



UPSC GEOLOGY OPTIONAL SCHEDULE 2024

S.NO	HOURS	DATE	SYLLABUS
1	1 Hr	06.10.2024	General Introduction to Geology and Syllabus Discussion
2	2hrs		Paper I (i) General Geology The Solar System, meteorites, origin and interior of the earth. Radioactivity and age of earth; Volcanoes- causes and products, volcanic belts. Earthquakes-causes, effects, earthquake belts, seismicity of India, intensity and magnitude, seismographs. Island arcs, deep sea trenches and mid-ocean ridges. Continental drift evidences and mechanics; seafloor spreading, plate tectonics. Isostasy, orogeny and epeirogeny. Continents and oceans.
3	2hrs	07.10.2024	(ii) Geomorphology and Remote Sensing Basic concepts of geomorphology. Weathering and mass wasting. Landforms, slopes and drainage.
4	3hrs	& 08.10.2024	Geomorphic cycles and their interpretation. Morphology and its relation to structures and lithology. Applications of geomorphology in mineral prospecting, civil engineering, hydrology and environmental studies. Geomorphology of Indian subcontinent.
5	2hrs	09.10.2024	Aerial photographs and their interpretation-merits and limitations. The Electron-magnetic Spectrum. Orbiting satellites and sensor systems. Indian Remote Sensing Satellites. Satellites data products.
6	1hr		Applications of remote sensing in geology. The Geographic Information System and its applications. Global Positioning System.
7	2hrs	13.10.2024	(iii) Structural geology Principles of geologic mapping and map reading, projection diagrams, stress and strain ellipsoid and stress-strain relationships of elastic, plastic and viscous materials. Strain markers in deformed rocks.
8	2hrs	14.10.2024	Behaviour of minerals and rocks under deformation conditions. Folds and faults classification and mechanics.
9	1hr		Structural analysis of folds, foliations, lineations, joints and faults, unconformities.
10	2hrs	15.10.2024 & 16.10.2024	(iv) Paleontology Species- definition and nomenclature. Megafossils and Microfossils. Modes of preservation of fossils. Different kinds of microfossils. Application of microfossils in correlation, petroleum exploration, paleoclimatic and paleoceanographic studies.
11	2hrs		Morphology, geological history and evolutionary trend in Cephalopoda, Trilobita, Brachiopoda, Echinoidea and Anthozoa. Stratigraphic utility of Ammonoidea, Trilobita and Graptoloidea.
12	2hrs		Evolutionary trend in Hominidae, Equidae and Proboscidae. Siwalik fauna. Gondwana flora and its importance.
13	2hrs	20.10.2024 & 21.10.2024	(v) Stratigraphy and Geology of India Classification of stratigraphic sequences: litho-stratigraphic, biostratigraphic, chronostratigraphic and magneto-stratigraphic and their interrelationships. Distribution and classification of Precambrian rocks of India.
14	2hrs		Study of stratigraphic distribution and lithology of Phanerozoic rocks of India with reference to fauna, flora and economic importance.
15	2hrs		Major boundary problems- Cambrian/Precambrian, Permian/Triassic, Cretaceous/Tertiary and Pliocene/Pleistocene.
16	2hrs		Study of climatic conditions, paleogeography and igneous activity in the Indian subcontinent in the geological past. Tectonic framework of India. Evolution of the Himalayas.
18	2hrs	22.10.2024	(vi) Hydrogeology and Engineering Geology : Hydrologic cycle and genetic classification of water. Movement of subsurface water. Springs. Porosity, permeability, hydraulic conductivity, transmissivity and storage coefficient, classification of aquifers. Water-bearing characteristics of rocks. Groundwater chemistry. Salt water intrusion. Types of wells. Drainage basin morphometry. Exploration for groundwater. Groundwater recharge. Problems and management of groundwater. Rainwater harvesting.
19	2hrs		Engineering properties of rocks. Geological investigations for dams, tunnels and bridges. Rock as construction material. Alkali aggregate reaction. Landslides-causes, prevention and rehabilitation. Earthquake-resistant structures
20	-	23.10.2024	Paper I SECTIONAL TEST I
21	2hrs	27.10.2024	PAPER II (i) Mineralogy Classification of crystals into systems and classes of symmetry. International system of crystallographic notation. Use of projection diagrams to represent crystal symmetry. Crystal defects. Elements of X-ray crystallography.



