



## ગુજરાત જાહેર સેવા આયોગ

સેક્ટર - ૧૦-એ, ૯-૩ સર્કલ પાસે, ૯ સેડ,  
ગાંધીનગર - ૩૮૨૦૧૦

જાહેરાત ક્રમાંક : ૪૫/૨૦૨૩-૨૪, સાયન્ટિફિક ઓફિસર (જીવ વિજ્ઞાન જૂથ ), વર્ગ-૨  
ની જગ્યા પર ભરતી માટેની પ્રાથમિક કસોટીમાં ભાગ-૧ અને ભાગ-૨ ના ૧૮૦  
મિનિટના સંયુક્ત પ્રશ્નપત્રનો અભ્યાસક્રમ

સીધી પસંદગીથી ભરતીની પ્રાથમિક કસોટીનો અભ્યાસક્રમ		
ભાગ-૧		
માધ્યમ: ગુજરાતી અને અંગ્રેજી.		કુલ ગુણ : ૧૦૦
મુદ્દા	વિષય	ગુણ
૧	ભારતની ભૂગોળ- ભૌગોલિક, આર્થિક, સામાજિક, કુદરતી સંસાધન અને વસ્તી અંગેની બાબતો- ગુજરાતના ખાસ સંદર્ભ સાથે	30
૨	ભારતનો સાંસ્કૃતિક વારસો- સાહિત્ય, કલા, ધર્મ અને રચાપત્યો- 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 હુકમો (૩) રાજ્યનીતિના માર્ગદર્શક સિદ્ધાંતો (૪) સંસદની રચના (૫) રાષ્ટ્રપતિની સત્તા (૬) રાજ્યપાલની સત્તા (૭) ન્યાયતંત્ર (૮) અનુસૂચિત જાતિ, અનુસૂચિત જનજાતિ અને સમાજના પછાત વર્ગો માટેની જોગવાઈઓ (૯) નીતિ આયોગ (૧૦) બંધારણીય તથા વૈધાનિક સંસ્થાઓ- ભારતનું ચૂંટણી પંચ, કોમ્પ્યુટર એન્ડ ઓડિટર જનરલ, માહિતી આયોગ	

ક	સામાન્ય વિજ્ઞાન, પર્યાવરણ અને ઈન્ફર્મેશન એન્ડ કોમ્યુનિકેશન ટેકનોલોજી	૧૦
૭	ખેલ જગત સહિત રોજબરોજના પ્રાદેશિક, રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય મહત્વના બનાવો	૧૦
૮	સામાન્ય બૌદ્ધિક ક્ષમતા કસોટી (૧) તાર્કિક અને વિશ્લેષણાત્મક ક્ષમતા (૨) સંખ્યાઓની શ્રેણી સંકેત અને તેનો ઉકેલ. (૩) સંબંધ વિષયક પ્રશ્નો. (૪) આકૃતિઓ અને તેના પેટા વિભાગ, વેન આકૃતિઓ (૫) ઘડીયાળ, કેલેન્ડર અને ઉમર સંબંધિત પ્રશ્નો. (૬) સંખ્યા વ્યવસ્થા અને તેના માનક્રમ. (૭) રૈખિક સમીકરણ (એક કે બે ચલમાં) (૮) પ્રમાણ, હિરસો અને ચલ. (૯) સરેરાશ યા મધ્યક, મધ્યરથ અને બહુલક, ભારિત સરેરાશ. . (૧૦) ઘાત અને ઘાતાંક, વર્ગ, વર્ગમૂળ, ઘનમૂળ, ગુ.સા.અ. અને લ.સા.અ (૧૧) ટકા, સાદુ અને ચક્રવૃદ્ધિ વ્યાજ, નહો અને ગુકશાન. (૧૨) સમય અને કાર્ય, સમય અને અંતર, ઝડપ અને અંતર. (૧૩) સરળ ભૌતિક આકૃતિઓના ક્ષેત્રફળ અને પરિમિતિ, જથ્થો અને સપાટીનો વિસ્તાર (છ સમાંતર બાજુ ધરાવતો ઘન, ઘન, સિલિન્ડર, શંકુ આકાર, ગોળાકાર). (૧૪) રેખા, ખૂણા અને સામાન્ય ભૌમિતિક આકૃતિઓ-સાદી કે ત્રાંસી સમાંતર રેખાઓના ગુણધર્મો, ત્રિકોણની સાપેક્ષ બાજુઓના માપનના ગુણધર્મો, પાયથાગોરસનો પ્રમેય, ચતુર્ભૂજ, લંબગોળ, સમાંતર બાજુ ચતુષ્કોણ, સમભૂજ ચતુષ્કોણ. (૧૫) બીજગણિતનો પરિચય-BODMAS-કાનાભાગુવઓ-વિચિત્ર પ્રતિકોની સરળ સમજૂતિ. (૧૬) માહિતીનું અર્થઘટન, માહિતીનું વિશ્લેષણ, માહિતીની પર્યાપ્તતા, સંભાવના	૩૦
૯	ગુજરાતી વ્યાકરણ (૧) ખેડણી (૨) સમાનાર્થી-વિરુદ્ધાર્થી શબ્દો (૩) રૂઢિપ્રયોગો અને કહેવતો (૪) સમાસ (૫) સંધિ (૬) અલંકાર (૭) ઇંદ	૧૦

