SLR-VE – 2

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
APPLIED GEOLOGY (Paper – II)
Igneous and Metamorphic Petrology

Day and Date : Wednesday, 23-4-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any five** questions.*
*2) Question No. **I** is **compulsory**.*
*3) Answer **two** questions **each** from Section **A** and **B**.*
*4) Draw **neat** and labelled diagrams **wherever** necessary.*
*5) **All** questions carry **equal** marks.*

I. Tick mark the correct answers : **14**

1) According to Peacock's classification the amount of silica in calc-alkaline series is _____ percent.
   a) 46 – 51 b) 51 – 56 c) 56 – 61 d) 61 – 70

2) In a phase diagram the eutectic situation is represented as
   a) line b) field c) point d) none

3) During the emplacement of carbonatite _____ is observed.
   a) Fenitization b) Granitization
   c) Migmatisation d) None

4) Which of the following rocks does monchiquite belongs to
   a) Syenitoids b) Granitoids
   c) Gabbroids d) Lamprophyre

5) The term MORB is related to
   a) buchites b) basalts
   c) basannite d) none

6) Find the odd one
   a) andesite b) eclogite
   c) marble d) amphibolite

7) The term window to mantle is applied to an altered porphyritic mica peridotite containing olivine (commonly altered) and phlogopite (also altered) and containing diamonds is commonly known as

a) carbonatite b) eclogite

c) kimberlite d) granulite

8) The zone concept in metamorphism was proposed by

a) Grubermann and Beek b) Tilley

c) Barrow d) Harker

9) Grossularite is the garnet that makes its first appearance in the rocks of chlorite zone of _____ facies.

a) zeolite b) greenschist

c) eclogite d) none

10) The 'Charnockite' found in south India are characteristic rocks of

a) hornblene granulite b) hornfels

c) pyroxene granulite d) none

11) The partially fused hornfelsic rocks occurring as xenoliths, usually in basalt or diabase as a product of pyrometamorphism is

a) slates b) gneisses

c) schists d) buchites

12) Find the mis-match pair from the following.

a) laumontite-zeolite

b) stilpnomelane granulite

c) glaucophane-blueschist

d) omphacite-eclogite

13) In the ACF diagrams used to represent metamorphic facies, the alphabet 'C' represents

a) CaO b) CaO – FeO + MgO + MnO

c) CaO – 3.3 P_2O_5 d) None

14) Khondalite of eastern ghats are of _____ facies.

a) zeolite b) greenschist

c) amphibolite d) none of the above

SECTION – A

II. Discuss the role of water vapour pressure in the crystallisation of albite-orthoclase system in light of the formation of perthites, sub-solvus and hyper-solvus granites and syenites.

III. Give the classification of metamorphic facies based on P and 7 diagram and state the index minerals of each of the metamorphic facies.

IV. Discuss the metamorphism and magmatism associated with divergent plate boundary.

SECTION – B

V. Bring out the salient aspects on the following :

a) Deccan basalts

b) Charnockites and khondalites.

VI. Write short notes on the following :

a) Fennitisation

b) TAS classification of volcanic rocks.

VII. Write briefly on the following :

a) ACF and AKF diagrams

b) S-type and I-type granites.

SLR-VE – 10

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
APPLIED GEOLOGY (Paper – X)
Mineral Exploration

Day and Date : Wednesday, 23-4-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *1) Attempt **not** more than **five** questions.*
*2) Question No. **1** is **compulsory**.*
*3) Attempt atleast **two** questions from **each** Section.*
*4) **All** questions carry **equal** marks.*
*5) **Neat** diagrams should be drawn **whenever** necessary.*

I. Choose the correct answer : **14**

1) The gravitational acceleration at the earth's surface is about
   a) 972 gals b) 980 gals c) 5159 gals d) None

2) Find the odd one out
   a) Free air correction b) Bouguer correction
   c) Topographic correction d) Diurnal correction

3) The daily cycle of magnetic change of earth field is referred to as
   a) Bouguer changes b) Secular change
   c) Diurnal change d) None

4) The local magnetic meridian consist of total field and
   a) Horizontal field b) X-direction field
   c) Y-direction field d) None

5) When a force F is applied uniformly to a small surface of area A we define the force per unit area F/A as the
   a) Strain b) Stress
   c) Poisson ratio d) None

P.T.O.

