



ગુજરાત જાહેર સેવા આયોગ

છ-૩ સર્કલ પાસે, છ રોડ, સેક્ટર-૧૦/એ, ગાંધીનગર-૩૮૨૦૧૦

જા.ક.૧૫/૨૦૨૦-૨૧

જગ્યાનું નામ: ભુસ્તરશાસ્ત્રી, વર્ગ-૧

(ઉદ્યોગ અને ખાણ વિભાગ)

ભાગ-૧ અને ભાગ-૨ ના ૧૮૦ મિનિટના સંયુક્ત પ્રશ્નપત્રની પ્રાથમિક

કસોટીનો અભ્યાસક્રમ

પ્રાથમિક કસોટીનો અભ્યાસક્રમ	
ભાગ-૧	
માધ્યમ: ગુજરાતી	
કુલ ગુણ : ૧૦૦	
૧	ભારતની ભૂગોળ- ભૌગોલિક, આર્થિક, સામાજિક, કુદરતી સંસાધન અને વસ્તી અંગેની બાબતો- ગુજરાતના ખાસ સંદર્ભ સાથે
૨	ભારતનો સાંસ્કૃતિક વારસો- સાહિત્ય, કલા, ધર્મ અને સ્થાપત્યો- ગુજરાતના ખાસ સંદર્ભ સાથે
૩	ભારતનો ઇતિહાસ- ગુજરાતના ખાસ સંદર્ભ સાથે
૪	ભારતની અર્થવ્યવસ્થા અને આયોજન
૫	ભારતીય રાજનીતિ અને ભારતનું બંધારણ: (૧) આમુખ (૨) મૂળભૂત અધિકારો અને ફરજો (૩) રાજ્યનીતિના માર્ગદર્શક સિદ્ધાંતો (૪) સંસદની રચના

	<p>(૫) રાષ્ટ્રપતિની સત્તા</p> <p>(૬) રાજ્યપાલની સત્તા</p> <p>(૭) ન્યાયતંત્ર</p> <p>(૮) અનુસૂચિત જાતિ, અનુસૂચિત જનજાતિ અને સમાજના પછાત વર્ગો માટેની જોગવાઈઓ</p> <p>(૯) એટર્ની જનરલ</p> <p>(૧૦) નીતિ આયોગ</p> <p>(૧૧) પંચાયતી રાજ</p> <p>(૧૨) નાણા પંચ</p> <p>(૧૩) બંધારણીય તથા વૈધનિક સંસ્થાઓ- ભારતનું ચૂંટણી પંચ, સંઘ લોક સેવા આયોગ, રાજ્ય લોક સેવા આયોગ, કોમ્પ્રોલર એન્ડ ઓડિટર જનરલ; કેન્દ્રીયસતર્કતા આયોગ, લોકપાલ તથા લોકાયુક્ત અને કેન્દ્રીય માહિતી આયોગ</p>
૬	સામાન્ય બૌદ્ધિક ક્ષમતા કસોટી
૭	સામાન્ય વિજ્ઞાન, પર્યાવરણ અને ઈન્ફર્મેશન એન્ડ કોમ્યુનિકેશન ટેકનોલોજી
૮	ખેલ જગત સહિત રોજબરોજના પ્રાદેશિક, રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય મહત્વના બનાવો

Syllabus of Preliminary Test	
Part-1	
Medium: Gujarati	Total Marks-100
1	Geography of India-Physical, Economic, Social, Natural Resources and population related topics- with special reference to Gujarat
2	Cultural heritage of India-Literature, Art, Religion and Architecture- with special reference to Gujarat
3	History of India with special reference to Gujarat
4	Indian Economy and Planning
5	<u>Indian Polity and the Constitution of India:</u> <ol style="list-style-type: none"> 1. Preamble 2. Fundamental Rights and Fundamental Duties 3. Directive Principles of State Policy 4. Composition of Parliament 5. Powers of the President of India 6. Powers of Governor 7. Judiciary 8. Provisions for Scheduled Castes, Scheduled Tribes and backward classes of the society 9. Attorney General

