

UNIVERSITY OF JAMMU

NOTIFICATION

Syllabus of Entrance/Screening Test for the post of Field Zoologist

Total Marks: 100

Time: 120 Minutes

S.No.	Examination Type	Section	Units	Marks	Duration
1.	Multiple Choice Questions	A	General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc.	30	2 Hours
2.	Multiple Choice Questions	B	Discipline Oriented	70	

SECTION-A

- I. General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc.

SECTION-B

Unit-1: Ecology

Environment: Physical environment, biotic environment, biotic and abiotic interactions, Ecological habitat, niche & Ecological equivalents, Characteristics of Population: Size & density, Dispersal & Dispersion, Age structure, Succession: Types, mechanisms, changes involved in succession, concept of climax, Species interaction, Competition, Predation, Commensalism, Mutualism, Competition, Predation and Parasitism.

Unit-2: Animal Conservation

Components of Biodiversity, diversity indices, levels of biodiversity: alpha, beta and gamma diversity, Key stone species, Umbrella species, Indicator species, Exotic species, Hot spots of biodiversity, National parks of India, Ex-situ conservation, In-situ conservation, Project Tiger, Wildlife Act.

Unit-3: Development Biology

Spermatogenesis: Process, Ultra structure of sperms, Spermiogenesis, Oogenesis: Process, Vitellogenesis, Types of eggs and egg membranes, Early development of frog and chick up to gastrulation, Characteristics and Patterns of cleavage, Placenta, Extra embryonic membranes.

Unit-4: Endocrinology

Types of endocrine glands of human body, Classification of hormones and mechanism of hormone action, Functions of Pituitary, Thyroid, Pancreas, Adrenal, Testes and Ovary Disorders associated with endocrine glands.

Unit-5: Molecular Biology

Structure of DNA, Types of DNA (A, B and Z DNA), Watson-Crick Model of DNA, Repetitive DNA, Mutation, Types, causes and detection, DNA replication in eukaryotes and prokaryotes, Transcription in Prokaryotes and Eukaryotes, RNA processing: RNA splicing, polyadenylation, Types of RNA, Translation and translational inhibitors, Genetic code, DNA Repair and mechanisms.

Unit-6: Ichthyology

Distinctive characteristics of fishes, Scales: types, structure and functions of scales, Coloration: chromatophores, pigments of coloration in fishes fins, their structure, modifications, Bioluminescence in fishes and its significance, Structure, modifications and functions of gills, Electric organs: their structure and use in fishes, Hill stream fishes, Venomous and poisonous fish, Migration in fishes.

Unit-7: Insect Diversity

Basics of insect classification & Bionomics of insect orders (Thysanura, Collembola, Odonata, Orthoptera, Dictyoptera, Dermaptera, Hemiptera, Homoptera, Lepidoptera, Diptera, Coleoptera, Hymenoptera), General structure of head, thorax and abdomen, types of mouth parts and their diversity, types of antennae & legs of insects. Metamorphosis: Types and its control, different types of larvae and pupae, Compound eye, Defence mechanism.

Unit-8: Animal Diversity

Classification of Invertebrates upto Phylum level: Porifera, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata. Classification of Phylum Chordata upto class level- Pisces, Amphibia, Reptilia, Aves, Mammalia.

Unit-9: Systematics and Evolution

Introduction to taxonomy, Zoological nomenclature, Isolating mechanisms, Sympatric, allopatric and parapatric species, Biological Species concept, Concepts of Taxon, holotype, paratype, topotype, Genetic drift, Vestigial organs, Atavism, Connecting links, Missing links, Evolution of man.

Unit-10: Techniques in Zoology

Preparation of killing bottles, Different techniques used for collection of insects, Various methods for preserving insects, Techniques of preserving and sorting of the collected specimens, Phytoplankton and zooplankton collection, Quantitative and qualitative analysis of plankton, Study of water quality parameters: dissolved oxygen, free carbon dioxide, carbonates, bicarbonates, calcium, magnesium, Polymerase Chain Reaction.

No. Estab./C&R/NTW/24/3490
Dated: 06-05-2024

REGISTRAR

UNIVERSITY OF JAMMU

NOTIFICATION

Syllabus of Entrance/Screening Test for the post of Museum-cum-Lecture Assistant (Geology)

Total Marks: 100

Time: 120 Minutes

S.No.	Examination Type	Section	Units	Marks	Duration
1.	Multiple Choice Questions	A	General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc.	30	2 Hours
2.	Multiple Choice Questions	B	Discipline Oriented	70	

SECTION-A

- I. General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc.

SECTION-B

Unit – I (Physical Geology & Remote Sensing)

Evolution of Earth; Earth's internal structure; Composition of the earth's crust and upper mantle and crust-mantle relationship; Earthquakes and volcanoes- causes and distribution; seismicity of India, Earthquake's measurement; 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 tectonics- types of plate boundaries and their inter-relationship; heat flow and heat production of the crust. Evolution of Cratonic domains. 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. Morphotectonic evolution of Himalaya and Tibetan Plateau.