6) The occurrence of an in the greenstone belts has apart from lithological criteria
   a) Stratigraphic criteria b) Structural criteria
   c) Geomorphological Criteria d) None

7) Which of the following methods are used for identification of carnotite deposit ?
   a) Radioactive b) Seismic c) Magnetic d) All the above

8) Electrical prospecting makes use of the properties such as
   a) Electrochemical activity b) Resistivity
   c) Dielectric constant d) All the above

9) The chemical action between minerals and solutions with which they are in contact is made use in
   a) Seismo-chemical survey b) Self-potential method
   c) Magneto telluric method d) Radio active method

10) In a three layer curve the resistivities are as $p_1 > p_2 < p_3$ than the curve so developed shall be of
   a) A-type b) K-type c) H-type d) None

11) The productive plutons for diamond deposits are
   a) Granite b) Kimberlite c) Greenstone d) None

12) The map showing changes of magnetic intensity per annum is termed as
   a) Isoporic map b) Geodic map
   c) Isomagnetic map d) None

13) The galmi flora are geobotanical indicators for
   a) Radia active minerals b) Gallium deposits
   c) Sulphide deposits d) None

14) During an exploration work the expected financial return E = PV and if P = 0 the E will be
   a) 1 b) 2 c) 1.73 d) 0

SECTION – A

II. State the advantages and disadvantages of Wenner and Schlumberger configuration of electrical prospecting. Add a brief note on various curve matching techniques.

III. Give in detail various productive plutons for mineral deposits from South India.

IV. Write various geological criteria for prospecting mineral deposits. Cite suitable Indian examples.

SECTION – B

V. Write a brief on the following :

a) Corrections in magnetic surveys

b) Geobotanical surveys.

VI. Write short notes on the following :

a) Association of elements and pathfinder elements

b) Corrections in gravity surveys.

VII. Write the salient aspect on the following :

a) Geochemical characters of Sn-bearing granite

b) Choice and sequence of prospecting.

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SLR-VE – 13

Seat No.	

M.Sc. – II (Semester – IV) Examination, 2014
APPLIED GEOLOGY (Paper – XIII)
Environmental Geology and Disaster Management

Day and Date : Tuesday, 22-4-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Answer **any five** questions.*
*2) **All** questions carry **equal** marks.*
*3) Question **1** is **compulsory**.*
*4) Answer **any two** questions from **each** Section.*
*5) Draw **neat** and labeled diagrams **wherever** necessary.*

1. Choose the correct answer : **14**

1) Earth day is celebrated on
   a) 5^{th} June b) 22^{nd} June
   c) 22^{nd} April d) None

2) Where in India was the "Save the soil movement" started ?
   a) Dehradun b) Hoshangabad
   c) Goshwal d) Solapur

3) "Sundarbans", the largest mangrove forest in the world lies in _____ India.
   a) West b) North
   c) East d) South

4) Solar cells are simple photovoltaic devices that convert solar energy directly into electrical energy and are manufactured from the second-most abundant element in the earth's crust. Name it.
   a) Al b) Si
   c) Ca d) Fe

5) Which element is depleted most from the soil after a crop is harvested ?
   a) K b) Na
   c) F d) Cl

P.T.O.

6) Which protocol/convention deals with ozone depleting substance ?
   a) Montreal b) Kyoto
   c) Bussel d) Delhi

7) Name the main element that is required to run a nuclear plant
   a) As b) C
   c) U d) K

8) There are three different types of coal. Two of them release a great deal of pollutants into the air whereas the third release less smoke and is considered to be less polluting. Name it.
   a) Lignite b) Bituminous
   c) Anthracite d) None

9) Ozone layer is present in which layer ?
   a) Stratosphere b) Troposphere
   c) Mesosphere d) None

10) Which of the following is not a green house gas ?
   a) Methane b) Oxygen
   c) CO_2 d) CFC

11) The greatest Tsunami disaster that struck Sumatra-Andaman Islands killing over 3 lakh people occurred on
   a) 24-12-2004 b) 25-12-2004
   c) 26-12-2004 d) None

12) Excess consumption of fluoride causes
   a) Necrosis b) Fluorosis
   c) Heart diseases d) None

13) Effective drainage of the soil prohibits soil
   a) Salinity b) Fluorosis
   c) Kankar formation d) None

14) Acid rains are the result of
   a) Air pollution b) Sound pollution
   c) Cloud pollution d) None

SECTION – A

II. Discuss in detail the causes and effects of climate change. Add a note on food security related to climate change. **14**

III. Write in detail the composition of lithosphere. **14**

IV. Write in detail on Killari earthquake. Add a note on disaster mitigation. **14**

SECTION – B

V. Write briefly on the following : **14**

a) GIS and Remote sensing in disaster management

b) Landslides.

