

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and syllabi relating to the B.Sc. degree course vide this office Circular No.UG/215 of 2006 dated 26th June, 2006 and the Principals of the affiliated colleges in Science are hereby informed that the recommendation made by the Board of Studies in Geology at its meeting held on 9th June, 2008 has been accepted by the Academic Council at its meeting held on 13th June, 2008 vide item No.4.12 and that, in accordance therewith, the syllabus in the subject of Geology at the F.Y.B.Sc. examination is revised as per Appendix and that the same has been brought into force with effect from the academic year 2008-2009.

MUMBAI-400 032
13th August, 2008

PRIN.K.VENKATARAMANI
REGISTRAR

To,

The Principals of the affiliated colleges in Science.

A.C./4.12/13.06.2008

No.UG/372- A of 2008, MUMBAI-400 032

13th August, 2008

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Science
- 2) The Chairman, Board of Studies in Geology
- 3) The Controller of Examinations,
- 4) The Co-Ordinator, University Computerization Centre,


(D.H. KATE)
DEPUTY REGISTRAR
U.G./P.G SECTION

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information.

The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyarnagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyarnagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar, (PRO) the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that, no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT (1 copy), the Deputy Account, Unit V (1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post-Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies)

13.6.2008

UNIVERSITY OF MUMBAI



Modified Syllabus

For the
F.Y.B.Sc. Examination
in Geology

(With effect from the academic year 2008-2009)

Geology Syllabus

PAPER-I: INTRODUCTION TO GEOLOGY-I
(Mineralogy, Crystallography and Stratigraphy)

FIRST TERM

THEORY QUESTION PAPER

2 hours 60 marks

There will be four questions of 15 marks each.

Q.1. Based on Unit Nos 1, 2, 3.

Q.2. Based on Unit No. 1.

Q.3. Based on Unit No. 2.

Q.4. Based on Unit No. 3.

Each question will be set for 22 or 23 marks with internal options

Unit-1:

(15 lectures)

Mineralogy

Chemical bonds and formation of compounds.

Minerals: definition, chemical compositions, classification and silicate structures.

Physical properties of minerals: colour, streak, luster, diaphaneity, form, habit, cleavage, fracture, hardness, specific gravity, and electrical and magnetic properties.

Isomorphism, polymorphism and pseudomorphism.

Mineral groups

Introduction to rock forming minerals: Feldspars, Silica, Pyroxene, Amphibole, Mica, Olivine.

Ore-forming and industrial minerals

Unit-2:

(15 lectures)

Elementary Crystallography

States of matter: crystalline state.

Elementary ideas about the crystal structure.

External characteristics of crystals: face, form, edge, solid angle, interfacial angle and its measurement, zone.

Crystal symmetry: planes, axes and center of symmetry.

Crystallographic axes and axial angles, parameters, indices and rational indices.

Classification of crystals into seven systems.

Study of the normal classes belonging to following systems:

Isometric, Tetragonal, Hexagonal, Trigonal, Orthorhombic, Monoclinic and Triclinic.

Principles of Stratigraphy

Principles, correlation of strata

Standard stratigraphic scale, Indian stratigraphic scale.

Study of the general geographical and climatic conditions and life during the various eras of earth history with brief reference to the lithology of Indian formations of those eras and special reference to:

- Age of fishes
- Permocarboniferous period
- Age of reptiles
- Evolution of birds
- Age of mammals
- Evolution of man
- Ice ages
- Major Phanerozoic orogenic events.

LIST OF RECOMMENDED BOOKS

“Physical Geology” (VII edition), Judson, Kauffman and Leed (Prentice Hall).

“Rutley's Mineralogy”; Read H.H. (CBS)

“Fundamentals of Historical Geology & Stratigraphy of India”; Ravindra Kumar, (Wiley Eastern India)

SECOND TERM

Second Term Examination (2 hours duration)

There will be four questions of 15 marks each.

Q.1. Based on Unit Nos 4, 5, 6.

Q.2. Based on Unit No. 4.

Q.3. Based on Unit No. 5.

Q.4. Based on Unit No. 6.

Each question will be set for 22 or 23 marks with internal options.

Unit-4:

(15 lectures)

Igneous Petrology

Rocks: definition, their classification.

Magma: definition, composition, origin, Bowen's Reaction Series, magmatic differentiation and assimilation.

