 - b) Chemical deposit
 - c) Volcanogenic sedimentary rocks
 - d) Metamorphic rocks
- 7) What is the state of lava or magma?
 - a) Liquid
 - b) Solid
 - c) Gaseous
 - d) Mixture of solid, liquid, gas

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M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Structural Geology and Tectonics (MSC19202)

Day & Date: Sunday, 23-07-2023
 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) Terms used to describe surfaces across which there has been perceptible displacement are many. However, most geologists would prefer one of the following terms:
 - a) Joints
 - b) Fractures
 - c) Cracks
 - d) faults
- 2) Which of the following is not a stress term?
 - a) megapascal
 - b) Pascal
 - c) Kilobars
 - d) kilometers
- 3) Fold having inclined axis are called ____ fold.
 - a) Overturned
 - b) Recumbent
 - c) Plunging
 - d) Isoclinal
- 4) An unconformity in which the oldest series of beds parallel to the younger series of beds is called _____.
 - a) Angular unconformity
 - b) Conformity
 - c) Disconformity
 - d) Non conformity
- 5) The angle between bedding plane and horizontal plane is _____.
 - a) Dip
 - b) Strike
 - c) Rake
 - d) Bearing
- 6) If a bed strikes east-west, it must have the dip _____.
 - a) Towards north
 - b) Towards south
 - c) It is a vertical
 - d) Information is insufficient
- 7) In _____ unconformity underlying rock is igneous and overlying rock is sedimentary.
 - a) Angular
 - b) Non conformity
 - c) Buttress
 - d) None of the above
- 8) The strata that dip in one direction at uniform angle the fold is called as _____.
 - a) Monocline
 - b) Homocline
 - c) Open
 - d) Structural terrace
- 9) The shearing stress is denoted by _____.
 - a) Sigma
 - b) Tau
 - c) Rho
 - d) Phi

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M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Hydrogeology (MSC19206)

Day & Date: Tuesday, 25-07-2023
 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) Water table in the upper surface of zone of saturation is known as _____ surface.
 - a) Piezometric
 - b) Phreatic
 - c) Hygroscopic
 - d) None of the above
- 2) Water which has recently been involved in atmospheric circulation, i.e. it has become a part of hydrological cycle is known as _____.
 - a) connate water
 - b) Juvenile water
 - c) Vadose water
 - d) Meteoric water
- 3) _____ is the founder of Groundwater Hydrology.
 - a) Aristotle
 - b) Edme Mariotte
 - c) Toad K
 - d) Edmond David
- 4) A saturated formation in which yield inappreciable quantity of water but through which appreciable leakage of water is possible is called as _____.
 - a) Aquifuge
 - b) Aquifer
 - c) Aquiclude
 - d) Aquitard
- 5) Dating of groundwater is done by _____.
 - a) Sodium salt dissolved in water
 - b) Radionucleods present in it
 - c) Carbon dioxide dissolved in it
 - d) None of the above
- 6) The force of adhesion in capillary water is _____ than Hygroscopic water.
 - a) Less
 - b) More
 - c) Equal
 - d) fluctuates time to time
- 7) Reverse and rotary drill is used for _____.
 - a) Drilling blast hole for seismic prospecting in aquifer
 - b) Groundwater drilling
 - c) Oil well drilling in aquiclude
 - d) All the above

8) At 25° C the total dissolved solids (TDS) in parts per million of natural water is determined by the formula _____.

- a) $\frac{TDS}{EC \times 10^6} = 0.64$ b) $\frac{EC}{TDS \times 10^6} = 0.64$
 c) $\frac{EC \times 10^6}{TDS} = 0.64$ d) $\frac{TDS}{10^6} = 0.64$

9) The chief source of potassium in groundwater is _____.

- a) Alkali feldspar b) Plant debris
 c) Small flakes of micas d) Halites

10) Most suitable well in limestone region is _____.

- a) Cable tool b) Rotary
 c) Rotary percussion d) None of the above

B) Fill in the blanks/True or False.

06

- 1) "The flow rate through porous media is directly proportional to the head loss & inversely proportional to the length of flow path" is _____ law.
- 2) Fresh water found in soil & rock layers below earth's surface is called _____.
- 3) The difference between the original water table level & the water level in the pumped well is called as _____.
- 4) Groundwater is not subordinate to surface water. (True / False)
- 5) Shale is having lowest porosity. (True / False)
- 6) The percentage of rocks total volume that is taken up by pore space is called as _____.

Q.2 Answer the following.

16

- a) Origin of water.
- b) Salt water intrusion in aquifer.
- c) Lineament mapping using remote sensing and GIS techniques.
- d) Effect of groundwater over exploitation.

