Total No. of Questions : 8] **[Total No. of Pages : 1**

P1210

[3830] - 21

M.Sc.

GEOLOGY

GL - 201: Igneous Petrology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***All questions carry equal marks.***
3) ***You are advised to attempt not more than 5 questions.***

Q1) Explain the factors responsible for magma generation.

Q2) Explain magmatic differentiation.

Q3) Write a concise account of magmatism at a divergent plate tectonic setting.

Q4) Write short notes on any Three of the following:

a) Inequigranular and equigranular textures.
b) Enriched morb.
c) Mantle xenoliths.
d) Tholecitic basalts.

Q5) Describe the magmatism at a destructive plate margin.

Q6) Write a concise account of classification of igneous rocks.

Q7) Explain the diversity of igneous rocks in nature.

Q8) Write short notes on any Three of the following:

a) Orogenic andesites.
b) Ophitic and hyaloophitic texture.
c) Normative classification.
d) Liquid immiscibility.

Total No. of Questions : 8] **[Total No. of Pages : 1**

P1211

[3830] - 22
M.Sc.
GEOLOGY
GL - 202: Metamorphic Petrology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***All questions carry equal marks.***
3) ***You are advised to attempt not more than 5 questions.***

Q1) Define metamorphism. Explain types of metamorphism. Give a brief account of their controlling factors.

Q2) Describe in detail the minerals commonly found in metamorphic rocks. Also add a note on their genesis and occurence.

Q3) Explain the concepts of metamorphic facies with the help of diagram explain the characteristic of various metamorphic facies of Eskola.

Q4) Write notes on any three of the following:

a) AFM diagram.
b) Deformation textures.
c) Metamorphic phase diagrams.
d) Prograde metamorphism.

Q5) Give an account of regional metamorphism of pelitic rocks.

Q6) Discuss in detail thermal metamorphism of basic igneous rocks.

Q7) Describe in brief "Tectonic and Metamorphism" with suitable examples.

Q8) Write notes on any two of the following:

a) Contact metamorphism of limestone.
b) Impact metamorphism.
c) Metamorphism of Granitoides.

Total No. of Questions : 8] **[Total No. of Pages :2**

P1212

[3830] - 24

M.Sc.

GEOLOGY

GL - 204: Geomorphology and Remote sensing

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***Attempt not more than 5 questions of which at least 2 questions must be from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***All questions carry equal marks.***

SECTION - I

Q1) Describe major geomorphic features of fluvial, glacial and coastal land forms.

Q2) Describe tectonic rejuvenation and climatic peneplanation and the role of lithology in peneplanation.

Q3) Describe the erosional and depositional landforms created by action of wind.

Q4) Write short notes on any three:

a) Fluvial process on hill slopes.

b) Types and tools in geomorphology.

c) Hydrolysis and hydration.

d) Types of deltas.

SECTION - II

Q5) What are photorecognition elements? Write an account of pattern and Texture as photorecognition element.

P.T.O.

Q6) Describe the working of a thermal scanner. Explain how following features can be identified.

a) Hot springs.

b) Ice berg.

c) Limestone Terrain

d) Water at night and day.

Q7) Describe the orthogonal and central perspective projections compare between aerial photograph and Topographic map.

Q8) Write notes on any two:

a) Bhaskara system and it's applications.

b) Photo scale.

c) Relief displacement.

d) Over laps.

Total No. of Questions : 8] **[Total No. of Pages :2**

P802

[3830] - 101

M.Sc.

GEOLOGY

GL - 101 : MINERALOGY

(2008 Pattern) (Sem. - I)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What is meant by symmetry operations? Explain different types of symmetry operations.

Q2) What is plane polarized and cross polarized light? Explain behaviour of minerals in cross polarized light.

Q3) Explain the determination of optic sign of uniaxial minerals with the help of interference figure.

Q4) Write notes on (any two) :

a) Paragenesis of pyroxene minerals.

b) Isomorphism in olivine minerals.

c) Physical properties of Alumino-silicate Group minerals.

d) Paragenesis of clay or feldspathoid minerals.

