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M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY
Mineralogy (2333101)

Day & Date: Friday, 05-01-2024
 Time: 03:00 PM To 05.30 PM

Max. Marks: 60

Instructions: 1) All questions are compulsory.
 2) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

08

- 1) Which of the following mineral has no cleavage?
 - a) Plagioclase
 - b) Zinnwaldite
 - c) Olivine
 - d) Calcite
- 2) Aluminosilicate group of minerals are having chemical formula _____.
 - a) Al_2SiO_5
 - b) $AlSiO_5$
 - c) Al_5SiO_4
 - d) Al_2O_3
- 3) Minerals in the Moh's scale of hardness are _____.
 - a) silicates, phosphates, carbonates, oxides
 - b) silicates, carbonates, chlorides, sulphides
 - c) silicates, phosphates, oxides, chlorides
 - d) silicates, carbonates, phosphates, sulphides
- 4) Which of the following minerals show lamellar twinning under microscope?
 - a) Calcite
 - b) Plagioclase
 - c) Orthoclase
 - d) Hornblende
- 5) The space lattice structure of minerals is determined using _____.
 - a) X-ray diffraction
 - b) spectroscopic methods
 - c) chemical analysis
 - d) scanning electron microscopy
- 6) Diamond crystallizes in:
 - a) Monoclinic system
 - b) Hexagonal system
 - c) Tetragonal system
 - d) Cubic system
- 7) Which is following Sodium rich mica.
 - a) Biotite
 - b) Muscovite
 - c) Paragonite
 - d) Lepidolite
- 8) Quartz is _____.
 - a) Uniaxial Positive
 - b) Biaxial Positive
 - c) Uniaxial Negative
 - d) Biaxial Negative

B) Fill in the blanks OR Write true/ false

04

- 1) What is the hardness of Topaz?
- 2) What type of silicate structure does the olivine mineral show?
- 3) The colour of streak of Hematite mineral is cherry red. (True/False)
- 4) Adamantine is the lustre shown by Diamond (True/False)

- Q.2 Answer the Following. (Any Six) 12**
- a) Define Isotropic and anisotropic minerals
 - b) Physical properties of Calcite group of minerals.
 - c) What is miller indices.
 - d) Use of XRD in mineralogy
 - e) Define pleochroism and streak of a mineral.
 - f) Name Ca and Mg Olivine minerals.
 - g) Planes and axis of symmetry.
 - h) Give optical properties Quartz.
- Q.3 Answer the following. (Any three) 12**
- a) Write in short Structure and Physical properties of Garnet group of minerals.
 - b) Write a note on behaviour of light under microscope.
 - c) Define twinning. Write a short note on twinning in feldspars.
 - d) Describe in brief optical and physical properties of Aluminosilicates group of minerals.
- Q.4 Answer the following. (Any two) 12**
- a) Describe in brief amphibole group of minerals.
 - b) Differentiate between clinopyroxene and orthopyroxene.
 - c) Describe in brief the mica group of minerals.
- Q.5 Answer the following (Any two) 12**
- a) What is interference figure? Add note on uniaxial interference figure.
 - b) Write a note on Cubic system.
 - c) Explain with neat diagram ortho and chain silicate structures.

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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY**

Igneous and Metamorphic petrology (2333102)

Day & Date: Sunday, 07-01-2024
Time: 03:00 PM To 05:30 PM

Max. Marks: 60

Instructions: 1) All question are compulsory.
2) Figure to right indicate full marks.