VI. Write short notes on the following : **14**

a) Classification of natural hazards

b) Composition of hydrosphere.

VII. Write salient aspects on the following : **14**

a) Seismic zones of India

b) Source and classification of waste products.

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SLR-VE – 14

Seat No.	

M.Sc. (Sem. – IV) Examination, 2014
APPLIED GEOLOGY (Paper – XIV)
Energy Resources

Day and Date : Thursday, 24-4-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 1) Objective question is* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Ans. ***any two*** *questions from* ***2****,* ***3*** *and* ***4****.*
4) Ans. ***any two*** *questions from* ***5****,* ***6****, and* ***7****.*
5) ***Draw*** *neat sketches* ***wherever*** *necessary.*

1. Choose correct answers : **14**

1) Coal occurs commonly in _____ rocks.
   a) Basinal b) Igneous
   c) Metamorphic d) Mylonitic

2) Which one of the following is not a structural trap ?
   a) Anticline b) Ancient shoreline
   c) Faut d) Shear gene

3) The constituents which make coal are termed as _____
   a) Mineral b) Maceral c) Gems d) Clays

4) Which one of the following is non productive basin ?
   a) Bombay b) Cambay c) Bhima d) Asam

5) A map prepared by joining equal thickness points is _____ maps.
   a) Isopatch b) Isohight c) Isobar d) Isocline

6) Pick out the non conventional energy resource.
   a) Wood b) Coal c) Solar d) Rock oil

7) Which one of the following is renewable resource ?
   a) Coal b) Hydrocarbon
   c) Radioactive d) Tidal

8) Pick out suitable cap rock from
   a) Lime stone b) Granite c) Shale d) Sandstone

9) Highest rank of the Coal is _____
   a) Lignite b) Bituminous c) Peat d) Anthracite

10) The first stage of coal formation is represented by _____
   a) Peatification b) Maturation
   c) Catagenesis d) Metagenesis

11) Cambay basin falls in _____ State.
   a) Maharashtra b) Gujarat
   c) M.P. d) U.P.

12) Migration of petroleum from the cap rock to atmosphere through soil cover is termed as _____
   a) Primary b) Secondary
   c) Tertiary d) None of these

13) The origin of petroleum is advocated from _____ source.
   a) Extra terrestrial b) Mantle
   c) Intrusives d) Sedimentary basin

14) Quality of oil is measure by API degree _____ of oil.
   a) Viscosity b) Density
   c) Gravity d) Fugacity

2. Describe various methods used to decide the quality of oil in laboratory. **14**

3. Write an essay on the oil potential of Bombay High Basin. **14**

4. Write in detail on the formation of coal. Add a note on their classification. **14**

5. Write in short on **any two** : **14**
   a) Reservoir rocks.
   b) Structural traps
   c) Cap rocks.

6. Write in brief on **any two** : **14**
   a) Macerals
   b) API gravity
   c) Incipassination.

7. Describe in brief **any two** : **14**
   a) Non conventional energy resource.
   b) Isopach maps.
   c) Proximate analysis.

_____

SLR-VE – 15

Seat No.	