Q5) Give an account of structure, chemical composition and paragenesis of calcium amphiboles.

Q6) Write on structure, chemical composition paragenesis and alteration products of plagioclase felspars.

P.T.O.

Q7) Give an account of structure, Chemical composition and paragenesis of Garnet group minerals.

Q8) Write notes on (any two) :

a) Biaxial Indicatrix.

b) Proper point groups.

c) Optical accessories.

d) Laue method of x-ray diffraction.

Total No. of Questions : 8] **[Total No. of Pages :2**

P803

[3830] - 102

M.Sc.

GEOLOGY

GL - 102 : Principles of Stratigraphy and Palaeontology

(2008 Pattern) (Sem. - I)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Explain Unconformable relationship among lithologies and add a note on the lateral extent.

Q2) Describe the concepts of Event stratigraphy.

Q3) Write on the concepts of Lithofacies and biofacies.

Q4) Write notes on any two of the following :

a) Marine Transgression and Regression.

b) Standard stratigraphic scale.

c) Index fossil.

d) Catastrophism.

Q5) Describe the test morphology of foraminifera with reference to shape, coiling and aperture.

Q6) Explain with suitable examples on the variation in hinge and adductor impressions of bivalvia. Add a note on their classification.

P.T.O.

Q7) Write a detailed account of morphology of Hard parts in Brachiopoda.

Q8) Write notes on any two of the following :

a) Pollen and spores

b) Uses of fossils in biology.

c) Oozes.

d) Separation of microfossils.

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Total No. of Questions : 8] **[Total No. of Pages :2**

P804

[3830] - 103

M.Sc.

GEOLOGY

GL - 103 : Physics & Chemistry of The Earth

(2008 Pattern) (Sem. - I)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Describe how nuclear synthesis takes place in stars.

Q2) Write a detailed account of meteors & comets.

Q3) Describe the characteristics of different types of seismic waves.

Q4) Write short notes on (any two) :

a) H-R diagram.

b) Quasars.

c) Outer core.

d) Atomic structure.

Q5) What is law of radioactivity? Explain half-life period and decay constant.

Q6) Explain the genesis of earth's magnetic field. Add a note on paleomagnetism.

Q7) Write a note on discontinuities encountered within the earth. Comment on their significance.

P.T.O.

Q8) Write short notes on (any two) :

a) Curie temperature.

b) Density distribution within the earth.

c) Atomic number & mass number.

d) Relation between magnetic dip & latitude.

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Total No. of Questions : 8] **[Total No. of Pages :2**

P805

[3830] - 104

M.Sc. (Sem. - I)

GEOLOGY

GL - 104 : Sedimentology

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

1) ***Your are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Discuss the importance of field procedures in sedimentary petrology.

Q2) Enumerate different constituents of limestone. Write a note on Dunham's classification of limestone.

Q3) Write an account of classification of primary sedimentary structures. Add a note on pene contemporaneous sedimentary structures.

Q4) What is estuary? Describe important characteristics of estuarine sediments.

Q5) Write short notes on any two of the following :

a) Ripple marks.

b) Reynold's and Fraude number.

c) Diagenetic structures.

d) Shape and roundness studies.

Q6) Describe in detail the different facies of meandering river deposits.

P.T.O.

Q7) Discuss in brief tectonic control on sedimentation.

Q8) Write short notes on any two of the following :

a) Heavy mineral analysis and its use.

b) Importance of biogenic sedimentary structures.

c) Significance of evaporite deposits.

d) Source and genesis of manganese nodules.

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Total No. of Questions : 8] **[Total No. of Pages :2**

P806

[3830] - 201

M.Sc. - I

GEOLOGY

GL - 201 : IGNEOUS PETROLOGY

(New) (Sem. - II)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Explain IUGS classification of Igneous rocks.

Q2) Explain the term fertile mantle and depleted mantle. Write the significance of metasomatic process in the evolution of enriched mantle.

Q3) Explain the terms textures and structures of igneous rocks. Write an account of textures of igneous rocks.