Fundamental concepts of remote sensing, electromagnetic radiation spectrum, Interaction of electromagnetic energy and its interactions in atmosphere and surface of the earth; 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; Fundamentals of photogrammetry; aerial photo interpretation and geological application. Elements of image interpretation. Geographic information system and global positioning system.

Unit – II (Structure Geology and Geotectonics)

Behaviour of rocks and minerals under deformation conditions; kinematic and dynamic analysis of deformation; stress-strain relationships for elastic, plastic and viscous materials; measurement of strain in deformed rocks; Folds and faults – classification and

mechanism; Shear zones geometry – types and products; structural analysis of fold, cleavage, boudin, lineation, joint, and fault. Principles of geological mapping; stereographic projection of linear and planar structures; superposed deformation; deformation at microscale- dynamic and static recrystallisation, controls of strain rate and temperature on development of microfabrics; time relationship between crystallisation and deformation, calculation of paleostress.

Evolution of important cratonic domains of India, Himalayan Tectonics- sedimentation, closing of continents, rotation of continental blocks, phases of deformation, shifting of depositional basins, vertical tectonics; Tectonics of Indian sub-continent, Drift and subduction of the Indian Plate, Andaman subduction zone and Makran subduction; Indus-Tsangpo suture zone, Main Central Thrust, Main Boundary Fault, Himalayan Frontal Fault. Neotectonic evidences in parts of Himalaya.

Unit- III (Stratigraphy)

Principles of stratigraphy; Geological time scale; Codes of stratigraphic nomenclature; Lithostratigraphy, biostratigraphy, chronostratigraphy and Magnetostratigraphy; Methods of stratigraphic correlation; Facies concept in Stratigraphy. Relative and absolute age dating. Earth's Climatic History. Evolution of Indian shield in space and time. Major Precambrian belts of India and their tectonic setting; Concept of Gondwanaland and global distribution of Gondwana rocks; Stratigraphic distribution and lithology of Phanerozoic rocks in India; Cenozoic and Quaternary stratigraphy of India with special reference to Himalaya.

Unit- IV (Palaeontology)

Origin and Diversity of life with major adaptive events; Evolutionary process and the fossil record; Type specimens, fixing and nature of type specimens, methods of fossil identification and description, law of priority, homonymy and synonymy. Taxonomic nomenclature and principles, important taxonomic groups, Gondwana floras of India and their significance, Application of palaeobotany in palaeoclimatic studies; General characters of vertebrates, origin of vertebrates; Siwalik vertebrate faunal changes and their relation to tectonic and eustatic events; univariate and bivariate analysis; preservation of fossils; mass extinction events; micropaleontology- methods of preparation of microfossils, morphology of microfossil groups.

Unit-V (Mineralogy and Geochemistry)

Definition of minerals, crystals and ore; silicate structures, Symmetry elements; Miller indices; concept of unit cell and Bravais lattices; 32 crystal classes; crystal imperfections- defects, twinning and zoning; polymorphism, pseudomorphism, isomorphism and solid solution. Structure, composition, physical and optical properties of major rock forming mineral groups and ores. Optical phenomena - double refraction, polarisation, pleochroism, sign of elongation, interference figure and optic sign. Principles of Transmitted and reflected light microscopy, Construction of Petrological and ore microscopes, Uniaxial and biaxial Interference figures and their applications, Methods and mechanism of determining the actual and apparent optic angle.

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; Partition coefficient and bulk partition coefficient; application of trace elements in petrogenesis; REE patterns, Eh and pH diagrams and mineral stability. Half-life and decay equation; dating of minerals and rocks with K-Ar, Rb-Sr, U-Pb and Sm-Nd isotopes; petrogenetic implications of Sm-Nd,

and Rb-Sr systems; stable isotope geochemistry of carbon, oxygen and sulphur and their applications in geology.

Unit-VI (Igneous and Metamorphic Petrology)

Generation of magma; magma differentiation, assimilation, mixing and mingling of magmas; types of mantle melting (batch, fractional and dynamic); nucleation and growth of minerals in magmatic rocks, Igneous textures and structures; IUGS classification of plutonic and volcanic rocks; binary and ternary phase diagrams and relevance to magmatic crystallization; petrogenesis of granites, basalts, ophiolite suite, komatiites, syenites, anorthosites and layered complexes, and alkaline igneous rocks; mantle metasomatism, hotspot magmatism and large igneous provinces of India.