M.Sc. II (Semester – IV) Examination, 2014
APPLIED GEOLOGY (Paper – XV)
Remote Sensing and GIS

Day and Date : Saturday, 26-4-2014 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1) Answer **any five** questions.*

*2) **All** questions carry **equal** marks.*

*3) Question **1** is **compulsory**.*

*4) Answer **any two** questions from question number **II, III** and **IV**.*

*5) Answer **any two** questions from question number **V, VI** and **VII**.*

*6) Draw neat and labeled diagram **wherever** necessary.*

I. Fill in the blanks : **14**

1) _____ sensor developed Indian Satellite.
A) SPOT B) NOAA C) LISS D) MSS

2) _____ spatial resolution IRS LISS-IV data.
A) 5 m B) 23 m C) 36 m D) 72 m

3) FCC stands for _____
A) Falles Colour Composite B) False Colour Composite
C) Few Colour complex D) All of above

4) Formula for NDVI _____
A) NIR/R B) NIR – R/NIR+R
C) VIR/R D) MIR/NIR

5) _____ in form vector data Generate.
A) Point B) Line C) Polygon D) All of above

6) _____ map display, location that fulfill all criteria.
A) Risk B) Thematic C) Topological D) None of these

P.T.O.

7) _____ datum follow Indian GPS.
A) Clark 1886 B) NAD 20 C) WSR 80 D) WGS 84

8) _____ Agency provided remote sensing data in India.
A) GSA B) NRSA C) ICAR D) DST

9) _____ is GIS is based software.
A) Arc GIS B) SKADA
C) Expert choice D) All of the above

10) _____ projection follow in Indian map.
A) Lambort B) UTM C) Polyconic D) None of these

11) _____ error generate editing any feature in map Generation.
A) Node B) Vertex C) Overshoot D) None of these

12) Father of GIS _____
A) Jayant Nurlikar B) Homibaba
C) Rojer Tomlinson D) Vijay Bhatkar

13) _____ number of band mention in LISS-III sensor.
A) 4 B) 5 C) 2 D) 1

14) Thematic mapper having _____ bands.
A) 2 B) 4 C) 8 D) 6

II. Describe thermal infrared remote sensing and its radiation properties.

III. Explain the detail component of GIS and its application.

IV. What are the role remote sensing and GIS in Geo-science ?

V. Write note on :
a) GPS
b) Data model

VI. Explain in short :
a) Photogrammetry
b) Electromegentic spectrum

VII. Describe in brief :
a) Softwares
b) Topology.

SLR-VE – 4

Seat No.	

M.Sc. I (Semester – I) Examination, 2014
APPLIED GEOLOGY (Paper – IV)
Geomorphology & Morphotectonics

Day and Date : Monday, 28-4-2014 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***N.B** : 1) Answer **any five** questions.*
*2) **All** questions carry **equal** marks.*
*3) Question **1** is **compulsory**.*
*4) Answer **any two** essay questions from **2, 3, 4**.*
*5) Answer **any two** short note questions from **5, 6, 7**.*
*6) Draw **neat** & labelled diagram **wherever** necessary.*

1. Fill in the blanks with appropriate word. **14**

1) _____ is the interpretative description of the relief features.

A) Geomorphology B) Geology
C) Geography D) All of the above

2) Complexity of geomorphic evolution is more common than simplicity was defined by _____

A) Strabler B) Streets
C) Thornbury D) Monkhouse

3) Submergenic of the land refers to _____

A) Decline of sea level in relation to the land
B) Land beneath the water
C) Upliftment of the land
D) Rise of sea level in relation to the land

4) "Weathering may be defined as the mechanical fracturing or chemical decomposition of rock by natural agents at the surface of the earth" by _____

A) C.P. Ollier B) B.W. Sparks
C) Euler D) H. Hens

P.T.O.

5) _____ weathering is also known as onoin weathering.
   A) Exfoliation B) Hydration
   C) Oxidation D) Carbonation

6) The process of hydration changes feldspar minerals into kaolinite is known as _____
   A) Hydrolysis B) Chelation
   C) Kaolinization D) Solution

7) The landforms resulting from several cycles of erosion whether complete or incomplete are called _____
   A) Cyclic landforms B) Polycyclic landforms
   C) Multicyclic landforms D) None of these

8) Which are the major factors that interrupt the normal cycle of erosion ?
   A) Volcanic eruption B) Climatic changes
   C) A & B both D) None of these

9) Who postulated the concept of geomorphic cycle of erosion ?
   A) Walter Penck B) W.M.Davis
   C) King D) Crikmay

10) Annular drainage pattern is also known as _____ pattern.
   A) Barbed B) Pinnate
   C) Rib D) Circular

11) The areas of accumulation of huge volume of ice are called _____
   A) Snow lines B) Glaciers
   C) Snow fields D) Ferm

