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JAI NARAIN VYAS UNIVERSITY, JODHPUR
FACULTY OF SCIENCE
NEW CAMPUS

B. Sc. I Year Geology 2020-2021

Theory		
Paper I	Physical Geology	50 Marks
Paper II	Mineralogy	50 Marks
Paper III	Palaeobiology	50 Marks
Practicals	: Practical Examination	75 Marks
		Total 225 Marks

Duration of each theory paper Examination 3 Hrs.

Duration of Practical Examination 3 Hrs.

PAPER I: PHYSICAL GEOLOGY

Unit I

Geology and its perspectives. Introduction to basic tenets of origin of the Universe, the solar system. Earth in the Solar System: origin, size, shape, mass, density, rotational and revolution parameters. Age of the Earth. Chemical composition of the Earth. Internal structure of the Earth. Formation of hydrosphere, atmosphere and biosphere. Internal heat and Radioactivity of the Earth; Convection in the earth's core and its magnetic field.

Unit II

Elementary ideas of continental drift, Sea floor spreading and the theory of plate tectonics. Types of plates. Causes and rate of plate movement. Application of theory of plate tectonics in Geology to explain origin of mineral deposits Mountains, Earthquake belts, Island arcs and various Petrogenesis.

Unit III

Rock Weathering. Difference between Weathering and Erosion. Types of weathering, Soil formation, soil profile and soil types.

Geological work of rivers, glaciers, wind and groundwater.

Unit IV

Earthquakes: Their causes, effects and distribution. Earthquake waves. Measurement of Earthquakes.

Volcanoes: Types, Products and distribution.

Unit V

Oceanography : Geological work of Ocean; Physical features of Oceans, Coasts, Deep Sea trench, Midoceanic Ridges and Abyssal plain. Generation of oceanic currents, surface currents and global ocean Conveyor system; waveerosion and beach processes; ocean as a thermostat for the earth's surface heat balance.

Climatology : Atmospheric circulation, weather and climate changes. Land-air-sea interaction, Earth's heat budget and global climatic changes. Glacial, interglacial periods and ice ages.

PAPER II: MINERALOGY

Unit I

Fundamental laws of crystallography, elements of crystal symmetry, Millers, Weiss and Millarian system of notation and parameters. Crystal forms and their classification into crystal system, Introduction to space lattice.

Study of the normal classes of following crystal systems – Cubic system, Tetragonal system, Hexagonal system, Trigonal system, Orthorhombic system, monoclinic system and Triclinic system.

Unit II

Physical properties of minerals. Physical properties of Important Silicate and economic minerals. Concept of Isomorphism, Polymorphism, Solid solution, Exsolution. Elementary idea

about structure and classification of silicate minerals. Physical properties of the following minerals.

Quartz, Jasper, Orthoclase, Plagioclase, Microcline, Muscovite, Biotite, Garnet, Olivine, Augite, Hornblende, Tourmaline, Talc, Gypsum, Fluorite, Calcite, Apatite, Barite, Asbestos, Corundum, Phosphorite, Beryl, Kyanite, Galena, Sphalerite, Chalcopyrite, Pyrite, Magnetite, Hematite, Chromite, Pyrolusite and Psilomelane, Bauxite and Coal.

Unit III

Petrological microscope and its construction; principles of optics as applied to orthoscopic and conoscopic study of minerals: color, form, Relief, pleochroism, Interference colour, Extinction. Uniaxial and biaxial characters of minerals. Study of optical properties of Muscovite, Biotite, Quartz, Orthoclase, Microcline, Plagioclase, Olivine, Augite and Hornblende.

Unit IV

Mineralogical study of the following families.

- (i) Olivine (ii) Pyroxene (iii) Amphiboles

Unit V

Mineralogical study of the following families.

- (i) Quartz (ii) Feldspar (iii) Mica (iv) Garnet

PAPER III: PALAEOBIOLOGY

Unit I

Fossils, their preservation and uses. Elementary idea of organic evolution. Morphology of hard parts and geological distribution of Foraminifera. Introduction to *Nummulites*.

Unit II

Study of morphology and geological distribution of Graptoloidea, Echinoidea and Corals. Introduction to *Monograptus*, *Diplograptus*, *Cidaris*, *Hemiaster*, *Micraster*, *Calceola* and *Zaphrentis*.

Unit III

Study of morphology of hard parts and geological distribution of Gastropoda, Lamellibranchia and Trilobita. Introduction to *Trochus*, *Murex*, *Physa*, *Turritella*, *Natica*, *Conus* and *Cyprea*, *Lima*, *Pecten*, *Ostrea*, *Graphea*, *Exogyra*, *Mytilus*, *Trigonia* and *Hippurites*. *Calymene*, *Paradoxides*, *Trinucleus* and *Phacops*,

Unit IV

Study of morphology and geological distribution of Brachiopoda and Cephalopoda. Introduction to *Productus*, *Spirifer*, *Terebratulina*, *Rhynchonella*, *Nautilus*, *Belemnites*, *Phylloceras*, *Orthoceras*, *Goniatites*, *Ceratites* and *Perisphinctes*.

Unit V

Elementary knowledge of Gondwana flora and vertebrates of Siwaliks. Evolutionary history of Man, Horse and elephant. Introduction to *Glosopteris*, *Gangmopteris*, *Vertibraria* and *Ptilophyllum*.

PRACTICALS

- (1) Identification and Description of fossils in hand specimens.
- (2) Identification and Physical Properties of Minerals in hand specimens.
- (3) Identification and Description of Minerals under Petrological microscope
- (4) Study of Geomorphic features and forms. Physical Geology Models.
- (5) Sessional Marks.

SUGGESTED READING

1. Dutta A. K. 'Physical Geology.'
2. Gosh Mukul 'Bhautic BhuVigyan.' Madhya Pradesh Hindi Granth Academy., Bhopal.
3. Arthur Holmes. 'Principles of Physical Geology'
4. Savinder Singh 'BhuAkratiVigyan'
5. Read H.H. 'Rutley's Elements of Mineralogy. 26th Ed CBS Pub. New Delhi
6. Jain B.C 'Khaniztatha Crystal Vigyan., Madhya Pradesh Hindi Granth Academy., Bhopal.

7. Tiwari D. R. 'KhanizVigyan'. Madhya Pradesh Hindi Granth Academy., Bhopal.
8. Deer WA, Howie RA and Zussman J. 1996: 'The Rock forming minerals' Longman publishers.
9. Woods, H., 1985: 'Invertebrate Palaeontology' CBS Publishers and Distributions.
10. Mishra R P 'JeevashmVigyan'. Madhya Pradesh Hindi Granth Academy., Bhopal.
11. P. C. Jain and M.S. Anantharaman: Palaeontology Evolution and AnimalDistribution. Vishal Publications.
12. Moore R. C., Lalicher CG and Fisher AC: 'Invertebrate fossils'. McGraw Hill.

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