Q4) Write short notes on (any two) :

a) Viscosity of magma.

b) Ophiolites.

c) Igneous rocks at subduction zone.

d) Petrology of Earth's crust.

Q5) What is eutectic crystallization? Describe the crystallization of anorthite-silica binary system. Explain how the phase rule can be applied to this system.

Q6) Give detailed account of Deccan Volcanic province with respect to its geographical distribution, tectonic setting and stratigraphy.

P.T.O.

Q7) Give detailed account of MORB, Tholeiites and ophiolites.

Q8) Write short notes on (any two) :

a) Role of liquid fractionation in magmatic differentiation.

b) Mixing of magmas.

c) Chemistry of carbonatites.

d) Characteristics and composition of Anorthosites.

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Total No. of Questions : 8] **[Total No. of Pages :2**

P807

[3830] - 202

M.Sc. - I

GEOLOGY

GL - 202 : Metamorphic Petrology

(New) (Sem. - II)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Define metamorphism. Explain types of metamorphism. Give a brief account of their controlling factors.

Q2) Explain the concept of metamorphic facies with the help of diagram. Explain the metamorphic facies of contact metamorphism.

Q3) What are paired metamorphic belts? Explain their significance and origin with the help of suitable example.

Q4) Write notes on <u>any two</u> of the following :

a) Metamorphic Phase Diagrams.

b) Common minerals of metamorphic rocks.

c) ACF diagram.

d) Textures related to recrystallization.

Q5) Give an account of regional metamorphism of pelitic rocks.

Q6) Give an account of thermal metamorphism of basic and ultrabasic rocks.

P.T.O.

Q7) Give an account of metamorphism of granitoids.

Q8) Write notes on <u>any two</u> of the following :

a) Migmatites.

b) Prograde metamorphism.

c) Thermal metamorphism of carbonate rocks.

d) Metamorphism related to plate tectonics.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P808

[3830] - 203

M.Sc. I

GEOLOGY

GL-203 : Structural Geology and Tectonics

(New) (Sem.- II)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Define components of stress. Explain the behaviour of rock material under different stress conditions.

Q2) What is mesoscopic structural analysis? Describe its procedure in detail.

Q3) Define the elements of folds. Give the classification of folds.

Q4) Write notes on (any two):

a) Lineation
b) Stylolites
c) Strike-slip fault
d) Concept of fabric domain.

Q5) Discuss the nature of the convection current system.

Q6) Discuss magmatism in relation to plate margins.

Q7) Discuss the concept of continental drift.

Q8) Write notes on (any two):

a) Ophiolites
b) Heat flow
c) Precession of equinoxes
d) Effects of Earth's planetary dynamics on climate.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P809

[3830] - 204

M.Sc. - I

GEOLOGY

GL-204 : Geomorphology & Remote Sensing in Geology

(New) (Sem.- II)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Define Geomorphology. Describe its development and concept.

Q2) What is 'weathering'? Describe briefly the physical and chemical weathering.

Q3) Describe different kinds of drainage pattern along with their significance. Add note on factors controlling development of drainage patterns.

Q4) Write notes on any three of the following.

a) Peneplaination
b) Development of beaches and beach dunes
c) Soil profile
d) Geomorphic zones of India.

Q5) What are photorecognition elements? Enlist different photorecognition elements and elaborate on tone of photo.

Q6) Describe the working of LANDSAT-3 MSS along with a neat sketch.

P.T.O

Q7) What is Microwave remote sensing? How following features will appear on Radar image.

a) Turbulent and calm water body.

b) Rock terrain.

c) Smooth terrain.

d) Corner..

Q8) Write notes on any three of the following

a) Atmospheric windows.

b) Significance of drainage anomaly.

c) Plank's law.

d) Parallax bar.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P810

[3830] - 301

M.Sc. (Sem.- III)

GEOLOGY

GL - 302 : Exploration Methods

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What is Gravimeter? Describe unstable type of gravimeter.

Q2) Explain the seismic Refraction method for dipping layer. Briefly discuss the operation method in Refraction.