Mode of occurrences, Intrusive and Extrusive forms.

Textures and structures.

Classification based on grain size and mineral composition.

Metamorphic Petrology

Metamorphism: definition, agents and types of metamorphism.

Metamorphic minerals: stress and anti-stress minerals, textures and structures.

Metamorphic facies and isograds, Relationship between metamorphism and deformation.

Rock cycle.

Unit-5:

(15 lectures)

Geotectonics

Earthquakes: causes, effects, tsunamis, measurement of earthquakes, seismic belts, seismic zonation in India.

Volcanoes: types, causes and distribution.

Origin of Mountains, Oceans and Continents.

General relief features of the ocean floor.

Sedimentary Petrology

Sediments: weathering, transport, deposition, consolidation, diagenesis.

Textures and structures.

Classification: Terrigenous and Chemical sedimentary rocks.

Unit-6:

(15 lectures)

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Mineral Deposits

Classification and brief study of following mineral deposits: Hydrothermal, Magmatic, Sedimentary (evaporites, strata-bound, bedded iron formations), Placer, Residual.

Introduction to Mineral Exploration and Mining

Methods of mineral exploration: Surface methods – grid sampling. Sub-surface methods – Seismic, Electrical, Magnetic and Electrical.
Basic ideas about the methods of mining.

LIST OF RECOMMENDED BOOKS

"The Principles of Petrology"; Tyrell G.W.

"Principles And Practices of Mineral Exploration"; P.K.Raman (Geol. Soc. India, Bangalore)(1989)

"Mining of Ores and Non-metallic Minerals"; M. Agoskhov S. Borisov & V.Layansky, (Mir Publications, Moscow)(1988) Ch.2 & Ch. 17

"Courses in Mining Geology"; Arogyaswami, (Oxford & IBH).

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PAPER-II: INTRODUCTION TO GEOLOGY-II
(Study of Earth, Atmospheric circulation, Cartography and Structural Geology)

FIRST TERM

THEORY QUESTION PAPER

2 hours 60 marks

There will be four questions of 15 marks each.

Q.1. Based on Unit Nos 1, 2, 3.

Q.2. Based on Unit No. 1.

Q.3. Based on Unit No. 2.

Q.4. Based on Unit No. 3.

Each question will be set for 22 or 23 marks with internal options

Unit-1:

(15 lectures)

Earth in the Solar System

Geology and its perspectives.

Earth in the Solar system: Origin, size, shape, mass, density, rotational parameters.

Earth's Internal Structure and Age

Internal structure: core, mantle, and crust.

Hydrosphere, Atmosphere and Biosphere: characteristics and elemental abundance in each constituent. Convection in the earth's core and production of its magnetic field.

Radioactivity

Age of the earth.

Unit-2:

(15 lectures)

Atmospheric circulation and Global climatic changes

Atmospheric circulation, weather and climate changes.

Land-air-sea interaction.

Earth's heat budget and global climatic changes.

Ocean currents

Generation of oceanic currents, surface currents and global ocean conveyor system.

Ocean as a thermostat for the earth's surface heat balance.

Cartography

Maps and Topographical maps; latitude – longitude concepts, Datum, map projections, types of maps, SOI map index, Contours and contour reading: Scales and Compass bearings, map grids (UTM).

Structural Geology

Stratification; Dip and Strike; Clinometer compass its use.
Outcrop pattern of horizontal, dipping and vertical strata on various types of topography.
Outliers, Inliers.

Folds: Definition, Morphology, anticline and syncline.

Types of folds: symmetrical, asymmetrical, recumbent, overturned, isoclinal, plunging, doubly plunging, structural dome and basin, monocline, structural terrace, chevron, fan, anticlinorium, synclinorium, Importance of folds.

Joints: Definition, geometric classification and importance.

Faults: morphology; geometric classification based on relation to affected rocks, angle of dip, apparent movement and relative movement; distributive faulting: horst, graben and step faults; nappes.

Unconformities: nature, types and importance; overlap and off-lap.

LIST OF RECOMMENDED BOOKS

"The Blue Planet" (II Edition), Skinner B.J., Porter S.C. and Botkin D.B. (J. Wiley & Sons)

"Oceanography – A brief Introduction", Siddhartha. K., (Kisalaya Publications, India)

"Elements of Cartography", Robinson. A, Sale. R, Morrison. J, 6 ed, J. Wiley & Sons.