Q.3 Answer the following.

16

- a) Explain in detail various types of aquifers with neat labelled diagram.
- b) What are surface geological methods of groundwater exploration? Explain with neat labelled diagrams.

Q.4 Answer the following.

16

- a) Write in detail types of wells and their different drilling methods of construction wells.
- b) Explain in detail rain water harvesting and its methods.

Q.5 Answer the following.

16

- a) Explain various methods for evaluation of aquifer parameters.
- b) What is groundwater balance estimation?

Q.6 Answer the following.

16

- a) Explain sub surface movement of water with neat labelled diagram.
- b) What is ground water legislation?

Q.7 Answer the following.

16

- a) Explain in detail the groundwater provinces of India.
- b) Describe groundwater recharge methods in detail.

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M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY

Climatology & Oceanography (MSC019301)

Day & Date: Monday, 10-07-2023
 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 the correct alternative.

10

- 1) Convection is a process of transfer of heat _____.
 - a) From one body to another body without the aid of a medium
 - b) Through the molecules of matter in a body
 - c) Through movement of a substance from one place to other
 - d) None of the above
- 2) High tides are formed when _____.
 - a) The sun and the moon are at the position of right angle with reference to the earth
 - b) The sun, the earth and the moon are in the same line
 - c) The sun and the earth at the position of 45° with reference to the moon
 - d) None of the above
- 3) Choose the correct statement.
 - a) Overall salinity of ocean increases with increasing depth.
 - b) Salinity decreases with increasing depth in low latitudes.
 - c) Salinity is higher at the surface at equator and lower below the water surface.
 - d) Salinity increases with increasing depth in high latitudes.
- 4) Specific heat of water is almost _____.
 - a) Two times greater than land
 - b) Three times greater than land
 - c) Four times greater than land
 - d) Five times greater than land
- 5) The phenomenon of increasing temperature with increasing altitude from the earth's surface is called _____.
 - a) Normal lapse rate
 - b) Temperature inversion
 - c) Negative lapse rate
 - d) Both 'b' and 'c'
- 6) The average slope of continental slope is about _____.
 - a) 30°
 - b) 45°
 - c) 5°
 - d) 10°
- 7) Flat-topped volcanoes on the ocean floor are known as _____.
 - a) Seamounts
 - b) Guyots
 - c) Plateaus
 - d) Oceanic ridges

- 8) Siliceous animal remains consist of _____.
 a) Skeletons of radiolaria b) Skeleton of algae
 c) Skeleton of diatoms d) None of the above
- 9) Isohalines are _____.
 a) The lines that join the places of equal salinity.
 b) The lines that join the places of equal temperature.
 c) The lines that join the places of equal humidity.
 d) The lines that join the places of equal precipitation.
- 10) The warmest and coldest months in northern hemisphere respectively are _____.
 a) June and December b) May and January
 c) July and January d) July and December

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

- 1) The water cycle affects weather when _____ falls as rain or snow.
 2) At any latitude, the higher the _____, the colder the temperature.
 3) The tilting of the earth axis is $23\frac{1}{2}^{\circ}$. (true/ false)
 4) Indian dipole movement depend on the two high pressure and low-pressure poles. (true/ false)
 5) Jetstream form on the equator only. (true/ false)
 6) Water has high Albedo. (true/ false)

Q.2 Answer the following. 16

- a) Earth sun relationship explain with net diagram.
 b) Write a note on Submarine Canyons.
 c) Give a brief note on Abyssal Plains.
 d) Explain Single-Cell Model.

Q.3 Answer the following. 08

- a) Explain nutrients in the ocean, their cycles and factors influencing their distribution. 08
 b) Describe with sketch distribution of Wind and Pressure over the surface of the earth. 08

Q.4 Answer the following. 08

- a) What is a scope of climatology in applied science and write different climate zones on earth? 08
 b) Write a note on Petroleum occurrences and exploration activity in the oceanic floor. 08

Q.5 Answer the following. 08

- a) Give an account of sediment distribution on the Indian Ocean floor. 08
 b) How earth has latitudinal Variations in Solar Radiation and its effect on climates. 08

Q.6 Answer the following. 08

- a) Give an account of Equatorial Trough and Inter Tropical Convergence Zone. 08
 b) Write a note on Chemical properties of sea water. 08

Q.7 Answer the following. 08

- a) Explain Three-Cell Model of the General Circulation. 08
 b) Describe Origin and evolution of the Indian Ocean. 08

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M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Mineral Exploration (MSC019302)

Day & Date: Tuesday, 11-07-2023
 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 the correct alternative.