12) What are pinnacles ?
   A) Narrow Ridge B) Narrow Depression
   C) Flat land D) None of these

13) An isolated mass or rock near coastline is called _____
   A) Rias B) Stacks
   C) Bars D) Roofs

14) The movement of two plates toward each other direction is called ____ plate margins.
   A) Constructive B) Destructive
   C) Conservative D) None of these

2. Explain fundamental concept in geomorphology. **14**

3. Describe Erosional & depositional land form of River [Fluvial]. **14**

4. What is drainage system ? Explain major drainage system. **14**

5. Write short note on : **14**
   A) Lineament analysis
   B) Beach process & shorelines changes.

6. Write small account on : **14**
   A) Cycle of Erosion
   B) Chemical weathering

7. Discuss in brief : **14**
   A) Depositional landform of Aeolian
   B) Polycyclic Relief.

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SLR-VE – 5

Seat No.	

M.Sc. – I (Semester – II) Examination, 2014
APPLIED GEOLOGY (Paper – V)
Economic Geology

Day and Date : Tuesday, 22-4-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N. B. *: 1) Answer **five** questions.*
*2) **All** questions carry **equal** marks.*
*3) Qu. **1** objective question is **compulsory**.*
*4) Answer **any two** questions from Question **2, 3** and **4**.*
*5) Answer **any two** questions from question **5, 6** and **7**.*
*6) Draw **neat** sketches **wherever** necessary.*

1. Fill in the blanks with correct choice : **14**

1) Emerald has _____ colour.

a) Red b) Green
c) Blue d) Violet

2) Chalcopyrite is the primary ore mineral of _____

a) Lead b) Zinc c) Copper d) Iron

3) Ilemenite is used to extract _____

a) Tungsten b) Titanium c) Tin d) Iron

4) A process of mixing high grade ore with low grade ore is _____

a) Quality improvement b) Mixing
c) Blending d) Stock piling

5) Pitch blende is the ore of _____

a) Rh b) Th c) Zr d) U

P.T.O.

6) Primary ore for aluminium extraction is _____

a) Bauxite b) Limonite

c) Basalt d) Dispore

7) The minimum percentage of the metal required to call the rock as a ore is _____ %.

a) Optimum b) Minimum

c) Tenor d) None of these

8) Surface manifestation of the ore is represented by

a) Gossan b) Supergene enrichment

c) Fault d) None of these

9) Which one of the following is not a hydrothermal deposit ?

a) Cavity filling b) Ladder vein

c) Filter pressing d) Replacement

10) The ore is found in supergene sulphide deposit at _____

a) Water table b) Below W.T.

c) Above W.T. d) None of these

11) Diamonds are found in _____

a) Pegmatites b) Aplites

c) Kimberlite pipes d) Ladder veins

12) Typical mineral which exits in liquid state is _____

a) Crude b) Gypsum

c) Sulphur d) Mercury

13) A mineral is found in sublimated form is _____

a) Mercury b) Sulphur

c) Cinnabar d) Realgar

14) Kudremukh iron ore deposit is found in _____ state.

a) Maharashtra b) Bihar

c) M.P. d) Karnataka

2. Write a full account on ore bearing fluids. **14**

3. What you know about placers ? Write in detail on types of placers. **14**

4. Describe formation of hydrothermal ore deposits. **14**

5. Write in short on **any two** : **14**
   a) Super gene sulphide enrichment
   b) Magmatic segregation deposits
   c) Carbonatites.

6. Write in brief on **any two** : **14**
   a) Refractory minerals
   b) Base metal deposit
   c) Metallogenic ephoch and provinces.

7. Write in short on **any two** : **14**
   a) National mineral policy
   b) Controls of mineralization
   c) Fluid inclusion geothermometry.

