SYLLABUS FOR COMPUTER BASED RECRUITMENT TEST (CBRT)
FOR THE POST OF ASSISTANT PROFESSORS IN GOVERNMENT COLLEGE (GEOLOGY)
UNDER
DIRECTORATE OF HIGHER EDUCATION
(Advt No. 5 Year 2020)

I. General English including Grammar **- 05 marks**

II. General Knowledge, Current Affairs and Events of National and International Importance **- 10 marks**

III. Logical Reasoning and Analytical Ability **- 10 marks**

IV. Core: - 50 marks

Structural Geology Mechanical principles - Properties of rocks and their controlling factors; Concept of Stress; Two dimensional stress analyses, Theories of Rock failure. Causes and dynamics of faulting; Strike slip faults, Normal faults, Thrust Faults, Thin skinned deformation, Decollement; Mechanics of folding and Buckling, Fold development and distribution of strain in folds; Superposed folding patterns.

Optical Mineralogy Optical crystallography of uniaxial and biaxial crystals, Indicatrix, pleochroism, Interference figures, crystal orientation, 2V and 2E.

Crystallography 32 crystals classes and description of the different normal classes. Different types of crystal projections – spherical and stereographic and their uses. Twinning and Twin Laws: common types of twins and their examples in minerals. Space Lattice and Symmetry of internal structures – 14 Bravais Lattice. Introduction to space group.

Igneous Petrology- Magma: Its physics, nature, factors affecting magma and its evolution. Thermal structure of the earth and melting of mantle. Plate tectonics and generation of different magmas in various tectonic settings. Concept of primary and secondary magma. Magma series, Dynamics, differentiation, emplacement and crystallization of the magma. Magma mixing, mingling and immiscibility. Plume magmatism and hot spots. Mantle metasomatism. Mantle heterogeneities.
Petrology & petrogenesis of the following igneous rocks with suitable Indian examples: (i) Peridotites, komatiites, gabbros, basalts, anorthosites komatiites, ophiolites. (ii) Large igneous Provinces, Mafic dyke swarms, boninites and layered complexes. (iii) Alkaline rocks, carbonatites, kimberlites, lamproites, kamafugites and lamprophyres (iv) Granitoids, adakites and sanukitoids

Tectonic classification of sedimentary basins; Sedimentary facies and facies models with Indian analogues; Processes and characteristics of depositional environments like Fluvial, Estuarine, Deltaic, Tidal flat, Lagoonal, , Barrier beach and Deep-Sea environments. Concise approach to regional unconformities, parasequences and systems tracts; Allogenic and autogenic controls on sedimentation. Introduction to Quaternary Sedimentology

Geomorphology of India --- Peninsular, extra-peninsular and Indo-Gangetic Plains. Application of Geomorphology in Mineral Prospecting, Civil Engineering, Military purposes, Hydrogeology and Environmental studies. Plates and plate boundaries; Principles of Plate Tectonics; Force Balance and Mantle Plume models of plate movements; Orogeny and Epeirogeny; Anatomy of orogenic Belts; Geodynamic Evolution of Himalaya

Micropaleontology -Definition and scope of the subject; Relationship of micropaleontology with ocean sciences; Modern field and laboratory techniques in the study of microfossils (collection, sampling and processing techniques, scanning electron microscopy and mass spectrometry); A brief account of the concepts and methods for the development of micropaleontological indicators useful in reconstruction of history of past, environmental changes and biostratigraphic correlation.

Oceanography- Sampling of modern ocean biogenic flux including sediment trap sampling; Methods of measuring properties of sea water; Temperature and salinity distribution (horizontal and vertical) in ocean waters; Dissolved gases in sea water, factors affecting the concentration of gases in sea water; Carbon dioxide equilibria, precipitation and dissolution of carbonates; Biological - chemical - physical interactions in the oceans; Oxygen minimum layer in the ocean. Ocean circulation, surface circulation; Concept of mixed layer, thermocline and pychnocline, Coriolis force and Ekman spiral, upwelling.

Hydrogeology Hydrological cycle and role of groundwater in the hydrological cycle. Occurrence of Groundwater: Origin and age of water; rock properties affecting groundwater; vertical distribution of groundwater, types of aquifers, springs and geological formations as aquifers. Hydrogeological properties of water-bearing materials – porosity, permeability, transmissibility, storage coefficient, specific yield and specific retention. Groundwater level and its fluctuations. Groundwater Quality: Quality criteria for different uses, graphical presentation of water quality data. Estimation and methods of water treatment for various uses; Problem of Arsenic and fluoride and remedial measures for their treatment. Quality Problems in India.

Remote Sensing and GIS --Remote sensing: principles and significance; Electromagnetic Radiation – Characteristics and Remote Sensing Regions and bands; Spectra of common natural objects – soil, rock, water and vegetation; General Orbital characteristics of satellites; Concepts of radiometric, spectral, spatial and temporal resolutions of satellite sensors; Sensor characteristics of remote sensing satellites: Landsat, IRS, ASTER, Quickbird

Concept of GIS: Definition and components of GIS; Object based and field based GIS data model; Raster, vector, Spatial and non spatial data structures; Data Based Management Systems and Model; Spatial Analysis: Spatial elements and analysis, local, focal, zonal and global operations; GIS query and output, Digital Elevation Model (DEM) and its derivatives; Utility of GIS in Geological projects

Note:

Duration for C.B.R.T : 75 Minutes

Maximum Marks for C.B.R.T : 75 Marks