10

- 1) The Value of Universal Gravity constant in S.I. Unit is _____.
 a) $6.67 \times 10^{-8} \text{ Nm}^2/\text{kg}^2$ b) $6.67 \times 10^{-9} \text{ Nm}^2/\text{kg}^2$
 c) $6.67 \times 10^{-7} \text{ Nm}^2/\text{kg}^2$ d) $6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$
- 2) 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
- 3) In which of the following configuration, the electrodes are uniform spaced?
 a) Schlumberge array b) Pole- dipole array
 c) Wenner d) Pole-pole array
- 4) Which of the following rock show high resistivity?
 a) Sedimentary
 b) Igneous and Metamorphic
 c) Igneous, sedimentary and metamorphic
 d) None of these
- 5) Drilling is employed for _____.
 i) Determination of stratigraphic or rock sequence
 ii) Locating and evaluating subsurface of economic value
 iii) Extracting economically valuable substances
 iv) Obtaining data for correlation
 a) ii and iii are correct
 b) i and ii are correct
 c) ii, iii and iv are correct
 d) all of the above are correct
- 6) Currently lithium is extracted only from _____.
 a) Anorthosites b) Syenites
 c) Granites d) Pegmatites
- 7) The Galmi flora is geobotanical indicators for _____.
 a) Radioactive minerals b) Gallium deposits
 c) Sulphide deposits d) None of these
- 8) Well logging is _____ technique in exploration.
 a) Surface b) Sub-surface
 c) S. P. Method d) Gamma-Gamma logging

Seat No.	
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**M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY**

Engineering Geology & Rock Mechanics (MSC019306)

Day & Date: Wednesday, 12-07-2023
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 the correct alternative.

10

- 1) Which state in India has the most numbers of large dams?
 - a) Karnataka
 - b) Orissa
 - c) Maharashtra
 - d) Madhya Pradesh
- 2) What is very critical about gravity dams?
 - a) Strength of the concrete used
 - b) Strength of the masonry used
 - c) Strength of the rock foundation
 - d) The type of water stored in the reservoir
- 3) The type of valley most common on earth is _____.
 - a) Rain valleys
 - b) Erosional valleys
 - c) Wind valleys
 - d) Tectonic valleys
- 4) The downgrade movement of mass along no definite surface is called?
 - a) Flowage
 - b) Sliding
 - c) Subsidence
 - d) Earthquake
- 5) Which of the following is not a part of Drilling machine?
 - a) Spindle
 - b) Head
 - c) Colom
 - d) Mandrel
- 6) Water content of soil can _____.
 - a) Never be greater the 100%
 - b) Take values only from % to 100
 - c) Be less than 0%
 - d) Be greater than 100%
- 7) Knowing the Lithology of the site is very important in terms of its safety and feasibility.
 - a) True
 - b) False
- 8) The arch dam in India is situated in which state?
 - a) Karnataka
 - b) Gujrat
 - c) Karela
 - d) Maharashtra
- 9) For good building stone, how much is the required crushing strength?
 - a) Less than 50 N/mm²
 - b) Greater than 100 N/mm²
 - c) 155 N/mm²
 - d) 10 N/mm²

- 10) Soil is made of _____.
- a) Weathered rock and minerals
 - b) Dead plants and animals
 - c) Air and water
 - d) All of the above

B) Fill in the blanks.

06

- 1) Crushing strength of rock Basalt is _____.
- 2) The very top layer of soil is mostly made of _____.
- 3) The _____ is responsible for earth's magnetic field.
- 4) _____ is the longest dam in India?
- 5) The underground routes or passages driven through the ground without disturbing overlying soil cover are called _____.
- 6) _____ is a pure white limestone and which is soft and easy to form powder.

Q.2 Write a short note on:

16

- a) Physical characters of building stones
- b) What are the causes of earthquake?
- c) Grouting method
- d) Write short note on.
 - 1) Porosity
 - 2) Permeability

Q.3 Answer the following.

- a) Explain the scope of geology in civil engineering.
- b) Give different causes of landslide.

08

08

Q.4 Answer the following.

- a) Air- Rotary drilling.
- b) Explain the types of mining.

08

08

Q.5 Answer the following.

- a) Discuss various types of Tunnels.
- b) Explain preliminary geological investigation for Reservoir site.

08

08

Q.6 Answer the following.

- a) Explain the terminology of dam and types of dam.
- b) Discuss in detail RQD.

08

08

Q.7 Answer the following.

- a) Drilling equipment and their uses.
- b) Explain strain and strength of rock.