SLR-VE – 6

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2014
APPLIED GEOLOGY (Paper – VI)
Indian Stratigraphy

Day and Date : Thursday, 24-4-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Question No.* ***1*** *is* ***compulsory****.*
2) Answer ***any two*** *questions* ***each*** *from Section* ***A*** *and Section* ***B****.*
3) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*
4) ***All*** *questions carry* ***equal*** *marks.*

1. Fill in the blanks with appropriate words. **14**

1) The smallest rock unit is known as _____
   a) Bed b) Member
   c) Formation d) Group
2) The two fold classification of Gondwana is based on _____
   a) Unconformity b) Floral characteristics
   c) Climatic conditions d) All the above
3) The Lilang Group in spiti is considered the Indian type area for the _____
   a) Permian b) Jurassic
   c) Triassic d) Cretaceous
4) The carbonaceous Bijaigarh shale formation belong to _____
   a) Semri group b) Rewa group
   c) Bhander group d) Kaimur group
5) Penganga group belong to _____
   a) Godavari supergroup
   b) Gondwana supergroup
   c) Dharwar supergroup
   d) None of these

6) The older lithostratigraphic succession of Kaladgi basin is _____
   a) Simikeri subgroup b) Lokapur subgroup
   c) Sedam subgroup d) Andola subgroup
7) Gaj formation from Bhavanagar to Okha Rann, contains a _____
   a) Sandstones
   b) Gravels
   c) Variety of mega-and microfossils
   d) Coals
8) Gogi in Bhima basin is important for _____
   a) Thorium b) Tungsten
   c) Ilmenite d) Uranium
9) The age for the Papghni subbasin is _____
   a) Paleoproterozic b) Mesoproterozoic
   c) Neoproterozic d) Paleozoic
10) Garbyang formation of Kumaun is equivalent to _____
   a) Kaladgi b) Haimantas
   c) Vaikrata d) Kurnool
11) In intertrappean beds physa is reported from _____
   a) Panjal trap b) Rajmahal trap
   c) Deccan trap d) Both (b) and (c)
12) Gorumahasani and Badampur hills in the Singhbhum craton are famous for _____
   a) Stratiform Cr deposits
   b) Copper deposits
   c) Coal deposits
   d) Banded iron formations
13) The oldest unit of Jurassic succession of Rajasthan is _____
   a) Lathi formation b) Jaisalmer formation
   c) Laki series d) Lachi series
14) Lonar crater is situated in _____
   a) Nagpur District b) Buldana district
   c) Ratnagiri district d) Akola district

SECTION – A

2. Discuss in detail Greenstone belts of Eastern Dharwar craton. **14**

3. Write a essay on deccan trap. **14**

4. Give an detail account on the cretaceous succession in trichinopoly area. **14**

SECTION – B

5. Write short notes on the following : **14**

   a) Sargur schist

   b) Rajmahal trap and Shylet trap.

6. Describe in brief : **14**

   a) Lameta formation

   b) Regional stratigraphy of Bastar craton.

7. Write notes on : **14**

   a) Triassic sequence of spiti

   b) Muth quartzite.

SLR-VE – 7

Seat No.	

M.Sc. I (Semester – II) Examination, 2014
APPLIED GEOLOGY (Paper – VII)
Hydrogeology

Day and Date : Saturday, 26-4-2014 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1) Answer **any five** questions.*
*2) **All** questions carry **equal** marks.*
*3) Question No. **1** is **compulsory**.*
*4) Answer **any two** questions from **each** Section.*
*5) Draw neat and labelled diagrams **wherever** necessary.*

I. Choose mark the correct answer. **14**

1) Evaporation evapotranspiration, precipitation and runoff are three important phases of the
   a) Water cycle b) Water transfer cycle
   c) Hylogic cycle d) b and c both

2) Frozen rain drops while falling through air at subfreezing temperature is known as
   a) Glaze b) Sleet c) Snow d) Hail

3) The air close to the warm earth gets heated and rises due to its low density, cools adiabatically to form a cauliflower shaped cloud, which finally bursts in to a thunder storm is a _____ type of precipitation.
   a) Convectional precipitation b) Frontal precipitation
   c) Orographic precipitation d) Cyclonic precipitation

4) The rate of evaporation is a function of the differences in vapour pressure at the water surface and in the atmosphere, staling that the evaporation is proportional to the difference in vapour pressures ew and ea is known as
   a) Vapour pressure law b) Laplace's law
   c) Peter's law d) Dalton's law of evaporation

5) The _____ is defined as that rate of rainfall above which the rainfall volume equals the runoff volume.
   a) W-index b) fave-index c) ϕ=index d) Y-index

6) The portion of runoff in a rising flood in a stream, which is absorbed by the permeable boundaries of the stream above the normal phreatic surface is called _____ storage.
   a) depression b) detention c) bank d) phreatic