Agents of metamorphism; concept of zones, grads, facies and facies series; geothermal gradients and tectonics of orogenic belts; structures, micro-structures and textures of regional and contact metamorphic rocks; graphical representation of metamorphic assemblages (ACF, AKF and AFM diagrams); metamorphic reactions; laws of thermodynamics; chemical potential, fugacity and activity; tracing the chemical reactions in P-T space, mineralogical phase rule in multi-component system; geothermobarometry; fluid-rock interactions; skarns, progressive and retrogressive metamorphism of pelitic, calcareous and basic rocks; P-T-t path and tectonic implications.

Unit-VII (Sedimentary and Fuel Geology)

Sediment generation and formation of sedimentary rocks; classification of sedimentary rocks; sedimentary structures and textures and their significance; quantitative grain size analysis; pore morphology, effect of texture on porosity and permeability; sediment transport and deposition- fluid and sediment gravity flows, laminar and turbulent flows, bed load and suspension load transport; principles and application of paleocurrent analysis; composition and significance of different types of sandstone, limestone, mudstone, conglomerate; carbonate diagenesis and dolomitisation; Application of Cathodo-luminescence technique in diagenetic studies; depositional sedimentary environments; petrological study of clastic and non-clastic rocks; sedimentation in major tectonic settings; principles of sequence stratigraphy.

Coal and its properties; proximate and ultimate analysis; varieties and ranks of coal; concept of coal maturity, peat, lignite, bituminous and anthracite coal; origin of coal, mineral and organic matter in coal; lignite and coal deposits of India; microscopic examination of coal; origin, migration and entrapment of natural hydrocarbons; characteristics of source and reservoir rocks; traps; petroliferous basins of India.

Unit-VIII (Economic Geology and Mineral Exploration)

Ore minerals and industrial minerals; ore textures and paragenesis; spatial and temporal distribution of mineral deposits; morphology of ore bodies; ore forming processes; source and migration of ore constituents and ore fluid, mechanism of ore deposition; genesis of magmatic, hydrothermal and pegmatitic deposits (chromite, Ti-magnetite, diamond, Cu-Ni sulphide, PGE, porphyry Cu-Mo, REE, muscovite, rare metals, Sn-W, VMS and SEDEX type sulphide deposits, gold); sedimentary deposits (Fe, Mn, phosphorite, placer); deposits due to weathering processes (Al, Ni, Cu and Fe); fluid inclusions studies, microthermometry and stable isotope (S, C, O, H) in ore genesis. Important industrial mineral and ore deposits in India.

Stages of exploration; methods of prospecting; 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.

Unit-IX (Engineering Geology and Hydrology)

Engineering properties of rocks; geological investigations in construction of dams, reservoirs, tunnels, bridges, highways and coastal protection structures; construction materials; Kinematic analysis; Rock quality designation (RQD), Rock mass rating (RMR) and slope mass rating (SMR). Classification and causes of landslides

Potential evapo-transpiration and water balance, drainagemapping and morphometric analysis; flow net and fracture trace analysis, groundwater and spring recharge zones, ground water-table contouring and estimation of the flow directions; aquifer boundaries; groundwater budgeting, steady and unsteady flow, SDT and APT; surface and subsurface geophysical and geochemical exploration, well log analysis, mining techniques

Unit-X (Lab Techniques and Museology)

Geological maps, stratigraphic columns; facies diagrams and correlation charts, fence diagrams, use of trigonometric techniques, Isopach maps. Preparation of thin sections of rocks (consolidated and unconsolidated), polished sections and grains, staining techniques for identification of minerals; heavy mineral separation; fossil collection and preparation, sample processing, picking and mounting and display; development of composite lithologs, division of lithocolumn; principal of Analytical Instruments (ICP, AAS, Spectrophotometer, XRF, XRD, SEM, EMPA); sample preparation for AAS, ICP, XRD, XRF and SEM; determination of various major oxides and elements; CIPW norm calculation, software in petrology like Sinclass, Petrograph, and GCD kit.

Definition of museum, scope and functions, museology, museography; history and philosophy of museums, classical vs virtual museums; collection and management, modes and ethics of collection, excavation, exploration, expedition, loan, exchange, purchase, confiscation, fabrication, registration, documentation, digitization, cataloguing, indexing, accessioning, storage, transport of collection; display, exhibits, education and outreach.