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

08

- 1) Coarse grained gneissose rock rich in hypersthene is called:
 - a) Kodurite
 - b) Khondalite
 - c) Charnockite
 - d) Gondite
- 2) Pyrolite is:
 - a) Three part peridotite and one part basalt
 - b) A rock found in continental crust
 - c) A model rock composition which can occur any where
 - d) A rock found on ocean floor
- 3) Lamprophyres are:
 - a) Metamorphic rock
 - b) Plutonic rock
 - c) Hypabyssal rock
 - d) Volcanic rock
- 4) Graphic texture is occur in _____ rock.
 - a) granite
 - b) Shale
 - c) basalt
 - d) pumice
- 5) The processes of splitting of homogeneous magma in to different fraction is known as _____.
 - a) Assimilation
 - b) Differentiation
 - c) Flowing
 - d) gas streaming
- 6) Marble is the resultant product of thermal metamorphism on
 - a) Shale
 - b) Sandstone
 - c) Limestone
 - d) Basalt
- 7) Directed pressure is the chief agent of _____ metamorphism.
 - a) Cataclastic
 - b) Thermal
 - c) Pneumatolytic
 - d) Plutonic
- 8) _____ of following is not a metamorphic rock.
 - a) Phyllite
 - b) Syenite
 - c) Quartzite
 - d) Gneiss

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

04

- 1) Dyke is a concordant body. (True/False)
- 2) Rapid cooling of lava leads to formation of fine grained rock. (True/False)
- 3) Gneissose rocks are formed by dynamothermal metamorphism of rock (True/False)
- 4) Glaucofane is the characteristic mineral of blueschist facies. (True/False)

- Q.2 Answer the following. (Any Six) 12**
- a) Name characteristic minerals of Zeolite facies.
 - b) Petrological characters of Granite rock.
 - c) What is crystal fractionation?
 - d) Isograde
 - e) Diagrammatic representation of Bowens reaction series.
 - f) Definition of metamorphic facies.
 - g) Define Index minerals.
 - h) What is pluton?
- Q.3 Answer the following. (Any Three) 12**
- a) Write in short classification of igneous rocks based on silica content.
 - b) .AFM diagram.
 - c) Eclogite facies.
 - d) Crystallization of magma.
- Q.4 Answer the following. (Any Two) 12**
- a) What is regional metamorphism? Add a note on the metamorphic products of pelites and impure calcareous rocks.
 - b) Write full note on agents of metamorphism.
 - c) Describe mineralogy, genesis and occurrence of carbonatite in India.
- Q.5 Answer the following. (Any Two) 12**
- a) Describe in detail the Deccan Volcanic Flood basalt
 - b) Write a detailed note on magmatism associated with convergent and divergent plate boundary.
 - c) Write note on Forsterite- Silica binary silicate system.

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M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY

Sedimentology and Palaeontology (2333108)

Day & Date: Tuesday, 09-01-2024
 Time: 03:00 PM To 05.30 PM

Max. Marks: 60

Instructions: 1) All question are compulsory.
 2) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

08

- 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) The area of exposure of sedimentary rock is about _____.
 - a) 75% of the earth's crust
 - b) 30% of the earth's crust
 - c) 05% of the earth's crust
 - d) 25% of the earth's crust
- 3) The size of fine-grained sand range between _____.
 - a) 0.1-1 mm
 - b) 2-4 mm
 - c) 0.64 mm
 - d) 0.00064 mm
- 4) Limestone rock is consist of _____.
 - a) calcite and gypsum
 - b) calcite and aragonite
 - c) calcite and dolomite
 - d) aragonite and dolomite
- 5) Fossils which have limited geological range but have a very wide geographical range is known as _____.
 - a) Living fossils
 - b) Trace fossils
 - c) Body fossils
 - d) Index fossils
- 6) Which of the following fossils found in lower Gondwana?
 - a) Glossopteris
 - b) Williamsonia
 - c) Gangamopteris
 - d) 'a' and 'c'
- 7) The most ancient type of eyes in trilobites are called as _____.
 - a) Archroal
 - b) Schizochroal
 - c) Holochroal
 - d) None of the above
- 8) Which of the following periods is known as age of fishes?
 - a) Carboniferous
 - b) Triassic
 - c) Ordovician
 - d) Devonian

B) Fill in the blanks OR write true/false.

04

- 1) Index Fossils are also known as Indicator Fossils. (True/False)
- 2) Phillipsia trilobite fossil geological age is Carboniferous to Permian (True/False)
- 3) In cold and dry climates will _____ weathering be most rapid.
- 4) Laterite is a _____ deposit.