Q3) Explain the principle of induced polarization method. Describe the concept of Electrode and Electrolytic polarization.

Q4) Write notes on (any two):

a) Path finder elements.

b) Geobotanical surveying techniques.

c) Applications of Resistivity methods.

d) Types of magnetometers.

Q5) Define the term sampling. Describe the surface methods of sampling in detail.

Q6) Which method is suitable to delineate a chromite ore body? Discuss the efficacy of the method in delineation of chromite body.

P.T.O

Q7) What is self potential? How is it generated? Describe the instruments and field procedures in self potential methods.

Q8) Write notes on (any two)

a) Resistivity logging.

b) Electrolytic polarization.

c) Bouguer correction and bouguer anomalies.

d) Estimation of ores.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P811

[3830] - 302

M.Sc. (Sem.- III)

GEOLOGY

GL - 303 : Petroleum Geology

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Describe the surface and subsurface occurrence of petroleum.

Q2) Explain the importance of porosity and permeability of reservoir rocks. Discuss the factors that control the porosity of reservoir rocks.

Q3) What is primary and secondary migration? Discuss secondary migration and accumulation of petroleum.

Q4) Write notes on any two of the following:

a) Structure contour and Isopach maps.

b) Properties of drilling fluid.

c) Reservoir fluids.

d) Traps related with faults.

Q5) What is geophysics? Enlist different methods of geophysical prospecting used in hydrocarbon exploration. Elaborate on efficasy of gravity prospecting in hydrocarbon exploration.

P.T.O

Q6) Write a note on mud logging. How will you detect and interprete hydrocarbon shows during mud logging.

Q7) Write an account of stratigraphy, structure and source reservoir characteristics of Mumbai offshore basin.

Q8) Write notes on any two of the following.

a) Classification of petroliferous basins of India.

b) Dipmeter log.

c) Well control system of rotary rig.

d) Applications of controlled directional drilling.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P812

[3830] - 303

M.Sc. (Sem.- III)

GEOLOGY

GL - 304 : Engineering Geology and Geotechniques

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What are the different properties of rock considered during the selection of rock as a building stone.

Q2) Explain geological criteria for the selection of dam site. Describe the forces acting on dam walls.

Q3) What is rock failure? Give the mechanism of rock failure.

Q4) Write notes on (any two)

a) Lining in tunnelling

b) Triangular classification of soil

c) Dimension stone and road material.

d) Types of spillways.

Q5) What are the different applications of remote sensing in engineering geology?

Q6) Describe the different types of bridges. Comment on the geological considerations for the selection of bridge site.

P.T.O

Q7) What are landslides? Describe in detail the different types of landslides.

Q8) Write notes on (any two):

a) Preparation of engineering geological report.

b) Highway and runway aggregates.

c) Silting of reservoirs.

d) Slope stability analysis.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P813

[3830] - 304

M.Sc. (Sem.- III)

GEOLOGY

GL - 305 : Computer Applications in Geology & Geographical Information System

(2008 Pattern)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What is GIS? Give different types of analyses performed with the help of GIS. Explain in details with examples.

a) Multi-Criteria analyses b) Querry analyses

Q2) What are the five basic operations performed by any computer system. What is hardware and software? Distinguish between them in details with the help of suitable examples.

Q3) What is secondary storage? How does it differ from primary storage? Explain how information is stored in a disk pack.

Q4) Write notes on any <u>two</u> of the following:

a) Historical development of GIS in 1990's.

b) TIN and their constructions.

c) Conic projection.

d) Adjacency and containment.

P.T.O

Q5) What type of database is used in GIS? How does the relational database model work?

Q6) Explain the difference between Geographic and Rectangular co-ordinate system. What are their relative advantages & disadvantages.

Q7) What is data encoding? What problems are faced when encoding digital and analogue data.

Q8) Write notes on any <u>two</u> of the following:

a) Binary and Decimal number system.

b) NAND Gate & NOR Gate.

c) System software.

d) Methods of editing spatial data.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P814

[3830] - 401

M.Sc.-II (Sem.- IV)

GEOLOGY

GL - 401: Economic Geology

(New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What are ore deposits? Explain the terms ore, gangue, grade, tenor, resources and reserves. Give classification of ore deposits.