7) If the ground water table is below the bed of the stream, the seepage from the stream feeds the ground water resulting in the build up of water mound, such streams are called _____ streams.
   a) influent b) effluent c) intermittent d) perennial

8) A formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs is known as
   a) Aquiclude b) Aquifuse c) Aquitard d) Aquifer

9) An imaginary surface coinciding with the hydrostatic pressure level of the water in the confined aquifer is known as
   a) Piezometric surface b) Potentiometric surface
   c) Aquisurface d) a and b both

10) _____ is defined as the volume of water that an aquifer releases from or takes into storage per unit surface area of aquifer per unit change in the component of head normal to that surface.
   a) Storage coefficient b) Transmissivity
   c) Specific yield d) Maximum yield

11) The flow rate through porous media is proportional to the headloss and inversely proportional to the length of the flow path, is known as
   a) Bernoullies law b) Possion's law
   c) Vector's law d) Darcy's law

12) Flow lines lie _____ to water table contours.
   a) Perpendicular b) Orthogonal
   c) Oblique d) Parallel

13) Naturally occurring radio isotopes (H^3 and C^{14}) are used to know
   a) Residence times of water
   b) Evaluating regional groundwater flow
   c) Age of groundwater
   d) All the above

14) The substances which are susceptible to the quantitative determination in minute concentration, absent from natural water, do not react chemically with the natural water, do not get absorbed by the porous media, safe in terms of human health, inexpensive and readily available are ideal
   a) Water sources
   b) Chemically active groundwater
   c) Groundwater tracers
   d) None of the above

SECTION – A

II. Describe groundwater flow net and write in short how do you understand groundwater setup of a region using groundwater flow net. **14**

III. What are groundwater tracers ? Describe its usefulness in groundwater studies. **14**

IV. Enumerate different graphic representations of chemical quality of groundwater. **14**

SECTION – B

V. Write notes on : **14**
   a) Groundwater basin investigations
   b) Types of aquifers.

VI. Describe in brief : **14**
   a) Darcy's law
   b) Fresh-saline water relationship.

VII. Discuss in short : **14**
   a) Groundwater pollution
   b) Infiltration.

SLR-VE – 8

Seat No.	

M.Sc. – I (Semester – II) Examination, 2014
APPLIED GEOLOGY
Paper –VIII : Geochemistry

Day and Date : Tuesday, 29-4-2014 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions**: 1) Answer **any five** question.*
*2) **All** questions carry **equal** marks.*
*3) Question no. **1** is **compulsory**.*
*4) Answer **any two** questions from **each** Section.*
*5) Draw **neat** and **labelled** diagrams **wherever** necessary.*

I. Choose the correct answer : **10**

1) The pH of the natural water lies between

a) 6-8.5 b) 7-8 c) 4-9 d) 1-7

2) The average salinity of the oceans is

a) 35% b) 15% c) 98% d) 10%

3) Find the odd one out

a) Ar b) Cw c) O d) H

4) The CO_2 concentration in the atmosphere increase with increasing consumption of

a) Tidal energy b) Solar energy c) Fossil fuel d) Nuclear energy

5) The Greek word chaleophile means love to

a) Sulphur b) Gases c) Iron d) All the above

6) Eh of an aqueous solution is a measure of its

a) Redox potential b) Alkalinity

c) Acidity d) None

P.T.O.

7) The sequence of concentration $Co_3 > So_4 > Cl$ is noticed in
   a) River water b) Sea water c) Glacial d) None

8) A rapid neutron capture or n- process produces elements havier than
   a) Nickle b) Iron c) Bismuth d) Silicon

9) The geochemical character of an element is largely governed by
   a) z/r b) z+r
   c) Electronic configuration d) None

10) When lithophile form ions their outer most electron shell have
   a) 8 electrons b) 18 electrons
   c) incompletely filled d) 20 electrons

11) The radiometric dating of wood, charcoal, bone and shells are possible by using
   a) 236 U b) 232 Th c) 238 U d) 14_C

12) The half life of 14_C is
   a) 5730 b) 5159 c) 5051 d) 1.31×10^9

13) The 5153 superior analysis were used in calculation of average composition of
   a) Igneous rocks b) Sedimentary rocks
   c) Metamorphic rocks d) All the above

14) Deep lakes and marine environments are likely to undergo seasonal thermal stratification into an underlying layer where temperature drops fast with depth called as
   a) Epilimnion b) Thermocline c) Hypolimnion d) Sediment

SECTION – A

Attempt **any two** questions from this Section.