08

08

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

- 1) The Agnigundala belt of Andhra Pradesh is famous for _____ ore minerals.
- 2) Malajkhand copper mineralization hosted by _____ igneous rock.
- 3) The ore minerals are always confined within specific strata and are distributed in a manner that resembles particles in a sedimentary rock is called as _____.
- 4) Quartz mineral has 2.65 g/cm³ specific gravity. (true / false)
- 5) Chemical composition of Hematite mineral is Fe₂O₃. (true / false)
- 6) Rich Uranium deposits is found in Jaduguda area of Andhra Pradesh. (true / false)

Q.2 Write short notes on 16

- a) Physical properties of Hematite ore mineral
- b) Heavy mineral separation method
- c) Short note on Industrial and refractory minerals
- d) Zoning in mineral deposit

Q.3 Answer the following.

- a) Define hydrothermal deposit. Explain in details cavity filling deposit with suitable example. 08
- b) Textures of ore deposit. 08

Q.4 Answer the following.

- a) What is wall rock alteration? Discuss in short various types of alteration. 08
- b) Write a note on ores in Igneous rocks. 08

Q.5 Answer the following.

- a) Explain geology, stratigraphy and depositional environment of Khetri copper deposit. 08
- b) Write a note on strategic, critical and essential minerals. 08

Q.6 Answer the following.

- a) Discuss full note on Fluid Inclusion thermocryometry. 08
- b) Write down different optical properties for identification ore minerals under reflected light microscope. 08

Q.7 Answer the following.

- a) Discuss Early magmatic deposit. 08
- b) Mechanical concentration 08

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023
APPLIED GEOLOGY
Fuel Geology (MSC019402)

Day & Date: Wednesday, 12-07-2023
 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) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. 10

- 1) Which of the following is the most stable of all the petroleum hydrocarbons?
 - a) C₂H₆
 - b) CH₄
 - c) C₃H₈
 - d) C₄H₁₀
- 2) Significant hydrocarbon generation begins at _____.
 - a) 500 F
 - b) 1000 F
 - c) 1500 F
 - d) 3000 F
- 3) Which of the following energy sources does not produce carbon dioxide?
 - a) Oil
 - b) Uranium
 - c) Coal
 - d) Natural gas
- 4) Wellsite geologist detects the oil in the mud by _____ under ultraviolet light.
 - a) Fluorescence
 - b) Phosphorescence
 - c) Thermo-luminescence
 - d) All of the above
- 5) Majority of world's coal resources are restricted to the following geological time period:
 - a) Triassic
 - b) Permo-carboniferous
 - c) Carboniferous-Ordovician
 - d) Eocene
- 6) Which of the following is a non-renewable energy resource?
 - a) Solar
 - b) Methane
 - c) Hydroelectric
 - d) Coal
- 7) The reservoir rock of Bombay High Oil Field is:
 - a) Sandstone
 - b) Limestone
 - c) Shale
 - d) Clay
- 8) Which of the following is least likely to contain an oil trap?
 - a) an anticline
 - b) Fault
 - c) natural stratigraphy
 - d) syncline
- 9) Gas oil or commonly known as fuel oil has the highest boiling point up to _____ degree Celsius:
 - a) 300
 - b) 350
 - c) 500
 - d) 1000

- 10) Which of the following problems is associated with the burning of coal?
- acid rain
 - carbon dioxide emissions
 - ash with toxic metal impurities
 - All of these

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

- Petroleum reservoirs are normally found in _____ rocks.
- Minerals like petroleum and natural gas, found far below the Earth's surface, are extracted by the process of remote sensing. (true / false)
- Plutonium-239 and uranium-235 are the most common isotopes used in nuclear weapons. (true / false)
- _____ is a sedimentary deposit composed predominantly of carbon that is readily combustible.
- What is the full form of CIL?
- Jharkhand has the largest reserves of coal in India followed by Odisha and Chhattisgarh. (true / false)

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

- Radioactive decay
- Source rock for petroleum
- Oil Migration
- Geology of Assam petroliferous basin

Q.3 Answer the following.

- Give an account of the geology and hydrocarbon occurrence in Bengal basin. **08**
- Write on the occurrence and distribution of major radioactive minerals (U-Th) of India. **08**

Q.4 Answer the following.

- Write a brief note on Coal bed Methane (CBM). **08**
- Write brief note on non- conventional energy resource. **08**

Q.5 Answer the following.

- Write a brief account on classification of petroliferous basins in India. **08**
- Write a brief note mineralogy and geochemistry of Uranium radioactive minerals. **08**

Q.6 Answer the following.

- Describe various geological and geophysical techniques of exploration of natural hydrocarbons. **08**
- Write a note on coal gasification. **08**

Q.7 Answer the following.

- Write a note on distribution of Tertiary coal deposits in India. **08**
- Write a note on petroliferous basins in Kutch (Kachchh). **08**