	10. NITIAayog 11. Panchayati Raj Institutions 12. Finance Commission 13. Constitutional and Statutory Bodies: Election Commission of India, Union Public Service Commission, State Public Service Commission, Comptroller and Auditor General; Central Vigilance Commission, Lokpal and Lokayukta, Central Information Commission
6	General Mental Ability
7	General Science, Environment and Information & Communication Technology
8	Daily events of Regional, National and International Importance including Sports

Part-2

Syllabus for the preliminary test for the recruitment on the post of Geologist, Class-I under Industries and Mines

Department

Marks – 200

Questions – 200

Medium - English

1. Physical geology and remote sensing

Evolution of Earth; Earth's internal structure; earthquakes and volcanoes; principles of geodesy, isostasy; weathering- processes and products; geomorphic landforms formed by action of rivers, wind, glaciers, waves and groundwater; features of ocean floor; continental shelf, slope and rise; concepts of landscape evolution; major geomorphic features of India-coastal, peninsular and extra peninsular.

Electromagnetic spectrum; electromagnetic bands in remote sensing; spectral signatures of soil, rock, water and vegetation; thermal, near infra-red and microwave remote sensing; digital image processing; LANDSAT, IRS and SPOT characteristics and use; aerial photos- types, scale, parallax, relief displacement; elements of image interpretation.

2. Structural geology

Principles of geological mapping; kinematic and dynamic analysis of deformation; stress-strain relationships for elastic, plastic and viscous materials; measurement of strain in deformed rocks; structural analysis of fold, cleavage, boudin, lineation, joint, and fault; stereographic projection of linear and planar structures; superposed deformation; deformation at microscaledynamic and static recrystallisation, controls of strain rate and temperature on development of microfabrics; brittle and ductile shear zones; time relationship between crystallisation and deformation, calculation of paleostress.

3. Sedimentology

Classification of sedimentary rocks; sedimentary textures- grain size, roundness, sphericity, shape and fabric; quantitative grain size analysis; sediment transport and deposition- fluid and sediment gravity flows, laminar and turbulent flows, Reynold's number, Froude number, grain

entrainment, Hjulstrom diagram, bed load and suspension load transport; primary sedimentary structures; penecontemporaneous deformation structure; biogenic structures; principles and application of paleocurrent analysis; composition and significance of different types of sandstone, limestone, banded iron formation, mudstone, conglomerate; carbonate diagenesis and dolomitisation; sedimentary environments and facies-facies models for fluvial, glacial, deltaic, siliciclastic shallow and deep marine environments; carbonate platforms- types and facies models; sedimentation in major tectonic settings; principles of sequence stratigraphy- concepts and factors controlling base level changes, parasequence, clinoform, systems tract, unconformity and sequence boundary.

4. Paleontology

Fossil record and geological time scale; modes of preservation of fossils and concept of taphonomy; body- and ichno-fossils, species concept, organic evolution, Ediacara Fauna; morphology and time range of Graptolites, Trilobites, Brachiopods, Lamellibranchs, Gastropods, Cephalopods, Echinoids and Corals; evolutionary trends in Trilobites, Lamellibranchs, Gastropods and Cephalopods; micropaleontology- methods of preparation of microfossils, morphology of microfossil groups (Foraminifera, Ostracoda), fossil spores, pollen and dinoflagellates; Gondwana plant fossils and their significance; vertebrate life through ages, evolution in Proboscidea, Equidae and Hominidae; applications of paleontological data in stratigraphy, paleoecology and paleoclimatology; mass extinctions.

5. Stratigraphy

Principles of stratigraphy- code of stratigraphic nomenclature of India; lithostratigraphy, biostratigraphy, chronostratigraphy and magnetostratigraphy; principles of stratigraphic correlation; characteristics of Archean granite-greenstone belts; Indian stratigraphy- geological evolution of Archean nuclei (Dharwar, Bastar, Singhbhum, Aravalli and Bundelkhand); Proterozoic mobile belts- Eastern Ghats Mobile Belt, Southern Granulite Terrain, Central Indian Tectonic Zone, Aravalli-Delhi Belt, North Singhbhum Mobile Belt; Proterozoic sedimentary basins (Cuddapah and Vindhyan); Phanerozoic stratigraphy- Paleozoic (Spiti,

Kashmir and Kumaon), Mesozoic (Spiti, Kutch, Narmada Valley and Trichinopoly), Gondwana Supergroup, Cenozoic (Assam, Bengal basins, Garhwal-Shimla Himalayas); Siwaliks; boundary problems in Indian stratigraphy.