Q.2 Answer the following. (Any Six)

- a) Frost wedging
- b) Lamination and Bedding
- c) Index fossil
- d) What is the difference between weathering and erosion.
- e) Carbonation
- f) Ripple mark
- g) Characteristics of sedimentary rocks
- h) Deltaic environment

12**Q.3 Answer the following. (Any Three)**

- a) Write a note on conditions of preservation of fossils.
- b) Write a note on morphology of trilobite.
- c) Write a note on Froude numbers.
- d) Write a brief account on clastic and non-clastic sedimentary rocks.

12**Q.4 Answer the following. (Any Two)**

- a) Discuss the process of paleo current analysis of sedimentary rock.
- b) Write a note on classification of sandstone.
- c) Draw the sketch and label explain the morphology of foraminifera.

12**Q.5 Answer the following. (Any Two)**

- a) Give an account on sedimentation in terrestrial environment.
- b) Write a note on evolution of man.
- c) Write a note on types of significance of fossils in mineral exploration stratigraphy and paleo-environment study.

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY**

Sedimentary and Metamorphic Petrology (MSC19103)

Day & Date: Tuesday, 09-01-2024
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 grain size of clastic silty sedimentary rock is _____.
a) more than 2.0 mm b) 2.0 mm to 0.062 mm
c) 0.062 mm to 0.004 mm d) less than 0.004 mm
- 2) Reverse graded cross lamination structure is developed in _____.
a) Fluvial environment b) Aeolian environment
c) Marine environment d) None of the above
- 3) Sandstone rocks are composed almost entirely of sand-sized quartz grains cemented together through lithification. Its grain size is in between _____.
a) more than 2.0 mm b) 2.0 mm to 0.062 mm
c) 0.062 mm to 0.004 mm d) less than 0.004 mm
- 4) The combination of poorly-sorted, predominantly coarse, rounded grains suggests that conglomerates form in _____.
a) High-energy environments such as steep-gradient streams.
b) Low-energy environments such as steep-gradient streams.
c) Low-energy environments such as gentle-gradient streams.
d) High-energy environments such as gentle-gradient streams.
- 5) 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) Thicker than 2 cm
- 6) The ripple index of wave-formed ripples is generally around _____.
a) 7 b) 4
c) 3 d) 2
- 7) Alluvial fans are the deposits with fan shaped approximating a segments of a cone and exhibiting convex up cross sectional profile. The sediments present in alluvial fans are _____.
a) Well sorted b) Poorly sorted
c) Moderately sorted d) Very well sorted
- 8) The AFM diagram to represent the rock composition and mineral assemblages to plutonic rocks was invented by _____.
a) Winkler b) Goldschmidt
c) Thompson d) Harker

- 9) Which of the following mineral is the stress mineral?
 - a) Andalusite
 - b) Sillimanite
 - c) Kyanite
 - d) Spinel
- 10) The structure shown by hornblende biotite gneiss is _____.
 - a) Schistose
 - b) Slaty
 - c) Granulose
 - d) Gneissose

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

06

- 1) The geobaric gradient is defined as the increase in temperature with depth in the Earth (True/False)
- 2) _____ pressure is the pressure increases with depth due to the weight overlying rock in all directions.
- 3) The processes that break a rock or minerals into small pieces without altering its composition are called as _____.
- 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) In a sedimentary rock all clasts are more or less of the same size are said to be _____ sorted sediments.
- 6) 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)

Q.2 Write a short note on:

16

- a) Roundness
- b) Reynolds number and Froude number
- c) Hydrothermal metamorphism
- d) Migmatites

Q.3 Answer the following.

16

- a) With the help of neat sketch, brief discuss the classification of sandstone.
- b) Discuss in brief graded bedding, current bedding, ripple marks and mud cracks sedimentary structures with sketch and label.

Q.4 Answer the following.

16

- a) With neat sketch, describe the erosional sedimentary structure.
- b) Describe types of chemical weathering.

Q.5 Answer the following.

16

- a) Discuss metamorphic differentiation and explain its mechanism.
- b) Explain the concept of metamorphic facies with suitable diagram.

Q.6 Answer the following.

16

- a) Discuss in details Orogenic. Burial metamorphism and Ocean floor metamorphism processes.
- b) Write a full note on amphibolites facies of rocks.