Q2) State the various ore forming processes. Explain in details the secondary ore forming processes.

Q3) Explain the role of magmas as ore forming fluids. Give a detailed account of pegmatitic deposits and its types.

Q4) Write notes on any **two** of the following:

a) Structural controls on ore localization.

b) Placer deposits.

c) Sublimation deposits.

d) Applications of Economic Geology.

Q5) Write classification & genesis of Manganese deposits and give their geological and geographical distribution.

P.T.O

Q6) Write classification and genesis of Aluminium deposits and give their geologic and geographical distribution.

Q7) Write classification and genesis of copper deposits and give their geologic and geographical distribution.

Q8) Write notes on any **two** of the following:

a) Skarn deposits

b) Surface rent and Royalty

c) Coalification

d) Uranium deposits.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P815

[3830] - 402

M.Sc.-II

GEOLOGY

GL - 402 : Mining Geology, Gemmology and Industrial Mineralogy

(New) (Sem.- IV)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) What are structural guides? Explain them in details with the help of suitable examples.

Q2) Give classification of drills. Explain their uses. Give a detailed account of any one of them.

Q3) Enlist various methods of mining. Describe any one of mining methods.

Q4) Write notes on **any two** of the follwing:

a) Intersecting Loci
b) Gossans
c) Verneuil process and identification of synthetic verneuil stones from natural gemstones
d) Use of polariscope in gem identification.

Q5) What are basic properties of gemstones? Explain various geological processes of gem formation.

Q6) Describe corundum gem species with respect to its varieties (colourwise), chemical composition, crystal system, physical and optical properties, characteristic inclusions and occurrences.

P.T.O

Q7) Which minerals are used as raw material in cement industry? Give detailed account of any two of them with respect to their characteristic properties, chemical composition and industrial specification.

Q8) Write notes on **any two** of the following:

a) Acidic refractory

b) Gypsum as an industrial mineral

c) Phosphate bearing rocks

d) Felspar as an industrial mineral.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P816

[3830] - 403
M.Sc.-II
GEOLOGY
GL - 403: Environmental Geology
(New) (Sem.- IV)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Describe the coastal hazards and sea level changes and their impact?

Q2) Explain the term 'Hazard'. Enumerate your answer with special reference to the types of Hazards and impact of catastrophic geological hazards.

Q3) Explain the term "Groundwater". Enumerate your answer with special reference to causes of Ground water pollution.

Q4) Write notes on any two of the following:

a) Process of soil Formation.
b) Scope of environmental science.
c) Fly ash and its related problems.
d) Effects of floods.

Q5) Describe the structure and composition of lithosphere.

Q6) Define biogeochemical cycle. Enumerate your answer with reference to the carbon cycle.

Q7) What are cyclones? Describe the types of cyclones. Add a note on the causes of cyclones.

Q8) Write notes on any two of the following:

a) Seismograph.

b) Types of landslides.

c) Effects of mining on environment.

d) Recycling of Resources.

Total No. of Questions : 8] **[Total No. of Pages : 1**

P817

[3830] - 404

M.Sc.-II (Sem.- IV)

GEOLOGY

GL - 404: Hydrogeology, Watershed Development & Management

(New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

1) ***You are advised to attempt not more than 5 questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Describe the vertical distribution of groundwater.

Q2) Explain the electrical resistivity method for groundwater prospecting.

Q3) What are the aquifer properties? Explain them with appropriate examples.

Q4) Write short notes on (any two):

a) Validity of Darcy's law.
b) Groundwater provinces of India.
c) Well inventory.
d) Water quality.

Q5) Explain the term watershed. Enumerate your answer with special reference to concept of watershed and its characteristics.

Q6) Role of NGO's and state Government in watershed management.

Q7) Describe the importance of conjunctive use of surface and groundwater resources.

Q8) Write short notes on (any two):

a) Contour bunding.
b) Water balance equation.
c) Aforestation.
d) Percolation dams.