22	1hr		Petrological microscope and accessories. Optical properties of common rock forming minerals. Pleochroism, extinction angle, double refraction, birefringence, twinning and dispersion in minerals.
23	2hrs	28.10.2024	Physical and chemical characters of rock forming silicate mineral groups. Structural classification of silicates. Common minerals of igneous and metamorphic rocks. Minerals of the carbonate, phosphate, sulphide and halide groups.
24	2hrs		(ii) Igneous and Metamorphic Petrology : Generation and crystallisation of magma. Crystallisation of albite-anorthite, diopside-anorthite and diopside-wollastonite-silica systems. Reaction principle. Magmatic differentiation and assimilation.
25	2hrs	29.10.2024 & 05.11.2024	Petrogenetic significance of the textures and structures of igneous rocks. Petrography and petrogenesis of granite, syenite, diorite, basic and ultrabasic groups, charnockite, anorthosite and alkaline rocks. Carbonatites. Deccan volcanic province. Types and agents of metamorphism. Metamorphic grades and zones. Phase rule. Facies of regional and contact metamorphism. ACF and AKF diagrams.
26	2hrs		Textures and structures of metamorphic rocks. Metamorphism of arenaceous, argillaceous and basic rocks. Minerals assemblages Retrograde metamorphism. Metasomatism and granitisation, migmatites, Granulite terrains of India.
27	2hrs		(iii) Sedimentary rocks: Processes of formation, diagenesis and lithification. Properties of sediments. Clastic and non-clastic rocks-their classification, petrography and depositional environment.
28	1hr		Sedimentary facies and provenance. Sedimentary structures and their significance. Heavy minerals and their significance. Sedimentary basins of India.
29	-	30.10.2024	Paper I SECTIONAL TEST II(ONLINE)
30	1hr	06.11.2024	(iv) Economic Geology : Ore, ore minerals and gangue, tenor of ore, classification of ore deposits. Process of formation of minerals deposits. Controls of ore localisation. Ore textures and structures. Metallogenic epochs and provinces.
31	2hrs		Geology of the important Indian deposits of aluminium, chromium, copper, gold, iron, lead zinc, manganese, titanium, uranium and thorium and industrial minerals. Deposits of coal and petroleum in India. National Mineral Policy. Conservation and utilization of mineral resources. Marine mineral resources and Law of Sea.
32	3hrs	10.11.2024 & 11.11.2024	(v) Mining Geology Methods of prospecting-geological, geophysical, geochemical and geobotanical. Techniques of sampling. Estimation of reserves of ore. Methods of exploration and mining metallic ores, industrial minerals and marine mineral resources. Mineral beneficiation and ore dressing.
33	2hrs		(vi) Geochemistry and Environmental Geology Cosmic abundance of elements. Composition of the planets and meteorites. Structure and composition of earth and distribution of elements. Trace elements. Elements of crystal chemistry-types of chemical bonds, coordination number. Isomorphism and polymorphism. Elementary thermodynamics.
34	2hrs		Natural hazards-floods, landslides, coastal erosion, earthquakes and volcanic activity and mitigation. Environmental impact of urbanization, open cast mining, industrial and radioactive waste disposal, use of fertilizers, dumping of mine waste and flyash. Pollution of ground and surface water, marine pollution Environment protection legislative measures in India.
35	-	13.11.2024	PAPER I FULL TEST
36	-	15.11.2024	PAPER II SECTIONAL TEST I
37	-	17.11.2024	PAPER II SECTIONAL TEST II
38	-	19.11.2024	PAPER II FULL TEST