Q.7 Answer the following.

16

- a) Describe the classification of terrestrial sedimentary depositional environments.
- b) Define metamorphic reactions. Explain univariant and divariant reactions.

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M.Sc. (Semester -I) (Old) (CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY
Geochemistry (MSC19108)

Day & Date: Thursday, 11-01-2024
 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) In the cosmic abundance of elements which of the following statement is false.
 - a) Elements of even atomic number are more abundant than those of odd atomic number.
 - b) Elements of odd atomic number are more abundant than those of even atomic number.
 - c) The abundance show rapid exponential decrease for element of lower atomic number (almost atomic number 40) followed by an almost constant value for heavier elements.
 - d) The relative abundance for elements of higher atomic number than nickel varies less than those for element of lower atomic number
- 2) The average vertical thermal gradient at the Earth's surface is about _____ °C /km

a) 25°C	b) 3°C
c) 80°C	d) 100°C
- 3) Hydrogen is converted to helium in the sun this nuclear reaction produces:

a) Solar radiation	b) Potential energy
c) Kinetic energy	d) Radiation energy
- 4) Chromium is strongly lithophile element in earth's crust but it is found as chalcophile in some meteorites because of _____.

a) Oxygen rich	b) Oxygen deficiency
c) Hydrogen deficiency	d) Carbon deficiency
- 5) The upper crust of the earth mainly consist of _____.

a) Sandstone	b) Shale
c) Limestone	d) Igneous and metamorphic rocks
- 6) Long -term changes in the geochemical cycle are known as:

a) Periodic changes	b) Permanent changes
c) Secular changes	d) Perennial changes
- 7) Which type of bond is present in the diamond?

a) Metallic bond	b) Ionic bond
c) Covalent bond	d) Van deer Waal's bond
- 8) Magma is characterised by: _____.

a) Composition	b) Temperature
c) Mobility	d) All the above

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M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-023
APPLIED GEOLOGY
Igneous Petrology (MSC19201)

Day & Date: Monday, 18-12-2023
 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 Pyrolite material:
 - a) Three part peridotite and one part basalt
 - b) A rock found in continental crust
 - c) A model rock composition which can oc-cur any where
 - d) A rock found on ocean floor
- 3) Batholith is an example of _____ type of igneous form.
 - a) Extrusive
 - b) Intrusive
 - c) Both the above
 - d) None of the above
- 4) The texture which is exhibited by igneous rocks whose constituent minerals are anhedral & approximately equal in size?
 - a) Hypidimorphic
 - b) Panidiomorphic
 - c) Xenomorphic
 - d) Allotriomorphic
- 5) What is Pahoehoe flow.
 - a) A type of Volcanic Crater
 - b) Lake formed by meteoric fall
 - c) A ropy type of lava
 - d) Typical mineral found in Antartica
- 6) The rapid cooling lava leads to formation of non-crystalline _____ texture.
 - a) Glassy
 - b) Granitic
 - c) Porphyritic
 - d) None of above
- 7) What is the state of lava or magma?
 - a) Liquid
 - b) Solid
 - c) Gaseous
 - d) Mixture of solid, liquid, gas
- 8) _____ is the last mineral which crystallized in Bowen reaction series.
 - a) Hornblende
 - b) Olivine
 - c) Quartz
 - d) Calcite
- 9) The Norms or CIPW classification is essentially a _____ classification.
 - a) Mineralogical
 - b) Chemical
 - c) Genetic
 - d) Textural