II. Discuss different concepts in determination of the average composition of Igneous rocks.

III. Describe the evolution of atmosphere highlighting the gains and losses during geological time. Add a note on climate change.

IV. Discuss the physico-chemical factors of elements during sedimentation.

SECTION – B

Attempt **any two** questions from this Section.

V. Write briefly on **any two** of the following :

a) Lithophiles

b) Cosmic abundance of elements.

c) Geological material for radio active dating.

VI. Write short notes on **any two** of the following :

a) difference between sea water and river water

b) primary differentiation of elements

c) Gibbs free energy.

VII. Bring out the salient aspects on the following :

a) Average composition of earth

b) E^h - p^H diagrams.

c) Origin of elements.

SLR-VE – 9

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
APPLIED GEOLOGY (Paper – IX)
Structural Geology and Geotectonics

Day and Date : Monday, 21-4-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Question number **I** is **compulsory**.*
*2) Answer **any two** questions from Section – **A**.*
*3) Answer **any two** questions from Section – **B**.*
*4) **All** questions carry **equal** marks.*
*5) **Draw** neat, labelled diagrams or sketches **wherever** necessary.*

I. Select the correct option from the choices given below :

1) _____ are formed due to orogenesis.
   a) Block mountains b) Fold mountains
   c) Rift valleys d) Cratons

2) The strike of _____ is oblique to strike and dip of bedding plane of the rocks involved.
   a) Bedding joints b) Strike joints
   c) Dip joints d) Diagonal joints

3) At greater depth in lithosphere, the rocks are subjected to equal force from all sides known as _____ pressure.
   a) Hydrostatic b) Lithostatic
   c) Atmospheric d) Directed

4) The _____ states that stress is proportional to strain.
   a) Hooke's Law b) Newton's Law
   c) Young's Modulus d) Bulk Modulus

P.T.O.

5) The value of Poisson's ratio falls between _____

a) – 1 and – 2 b) $-\frac{1}{2}$ and 1 c) – 1 and + $\frac{1}{2}$ d) –1 and + 2

6) _____ substances undergo extensive plastic deformation before rupture.

a) Ductile b) Brittle c) Amorphous d) Solid

7) _____ are rocks consisting of parallelly assigned finely crushed particles of rocks and minerals.

a) Fault breccia b) Mylonites

c) Gneisses d) Hornfels

8) Shear fractures make an angle of _____ degrees with the greatest principle stress axis (σ_1)

a) 0 b) 90

c) Less than 45 d) None of the above options

9) _____ in orogenic belts marks the closure of continents after their collision.

a) Basalts b) Ophiolites

c) Granites d) Flaser rocks

10) Basaltic rocks of identical age are found on either sides of _____

a) convergent plate boundaries b) mid-oceanic ridges

c) subduction zones d) deep oceanic trenches

11) The _____ boundary between continental plates has given rise to the Himalayan mountains.

a) divergent b) convergent

c) transform fault d) none of given options

12) _____ studies on ocean floor provided reliable evidence to the concept of continental drift.

a) Palaeomagnetic b) Radiometric

c) Structural geological d) Topographical

13) Hot spots are formed as a result of _____
   a) Movements in the earths core b) Descending convection currents
   c) Ascending convection currents d) Isostatic adjustments in the crust

14) The phanerozoic continental growth occurs in _____
   a) rift setting
   b) intraplate setting
   c) arc setting along active plate margins
   d) continental collision setting

SECTION – A

Answer **any two** questions from this Section :

II. What are joints ? Give genetic classification of joints and their significance in deformation structures.

III. What is foliation ? Discuss the morphology of different types of foliation.

IV. What is plate tectonics ? Discuss the concept in detail.

SECTION – B

Answer **any two** questions from this Section :

V. Write notes on :
   a) Tripple junction
   b) Benioff zone.

VI. Describe the following :
   a) Continental and oceanic crust.
   b) Concept of deformation.

VII. Explain the following :
   a) Seafloor spreading
   b) Mohr circle.

_____