<p>૧૦</p>	<p><b>English Grammar</b>  (1) Articles, Pronouns, Adjectives, Prepositions, Conjunctions and Question tag.  (2) Verb and Tense, Agreement between subject and verb, Gerund, Participles.  (3) Modal auxiliaries. Usage of can, may, could, should, etc.  (4) Use of some, many, any, few, a little. Since and for.  (5) Active and passive voice  (6) Degrees of adjectives.  (7) Common errors of usage.</p>	<p>૧૦</p>
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❖ મુદ્દા ક્રમાંક ૮ થી ૧૦ માટેનો અભ્યાસક્રમ ધોરણ- ૧૨ સમકક્ષ રહેશે.

<b>Syllabus for preliminary test for recruitment from Direct Selection Part-1</b>		
<b>Medium: Gujarati and English</b>		<b>Total Marks: 100</b>
Point No	Subject	Marks
1	Geography of India – Geographical, Economic, Social, Natural Resources and Population related topics – With Special reference to Gujarat	30
2	Cultural Heritage of India – Literature, Arts, Religion and Architecture - With Special reference to Gujarat	
3	History of India- With Special reference to Gujarat	
4	Indian Economy and Planning	
5	Indian Politics and Constitution of India: (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 Casts, Scheduled Tribes and Backward Classes of the society (9) NITI Aayog (10) Constitutional and Statutory Bodies: Election Commission of India, Comptroller and Auditor General, Information Commission	
6	General Science, Environment and Information & Communication Technology	10
7	Daily events of Regional, National and International Importance including Sports	10
8	General Mental Ability Test (1) Logical Reasoning and Analytical Ability (2) Number Series, Coding-Decoding (3) Questions about relationship. (4) Shapes and their Sub-sections, Venn Diagram (5) Questions based on Clock, Calendar and Age (6) Number system and order of Magnitude (7) Linear Equations - in one or two Variables (8) Ratio, Proportion and Variation (9) Average of Mean, Median, Mode- including weighted Mean (10) Power and Exponent, Square, Square Root, Cube Root, H.C.F. & L.C.M. (11) Percentage, Simple and Compound Interest, Profit and Loss (12) Time and Work, Time and Distance, Speed and Distance (13) Area and Perimeter of Simple Geometrical Shapes, Volume and Surface	30

	<p>Area of Sphere, Cone, Cylinder, Cubes and Cuboids</p> <p>(14) Lines, Angles and Common geometrical figures - properties of transverse or parallel lines, properties related to measure sides of a triangle, Pythagoras theorem, quadrilateral, rectangle, Parallelogram and rhombus.</p> <p>(15) Introduction to algebra-BODMAS, simplification of weird Symbols.</p> <p>(16) Data interpretation, Data Analysis, Data sufficiency, Probability</p>	
9	<p>Gujarati Grammar</p> <p>(૧) બેડણી</p> <p>(૨) સમાનાર્થી-વિરુદ્ધાર્થી શબ્દો</p> <p>(૩) રૂઢિપ્રયોગો અને કહેવતો</p> <p>(૪) સમાસ</p> <p>(૫) સંધિ</p> <p>(૬) અલંકાર</p> <p>(૭) ઇંદ</p>	10
10	<p>English Grammar</p> <p>(1) Articles, Pronouns, Adjectives, Prepositions, Conjunctions and Question tag.</p> <p>(2) Verb and Tense, Agreement between subject and verb, Gerund, Participles.</p> <p>(3) Modal auxiliaries. Usage of can, may, could, should, etc.</p> <p>(4) Use of some, many, any, few, a little. Since and for.</p> <p>(5) Active and passive voice</p> <p>(6) Degrees of adjectives.</p> <p>(7) Common errors of usage.</p>	10

❖ The standard of the syllabus for point no. 8 to 10 will be equivalent to Standard 12.

**Syllabus for the Preliminary Test for the recruitment of Scientific Officer (Biology),  
(FSL), Class-II**

**Marks – 200**

**Questions-200**

**Medium: English**

**1. Fundamentals of Forensic Biology**

Definition and scope of forensic biology, Historical development and evolution of forensic biology, Different domains of forensic biology, Types of biological evidence, Importance of biological evidence in forensic investigation, Procedure for Collection, Preservation, packing, sealing, and forwarding of biological samples.

**2. Cell Biology and Basic Biochemistry**

Structure and function of cell and cellular organelles, Amino acids: structure and functional group properties. Composition of proteins, Primary, Secondary and Tertiary structure of protein. Definition, biological importance, classification and chemistry of Carbohydrates and Lipids. Structure and functions of nucleic acids (DNA and RNA). Overview of DNA Replication, Transcription, and Translation.