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

Day & Date: Tuesday, 19-12-2023
 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) Parallel faults having a central upthrown block is a _____ faults.
 - a) Graben
 - b) Horst
 - c) Trench
 - d) None
- 2) Slicken slides, gauge and breccia are field guides to recognize _____.
 - a) Fault
 - b) Angular unconformity
 - c) Joints
 - d) Fold
- 3) The fastest spreading divergent plate boundary is the _____.
 - a) Central-Indian ridge
 - b) Carlsberg ridge
 - c) Mid-Atlantic ridge
 - d) East Pacific rise
- 4) The average slope of continental slope _____.
 - a) 1 degree
 - b) 15 degree
 - c) 10 degree
 - d) 4 degree
- 5) _____ states about the strain being proportional to the stress-producing it within the elastic limit of a material.
 - a) Hooke's Law
 - b) Newton's Law
 - c) Young's Modulus
 - d) Bulk Modulus
- 6) Substances that elongate considerably and undergo plastic deformation before they break are known as _____ substances
 - a) Ductile
 - b) Brittle
 - c) Amorphous
 - d) Solid
- 7) Which of the following fold has horizontal axial plain?
 - a) Chevron fold
 - b) Symmetrical fold
 - c) Recumbent fold
 - d) Homocline fold
- 8) The fold hinge is the line joining points of maximum curvature on a folded surface.
 - a) Hinge
 - b) Trough
 - c) Axial surface
 - d) Crest
- 9) Tombolo is formed due to _____.
 - a) glacial deposits
 - b) wind deposits
 - c) river deposits
 - d) sea deposits

- 10) Fold having sharp hinges and smooth sides are termed as _____ fold.
- a) Cuspate
 - b) Isoclinal
 - c) Chevron
 - d) Anticline

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

- 1) The average density of the continental crust is 2.7-2.8 g/cm³. (True/False)
- 2) The Pacific Ring of Fire is an example of a _____ plate boundary.
- 3) Subduction of the Juan de Fuca Plate under North America creating the Cascade Range, (True/False)
- 4) _____ is an area of sediment accumulation (usually sand) exposed to wave action along the coast.
- 5) _____ is extremely smooth portion of the deep-sea floor.
- 6) Syncline folds are arch-shaped fold into which rock strata have been compressed, the oldest rocks occurring in the core. (True/False)

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

- a) Conservative plate margin
- b) Morphology of the ocean floor.
- c) Geometry of the fault
- d) Strike and dip of the bed

Q.3 Answer the following.

- a) Draw neat sketches and discuss Ramsay's classification of fold.
- b) Write a brief note on erosional landforms in costal geomorphology.

08**08****Q.4 Answer the following.**

- a) Write a brief note on neotectonism.
- b) Give the geometric classification of Fault.

08**08****Q.5 Answer the following.**

- a) Explain the evidences and mechanism of sea floor spreading.
- b) Give an account on cratons and ocean basins.

08**08****Q.6 Answer the following.**

- a) Explain with diagram Strike, Dip, Apparent dip and Plunge of a rocks.
- b) Give detail account on joints and their different types.

08**08****Q.7 Answer the following.**

- a) Define unconformities and discuss the criteria for their recognition.
- b) Write a note on what are the evidences of active tectonics in Himalaya?

08**08**

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

- 1) _____ well contain water that is under pressure, which may cause the well water to spur in to the air.
- 2) The process of water seepage in to the ground is called as _____.
- 3) The ability of earth material to transmit water is measure of its _____.
- 4) Sonic logging is also known as porosity logging. (True /False)
- 5) Isohydal lines are the lines joining points of equal depth of water table. (True /False).
- 6) The water which in a state of downward movement under gravity is _____ water.

Q.2 Answer the following. 16

- a) Hydrostratigraphic units of India.
- b) Sea water contamination in aquifer.
- c) Groundwater potential zone mapping using remote sensing and GIS techniques.
- d) Specific capacity of wells.

Q.3 Answer the following.

- a) Explain in detail various hydrological properties of rocks. 08
- b) What are sub-surface geophysical methods of groundwater exploration? explain with neat labelled diagrams. 08

Q.4 Answer the following.

- a) Write in detail determination of permeability in field and laboratory. 08
- b) Explain in detail Vertical distribution of water. 08

Q.5 Answer the following.

- a) Explain types of flow conditions of groundwater. 08
- b) Describe arsenic and fluorite contamination in groundwater. 08

Q.6 Answer the following.

- a) Explain the effect of groundwater structures on hydraulic conductivity of rocks. 08
- b) What is water table fluctuation? Describe various factors affecting the water table fluctuations. 08

Q.7 Answer the following.