"Structural Geology"; Billings M.P. (Prentice Hall)

SECOND TERM

Second Term Examination (2 hours duration)

There will be four questions of 15 marks each.

Q.1. Based on Unit Nos 4, 5, 6.

Q.2. Based on Unit No. 4.

Q.3. Based on Unit No. 5.

Q.4. Based on Unit No. 6.

Each question will be set for 22 or 23 marks with internal options.

Unit-4:

(15 lectures)

Weathering and Erosion

Introduction to Weathering and Erosion.

Soil: definition, formation and functions; soil profile and soil types.

Rivers: development of a typical river system, source and surface flow; erosion, transportation and deposition.

Wind: erosion, transport and deposition; types of deserts and dunes; loess.

Glaciers: types, formation and morphology; erosion, transport and deposition.

Unit-5:

(15 lectures)

Introduction to Paleontology

Definition and scope of Paleontology

Processes of fossilization, preservation potential of organisms.

Uses of fossils, zone fossils.

Systematic classification of organisms.

Elementary ideas about the origin of life, evolution and fossil record.

Morphology of Fossils-I

Systematic study of morphological characters, classification, environmental factors and geological distribution of the following groups:

Arthropoda: **Trilobites**

Coelenterata: **Corals** (simple corals and compound hexa-corals and octa-corals)

Unit-6:

(15 lectures)

Morphology of Fossils-II

Systematic study of morphological characters, classification, environmental factors and geological distribution of the following groups:

Brachiopoda, Mollusca: **Lamellibranchs, Gastropods, Cephalopods.**

Systematic study of morphological characters, classification; environmental factors and geological distribution of the following groups:

Graptoloidea. Echinodermata: **Regularia and Irregularia**

LIST OF RECOMMENDED BOOKS

"Holmes' Principles of Physical Geology", Holmes D.L.;(ELBS & Nelson)

"Invertebrate Paleontology"; Wood; (CBS)

"Principles of invertebrate Paleontology"; Shrock & Twenhofel, (CBS)

"Principles of Paleontology"; Raup & Stanley, (CBS)

Supplementary Examination (3 hours duration)

90 Marks

There will be six questions of 15 marks each.

Q.1. Based on Unit Nos 1.

Q.2. Based on Unit No. 2.

Q.3. Based on Unit No. 3.

Q.4. Based on Unit No. 4.

Q.5. Based on Unit No.5.

Q.6. Based on Unit No. 6.

Each question will be set for 22 or 23 marks with internal options.

F.Y.B.SC. GEOLOGY PRACTICAL

2 Practicals, each of 2 ½ hours' duration and 40 marks.

PRACTICAL-I

(30 practical)

1. Study of twenty-five crystal models representing forms of seven normal classes of symmetry.
2. Identification and description of the physical properties, composition, occurrences and uses of 30 minerals comprising rock forming, industrial and ore minerals.
3. Identification of group characteristics of 25 common rocks and their classification into major rock groups. Identification and systematic description, of the megascopic features of these rocks.
4. Identification, classification, description and geological time range of twenty-five fossils belonging to the phyla included in the theory syllabus.

PRACTICAL-II

(30 practical)

1. Reading of topographical maps.
 2. Use of Clinometer and Brunton compasses
 3. Description and drawing of vertical cross section of simple geological maps involving horizontal or dipping strata with vertical faults, folded (non-plunging and non-faulted) strata and strata involving angular unconformity.
 4. Completion of outcrops involving horizontal and inclined strata that may have been affected by vertical fault.
 5. Graphical solution of structural geology problems involving
 - a) Strike, true dip and apparent dip
 - b) Thickness and width of outcrop.
- For conducting practical classes as well as examination, the number of students in each batch may be 15 students.
 - Number of Examiners per batch may be 1.

GEOLOGICAL FIELD TRAINING

- Students will be required to carry out local fieldwork for 4 days in a suitable geological area to study the elementary aspects of field geology and to submit a report thereon.
- Out of 40 marks of each Practical, 10 marks each should be allotted for the assessment of the field report submitted by the students.
- Calculation of workload for the purpose of Geological field training may be counted as 1 period per practical per week per batch. (Total of 2 lecture periods per week per batch).

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