6. Mineralogy

Symmetry, motif, Miller indices; concept of unit cell and Bravais lattices; 32 crystal classes; types of bonding, Pauling's rules and coordination polyhedra; crystal imperfections- defects, twinning and zoning; polymorphism, pseudomorphism, isomorphism and solid solution; physical properties of minerals; polarising microscope and accessory plate; optical properties of minerals- double refraction, polarisation, pleochroism, sign of elongation, interference figure and optic sign; structure, composition, physical and optical properties of major rock-forming minerals- olivine, garnet, aluminosilicates, pyroxene, amphibole, mica, feldspar, clay, silica and spinel group.

7. Geochemistry and isotope geology

Chemical composition and characteristics of atmosphere, lithosphere, hydrosphere; geochemical cycles; meteorites- types and composition; Goldschmidt's classification of elements; fractionation of elements in minerals/rocks; Nernst's partition coefficient (compatible and incompatible elements), Nernst-Berthelot partition coefficient and bulk partition coefficient; Fick's laws of diffusion and activity composition relation (Roult's and Henry's law); application of trace elements in petrogenesis; principles of equilibrium and Rayleigh fractionation; REE patterns, Eh and pH diagrams and mineral stability.

Half-life and decay equation; dating of minerals and rocks with potassium-argon, rubidium-strontium, uranium-lead and samarium-neodymium isotopes; petrogenetic implications of samarium-neodymium and rubidium-strontium systems; stable isotope geochemistry of carbon, oxygen and sulphur and their applications in geology; monazite chemical dating.

8. Igneous petrology

Viscosity, temperature and pressure relationships in magmas; IUGS classification of plutonic and volcanic rocks; nucleation and growth of minerals in magmatic rocks, development of igneous textures; magmatic evolution (differentiation, assimilation, mixing and mingling); types of mantle melting (batch, fractional and dynamic); binary (albite-anorthite, forsterite-silica and diopside-anorthite) and ternary (diopside-forsterite-silica, diopside-forsterite-anorthite and nepheline-kalsilite-silica) phase diagrams and relevance to magmatic crystallization; petrogenesis of granites, basalts, ophiolite suite, komatiites, syenites, boninites, anorthosites and layered complexes, and alkaline rocks (carbonatite, kimberlite, lamproite, lamprophyre); mantle metasomatism, hotspot magmatism and large igneous provinces of India.

9. Metamorphic petrology

Limits and physico-chemical controls (pressure, temperature, fluids and bulk rock composition) of metamorphism; concept of zones, facies, isograds and facies series, geothermal gradients and tectonics of orogenic belts; structures, micro-structures and textures of regional and contact metamorphic rocks; representation of metamorphic assemblages (ACF, AKF and AFM diagrams); equilibrium concept in thermodynamics; laws of thermodynamics, enthalpy, entropy, Gibb's free energy, chemical potential, fugacity and activity; tracing the chemical reactions in P-T space, phase rule and mineralogical phase rule in multi-component system; Claussius-Clapeyron equation and slopes of metamorphic reactions; heat flow, diffusion and mass transfer; Fourier's law of heat conduction; geothermobarometry; mass and energy change during fluid-rock interactions; charnockite problem, formation of skarns, progressive and retrogressive metamorphism of pelitic, calcareous and basic rocks; P-T-t path and tectonic setting.

10. Geodynamics

Phase transitions and seismic discontinuities in the Earth; seismic waves and relation between V_p , V_s and density; seismic and petrological Moho; rheology of rocks and fluids (Newtonian and non-Newtonian liquids); rock magnetism and its origin; polarity reversals, polar wandering and supercontinent cycles; continental drift, sea floor spreading; gravity and

magnetic anomalies of ocean floors and their significance; mantle plumes and their origin; plate tectonic types of plate boundaries and their inter-relationship; heat flow and heat production of the crust.