- a) Explain in detail pumping test with suitable diagram. 08
- b) Classify various rocks with respect to their water bearing characteristics. 08

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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY**

Climatology & Oceanography (MSC019301)

Day & Date: Friday, 05-01-2024
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 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) 13hours
 - b) 16hours
 - c) 18hours
 - 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) The average slope of continental slope is about _____.
 - a) 30°
 - b) 45°
 - c) 5°
 - d) 10°
- 7) Flat-topped volcanoes on the ocean floor is known as _____.
 - a) Seamounts
 - b) Guyots
 - c) Plateaus
 - d) Oceanic ridges
- 8) Siliceous animal remains consist of _____.
 - a) Sekeletons 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

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

Day & Date: Sunday, 07-01-2024
 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) In Schlumberger configuration method of electrical prospecting the distance between two electrodes is _____.
 - a) different
 - b) same
 - c) change with depth
 - d) uniform
- 2) Geological sampling is defined as _____ fraction of the bulk.
 - a) Recoverable
 - b) Representative
 - c) Resource
 - d) Reserve
- 3) In India which of the following organizations and agencies are responsible for mineral prospecting.
 - a) GSI and MECL
 - b) State and central Govt.
 - c) Private investors
 - d) None of the above.
- 4) 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.
- 5) Find the odd one out?
 - a) Some logging
 - b) Gamma ray logging
 - c) S.P. logging
 - d) Sampling
- 6) _____ helps to interpret the 3D picture of the area.
 - a) Bore hole drilling data and surface investigation
 - b) Gamma ray logging
 - c) Sampling
 - d) None of the above
- 7) The equation $\rho = 2\pi aV/I$ is used in _____.
 - a) Potential drop
 - b) Self potential
 - c) Wenner
 - d) Schlumberger
- 8) _____ is most suitable drilling techniques in Igneous, sedimentary and metamorphic rocks.
 - a) Cable tool drilling
 - b) Rotary drilling
 - c) Environmental drilling
 - d) None of the above

- 10) Which among the following is not an objective for the construction of the dam?
- a) To make sure rains occur periodically.
 - b) Generation of hydropower energy.
 - c) Providing water supply for domestic and industrial purposes.
 - d) providing irrigational facilities.

B) Fill in the blanks.**06**

- 1) The dam which generally is of trapezoidal shape is embankment dams. (True/False)
- 2) Artificially created water storage basin with storage capacity that may range from a few thousand cubic meter are called tunnel (True/False)
- 3) Anthracite is the ore of Bauxite (True/False)
- 4) _____ is a road material which is metamorphic origin and are hard, crystalline and compact in nature.
- 5) India is divided into _____ earthquake zone.
- 6) The layer of soil which the topsoil is found _____.

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

- a) Disadvantage of Reservoirs.
- b) Behavior of rocks under stress.
- c) Explain blast holes and their pattern.
- d) Buttress dam.

Q.3 Answer the following.

- a) Given an account on various geological investigation involved in civil engineering projects.
- b) Explain engineering properties of rocks.

08**08****Q.4 Answer the following.**

- a) Explain the soil mechanics.
- b) Explain important building stones.

08**08****Q.5 Answer the following.**

- a) How Gravity method used in geophysical investigation.
- b) Write a note on Auger drilling.

08**08****Q.6 Answer the following.**

- a) What are different geological investigation carried out during construction of Koyana dam.
- b) Discuss in detail about Underground mining.

08**08****Q.7 Answer the following.**

- a) What is the scope of Rock Mechanics?
- b) Discuss in detail mass wasting.

08**08**

- 9) Why would you expect to find rich mineral resources on land associated with divergent plate boundaries?
- a) Divergent boundaries accumulate sediment and secrete quantities of oil and gas.
 - b) Divergent boundaries move apart and then closer together to squeeze minerals out of rocks.
 - c) Divergent boundaries are not associated with volcanic activity and rarely form minerals.
 - d) Divergent boundaries are low-lying basins that collect water and form evaporite deposits.
- 10) The chief raw material of the ceramic industry is _____.
- a) Silt
 - b) Clay
 - c) Kyanite
 - d) Quartz

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

- 1) The amount of incident light on a polished surface of a particular mineral that is reflected back to the observer depends on an important property of that mineral its reflectance. (True/False)
- 2) Khetri mineralised belt is situated at the foothills of the Aravalli Range, which hosts Phosphate mineralization. (True/False)
- 3) Chemical composition of Chalcopyrite mineral is Fe_3O_4 . (True/False)
- 4) Juvenile water is also called _____.
- 5) Placer deposits along hill slope, caused by hill slope are known as _____.
- 6) What is the ore of Arsenic?