No. Estab./C&R/NTW/24/ 3492

Dated: 08-05-2024

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REGISTRAR


UNIVERSITY OF JAMMU

Notification

Syllabus of Entrance/Screening Test for the post of Statistical Assistant

Total Marks: 100

Time: 120 Minutes

S.No.	Examination Type	Section	Units	Marks	Duration
1.	Multiple Choice Questions	A	I. General Knowledge & Current Affairs	05	2 Hours
			II. General Economics	05	
			III. Computer Applications	10	
2.	Multiple Choice Questions	B	Discipline Oriented	80	

SECTION-A

- I. General Knowledge, Current Affairs **05 Marks**
- II. General Economics **05 Marks**
- III. **COMPUTER APPLICATIONS** **10 Marks**
- (i) Fundamentals of Computer Sciences
 - (ii) Concept of Open-Source Technologies/software
 - (iii) Data types and operators in C++
 - (iv) Selection and loop statements in C++
 - (v) SPSS and R softwares usage
 - (vi) Programming Language Classification
 - (vii) MS Excel

SECTION-B

- I. **STATISTICAL METHODS** **80 Marks**
- (i) Primary and Secondary data, Methods of collecting primary data and preparation of questionnaires, Tabulation and Classification of data, Measures of Central Tendency and Dispersion, Coefficient of variation. **(10 Marks)**
 - (ii) Knowledge of Theoretical Distributions (Binomial, Poisson and Normal, Exponential, Negative Binomial, Hypergeometric, Cauchy, Beta and Gamma Distribution) and their inter-relations. **(10 Marks)**
 - (iii) Large and small sample theory, Asymptotic sampling distribution and large sample tests, Sampling, Distribution: t , x^2 , F and Tests of significance based on them. **(10 Marks)**

- (iv) Index numbers of prices and quantities, Different types of index numbers i.e. index number of wholesale prices and cost of living index numbers. Tests and Criterion of good index number, Simple, Partial and Multiple Correlations, Linear Regression, Properties of regression coefficients with their properties. (10 Marks)
- (v) Analysis of variance, Basic principles of design of experiment, Randomized blocks and Latin square designs and their analysis, Strip and Split plots, Factorial experiments 2^n and confounding (concepts), Balanced Incomplete Block Designs and relationship between its parameter. (10 Marks)
- (vi) Simple random sampling with and without replacement, Stratified, Cluster and systematic sampling, Ratio and regression methods of estimation, Successive sampling, Sampling and Non-sampling errors. (10 Marks)
- (vii) Point and interval estimates, Characteristic of a good estimator and methods of estimations, testing of hypothesis, Null and Alternative hypothesis. Simple and Composite. Two types of errors, Critical region, Best Critical region, MVU estimators, CR lower bound. (10 Marks)
- (viii) Multivariate Normal Distribution and its important properties, Hotelling's T^2 , Wishart distribution and its important properties, Principal component analysis. (10 Marks)

No. Estab./C&R/NTW/24/ 3488
Dated:- 06-05-2024


REGISTRAR


UNIVERSITY OF JAMMU

NOTIFICATION

Syllabus of Entrance/Screening Test for the post of Junior Technical Assistant (Chemistry)

Total Marks: 100

Time: 120 Minutes

S.No.	Examination Type	Section	Units	Marks	Duration
1.	Multiple Choice Questions	A	General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc.	25	2 Hours
2.	Multiple Choice Questions	B	Discipline Oriented	75	

SECTION-A

- I. General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc. 25 Marks**

SECTION-B

- I. Introduction: 10 Marks**
Scientific glass blowing, Components of glass workshop, Glass components, Stress and Strain, General glass blowing resources, Technical glass blowing resources.
- II. Glass: 18 Marks**
Types, Identification of different types of glasses, Comparison among different glasses, Uses & Properties of glass, Co-efficient of thermal expansion of glasses, Bursting pressure of Glass, Modified varieties of glass, Three main components of glass, Raw materials of glass, Fabrication of glass- Different methods & Materials. Effect of minerals and metals in glass, Marking and Itching of glass- Annealing point, Tempering of glass, Flame annealing of glass and Strain point.
- III. Basic Concepts: 17 Marks**
Salient features and Types of Glass blowing, Principle of working, Various tools and techniques: Different types of flames, Effect of heating and pressure. Objectives and safety, Terminology, The glass blower's bench, Oxygen and fuel gas systems, Cutting glass, Rotating glass, Fire polishing, Annealing, Making a test tube, Butt seals, T seals, Ring seals, Bending glass, Sending Ampulses, 90 deg Bend, Capillaries, Repairs: Crack repair and Hole repair.

IV. Glass blowing Tools:

15 Marks

Burners and torches, Calipers, Glass Saw, Glass Lapping, Wheel, Hand tools, Glass blowing Lathe, Glass Oven, Rosedidymium Eyeglasses, Different type of furnace used in glass blowing, Glass value-Types and uses, Glass couplings and gaskets and their uses, Types of Glassware joints.

V. Application of glass blowing:

15 Marks

Measuring glass ware, Joint sizes measurements, Annealing in the Home Shop, Cutting Flat Glass-Scoring/Scratch method, Glass rills, general Tips, Quartz Capillary Seals, Quartz sample collector, Suck seals, Vacuum Formed Quartz Tubes and scientific glass equipments used in Chemical laboratories.

No. Estab./C&R/NTW/24/3489

Dated: 06-05-2024


REGISTRAR