11. Economic geology

Ore minerals and industrial minerals; physical and optical properties of ore minerals; ore textures and paragenesis; characteristics of mineral deposits spatial and temporal distribution, rock-ore association; syngenetic and epigenetic deposits, forms of ore bodies, stratiform and strata-bound deposits; ore forming processes- source and migration of ore constituents and ore fluid, mechanism of ore deposition; magmatic and pegmatitic deposits (chromite, Titanomagnetite, diamond, Cu-Ni sulphide, PGE, REE, muscovite, rare metals); hydrothermal deposits (porphyry Cu-Mo, greisen Sn-W, skarn, VMS and SEDEX type sulphide deposits, orogenic gold); sedimentary deposits (Fe, Mn, phosphorite, placer); supergene deposits (Cu, Al, Ni and Fe); metamorphic and metamorphosed deposits (Mn, graphite); fluid inclusions in ore mineral assemblage- physical and chemical properties, microthermometry; stable isotope (S, C, O, H) in ore genesis- geothermometry, source of ore constituents; global tectonics and mineralisation.

12. Indian mineral deposits and mineral economics

Distribution of mineral deposits in Indian shield; geological characteristics of important industrial mineral and ore deposits in India- chromite, diamond, muscovite, Cu-Pb-Zn, Sn-W, Au, Fe-Mn, bauxite; minerals used in refractory, fertilizer, ceramic, cement, glass, paint industries; minerals used as abrasive, filler; building stones.

Strategic, critical and essential minerals; India's status in mineral production; co-products and by-products; consumption, substitution and conservation of minerals; National Mineral Policy; Mineral Concession Rules; marine mineral resources and laws of the sea.

13. Gujarat Mineral deposits and mineral economics

Value addition, UNFC classification and latest method of classification, existing mineral policy of Gujarat State, Geology of Gujarat, Rules and regulation pertaining to prevention of illegal mining.

14. Mineral exploration

Stages of exploration; scope, objectives and methods of prospecting, regional exploration and detailed exploration; geological, geochemical and geobotanical methods; litho-, bio-, soil geochemical surveys, mobility and dispersion of elements, geochemical anomalies; ore controls and guides; pitting, trenching, drilling; sampling, assaying, ore reserve estimation; categorization of ore reserves; geophysical methods- ground and airborne surveys; gravity, magnetic, electrical and seismic methods of mineral exploration.

15. Fuel geology and Engineering geology

Coal and its properties; proximate and ultimate analysis; different varieties and ranks of coal; concept of coal maturity, peat, lignite, bituminous and anthracite coal; origin of coal, coalification process; lithotypes, microlithotypes and maceral groups of coal; mineral and organic matter in coal; lignite and coal deposits of India; origin, migration and entrapment of natural hydrocarbons; characteristics of source and reservoir rocks; structural, stratigraphic and mixed traps; geological, geochemical and geophysical methods of hydrocarbon exploration; petroliferous basins of India; geological characteristics and genesis of major types of U deposits and their distribution in India. Engineering properties of rocks; geological investigations in construction of dams, reservoirs, tunnels, bridges, highways and coastal protection structures; geologic considerations of construction materials.

16. Environmental geology and Natural hazards

Stefan-Boltzmann equation and planetary temperature; cause and effects of global climate change; Earth's radiation budget; greenhouse gases and effect; examples of positive and negative feedback mechanisms; biogeochemical cycle of carbon; geological investigations of nuclear waste disposal sites; marginal marine environments- estuaries, mangroves and lagoons; ozone hole depletion, ocean acidification, coral bleaching, Milankovitch cycle, sea level rise, eutrophication and acid rain; environmental impacts of urbanization, mining and hydropower projects; water pollution, water logging and soil erosion; Himalayan glaciers; causes and consequences of earthquakes, volcanoes, tsunami, floods, landslides, coastal erosion, droughts and desertification; application of remote

sensing and geographic information systems (GIS) in environmental management.

17. Current trends and recent advancements in the relevant fields.