Q.2 Write short notes on.**16**

- a) Explain Exsolution and Mutual boundary texture of ore minerals.
- b) Metasomatic deposits.
- c) How will you prepare ore polished section.
- d) Banded Iron Formation.

Q.3 Answer the following.

- a) What is magmatic concentration. Explain in details Early magmatic processes. Give Indian examples.
- b) Fluid Inclusion Geothermometry.

08**08****Q.4 Answer the following.**

- a) Stratigraphic, lithological and Structural controls on mineral localisation.
- b) Mineralization associated with Convergent plate margin.

08**08****Q.5 Answer the following.**

- a) Write a note on Openings in Rock.
- b) Write a note on oxidation & supergene enrichment deposit.

08**08****Q.6 Answer the following.**

- a) Discuss full note on Ore Bearing fluids.
- b) What is wall rock alteration. Discuss in short various types of alteration.

08**08****Q.7 Answer the following.**

- a) Froth flotation method.
- b) Paragenesis and Zoning.

08**08**

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

Day & Date: Tuesday, 19-12-2023
 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) _____ state is the largest producer of petroleum in India.
 - a) Rajasthan
 - b) Gujarat
 - c) Assam
 - d) Orissa
- 2) What type of energy is derived from heated groundwater?
 - a) Solar energy
 - b) Geothermal energy
 - c) Hydroelectric energy
 - d) Nuclear energy
- 3) The oil producing zone of Bombay high is in the _____.
 - a) Miocene sandstone
 - b) Miocene limestone
 - c) Oligocene sandstone
 - d) Oligocene limestone
- 4) Kalol and Nawgam petroleum deposits are in _____.
 - a) Maharashtra
 - b) Gujarat
 - c) Assam
 - d) West Bengal
- 5) Palana lignite deposit is assigned to age:
 - a) Late Triassic
 - b) Early Jurassic
 - c) Tertiary
 - d) Cretaceous
- 6) The ranking depends on the:
 - a) The water content in the coal.
 - b) Amounts of carbon contain and heat energy the coal can produce.
 - c) The presence of SO₂ in the coal.
 - d) None of these.
- 7) The transformation of a primary petroleum-like organic material into petroleum begins with its deposition in the sediments in a _____.
 - a) Reducing environment
 - b) Oxidizing environment
 - c) Both of the above
 - d) Glacial environment
- 8) Oil shale contain____
 - a) Solid hydrocarbon
 - b) Gaseous hydrocarbon
 - c) Liquid hydrocarbon
 - d) None of the above
- 9) A layer of impermeable rock, called the _____ prevents the upward or lateral escape of the petroleum.
 - a) Cap rock
 - b) Reservoir rock
 - c) Trap rock
 - d) None of these

- 10) _____ is one of the most important variables used to determine oil quality.
- a) viscosity
 - b) density
 - c) API gravity
 - d) colour and smell

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

- 1) Sub-bituminous coals are the second division of high-rank coals.
(True / False)
- 2) Petroleum is a naturally occurring complex mixture made up predominantly of organic carbon and hydrogen compounds.
(True / False)
- 3) Coal is fossil fuel or fuel that comes from the remains of prehistoric plants or animals. (True / False).
- 4) The rock having high porosity high permeability is most suitable _____ for petroleum.
- 5) American Petroleum Institute gravity (API gravity) is a scale used to compare crude oil density to water.
(True / False)
- 6) _____ mine has the distinction of being the first Uranium Mine of the country.

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

- a) Reservoir rock in petroleum.
- b) Geology of Bengal petroliferous basin
- c) Jaisalmer Basin petroliferous basin
- d) Coal seams.

Q.3 Answer the following.

- a) Write brief note on distribution of Gondawana coal deposits in India. **08**
- b) Write a brief note mineralogy and geochemistry of Thorium radioactive minerals. **08**

Q.4 Answer the following.

- a) Give an account of the geology and hydrocarbon occurrence in Assam basin. **08**
- b) Write brief note on non- conventional energy resource. **08**

Q.5 Answer the following.

- a) Discuss in brief various types of coal and its grades. **08**
- b) Give an account of mode of occurrence, association and distribution of atomic minerals in nature. **08**

Q.6 Answer the following.

- a) Give application of radioactivity in geochronometry. **08**
- b) Write a note on stratigraphic, structural and combined traps of petroleum. **08**

Q.7 Answer the following.

- a) Give a brief account on Mumbai offshore basin. **08**
- b) Write a note on Coal bed methane (CBM). **08**

Seat No.	
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**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
APPLIED GEOLOGY**

Environmental Geology & Disaster Management (MSC019403)

Day & Date: Wednesday, 20-12-2023
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) To prevent landslide, improving the cultivation in the sloppy region, the roots of which Provide effect.
 - a) Erosion
 - b) coherent
 - c) cohesion
 - d) flood
- 2) Point at which earthquake takes place is known as _____.
 - a) Origin
 - b) Epicenter
 - c) Principal
 - d) Focus
- 3) The typical citation of reservoir induced specificity (RIS) of India is.
 - a) Koyna dam
 - b) Srisailam dam
 - c) Jayakwadi dam
 - d) Almatti dam
- 4) Among the following biogeochemical cycles which one does not have losses due to respiration.
 - a) Sulphur
 - b) Nitrogen
 - c) Phosphorus
 - d) All of the above
- 5) Which of the following is the best thing to do during heavy lightning?
 - a) lie on the ground in an open place
 - b) Go into a water body
 - c) Stay indoors, away from metallic doors and windows.
 - d) Stand under a tall tree
- 6) Respiration and photosynthesis are Central to these process.
 - a) Nitrogen cycle
 - b) Phosphorus cycle
 - c) Carbon cycle
 - d) Sulphur cycle
- 7) Diseases that becomes unusually widespread and even global in its rich in referred to as.
 - a) Epidemic
 - b) Pandemic
 - c) Spanish flu
 - d) Hyperendemic
- 8) What is ring of fire?
 - a) Belt of volcanoes in the circum Pacific region.
 - b) Belt of volcanoes in the mid continental region.
 - c) Belt of volcanoes in the mid-Atlantic region.
 - d) None in the above.
- 9) Composition of ozone is _____.
 - a) O
 - b) O₂
 - c) O₃
 - d) none of these

- 10) Which of the following is not a man made hazard?
a) Leakage of toxic waste b) Wars and civil strike
c) Drought d) Environmental

B) Fill in the blanks / True OR False **06**

- 1) Volcanic erupted material when inside the hill / Earth / mountain it is called _____.
- 2) _____ biological method of disposal of municipal solid waste?
- 3) In India national institute of disaster management is located.
- 4) Landslide is the example of terrestrial hazards. (True/False)
- 5) The soil is the source of energy for all ecosystem (True / False)
- 6) An ecological pyramid shows that relationship between consumers and producers (True / False)

Q.2 Answer the following **16**

- a) Explain the water cycle.
- b) What is the difference between natural disaster and man made disasters.
- c) Short notes on biological hazards.
- d) What is meant by flash flood?

Q.3 Answer the following.

- a) Impact of Urbanization on environment. **08**
- b) Write a note on Bhopal gas tragedy. **08**

Q.4 Answer the following.

- a) Discuss various types of landslides. Give remedial measure for prevention of landslide. **08**
- b) GIS and remote sensing study in disaster management **08**

Q.5 Answer the following.

- a) Explain in detail coastal zone management. **08**
- b) Write full note on Killari earthquake. **08**

Q.6 Answer the following.

- a) Explain natural disaster and its mitigation strategies. **08**
- b) Preparedness for relief and recovery operations. **08**

Q.7 Answer the following.

- a) Explain sources and management of water pollution. **08**
- b) Explain the nitrogen cycle with neat sketch diagram. **08**