**3. Microscopy**

Introduction to principles, working and application of Compound Microscope, Stereo Microscope, Comparison Microscope, Phase Contrast Microscope, Fluorescence Microscope and Electron Microscope.

**4. Biostatistics**

Definition and scope of biostatistics, Importance of statistical methods in biological and health sciences. Descriptive Statistics: Measures of central tendency (mean, median, mode). Measures of dispersion (range, variance, standard deviation). Frequency distributions and graphical representation of data. Probability and Probability Distributions: Basic concepts of probability. Probability distributions (binomial, Poisson, normal). Probability rules and Bayes' theorem. Inferential Statistics: Hypothesis testing, Confidence intervals, Type I and Type II errors. Parametric and Nonparametric Tests: t-tests (one-sample, two-sample), Analysis of variance (ANOVA), Chi-square tests. Nonparametric tests (Wilcoxon rank-sum, Kruskal-Wallis).

**5. Molecular Biology Techniques**

Techniques of DNA extraction, Agarose Gel Electrophoresis, Polyacrylamide Gel Electrophoresis, Quantification of DNA by UV-Visible spectrophotometry, Polymerase Chain Reaction, Real Time PCR and its application in DNA forensics, Capillary Gel Electrophoresis and Genetic analysers, DNA sequencing by Sanger Method, Southern blotting, Northern blotting, Western blotting, Iso-electric focusing, Bioinformatics: DNA/Protein Sequence alignment by BLAST and its variants, DNA/Protein Sequence Databases, BOLD database.

**6. Forensic DNA analysis**

Sources of DNA at Crime scenes, Procedure for collection and preservation of biological sample for DNA analysis, History of DNA fingerprinting and DNA polymorphism, Genes and DNA markers in forensic DNA analysis, Various commercial kits for STR profiling, STR profile analysis and its interpretation, Statistical analysis of DNA profiles: Random Match Probability and Likelihood Ratio, Low Copy number (LCN) DNA typing and its guidelines, Y-STR and X-STR markers analysis, Mitochondrial DNA analysis and its forensic importance, Various national/international guidelines for forensic DNA analysis and Interpretations.

## **7. Recent Developments and Future Directions in DNA profiling**

Next Generation Sequencing, Single Nucleotide Polymorphism (SNP) and its applications in forensic investigation, Prediction of ancestry, physical characteristics, biogeography using NGS and other techniques, Genetic genealogy in forensic investigation, Forensic tissue identification with nucleic acids: Classical, RNA based and DNA methylation-based approaches.

## **8. Immunology**

Overview of cells and organs of immune system and basic immunology, Antigen: Epitope, essential factors for antigenicity, haptens and adjuvant, Immunoglobulin: structure, classes of immunoglobulin, Antibody: antibody reactions and their techniques in serological analysis, Application of various polymorphic enzymes and proteins in criminal investigation, Antigen Processing and presentation, Production of Monoclonal and polyclonal antibodies, hybridoma technology, Autoimmunity and hypersensitivity, HLA typing and its forensic importance, Vaccines, Lectins, and their forensic significance.

## **9. Forensic Serology**

Blood and its composition, Haemoglobin and its variants, Theories and biochemical tests for the identification of blood, Blood Typing/Grouping : 'ABO' system and its significance in forensic investigation, Other blood group antigens: 'Rh sub types', MN, I, P, Kell, Duffy, Kidd, Lewis, Lutheran and Bombay blood group, Forensic examination and biochemical tests for the identification of semen and other body fluids: vomit, faeces, urine, saliva, and vaginal secretions.

## **10. Animal and Plant Biotechnology**

Cell lines: Definition, development, maintenance, and management, established cell lines and their characteristic features, Gene therapy: potential approach to gene therapy, Overview of Stem cells and its applications.

## **11. Forensic Botany**

Diatoms Examination: Introduction to Diatoms, Types and Structure of Diatoms, Importance, and examination of Diatoms in Forensic Science. Various types of woods. Varieties of timber, seeds, and leaves: their identification and matching, Study and identification of pollen grains, starch grains, Morphological and anatomical characteristics of plants yielding drugs of abuse like Opium, Cannabis, Coca plant, Psilocybin mushrooms, Tobacco, etc. DNA based plant species identification.

## **12. Anthropology, Forensic Medicine, and Medico legal Investigation**

Objectives of medico legal investigation, Inquest and types of Inquest, Thanatology, Death and its causes, types of death, Signs of death, Postmortem changes, Mode and Manner of death, Custodial Death, Determination of cause of death, Autopsy, Post-mortem examination of dead body, Techniques used for the Estimation of time since death, Post-mortem biochemistry of the body fluids, exhumation.

## **13. Forensic Microbiology**

Introduction to microbiology, cell wall composition of Gram positive and Gram-negative bacteria. Sterilization techniques - Physical agents: Dry heat, wet heat and cold sterilization, filtration, radiation; Chemical agents (Disinfectants, antibiotics, alcohols) and their mechanisms. Microbial growth and environmental factors affecting the growth. Different methods for isolation enumeration of microorganisms from forensic samples like vomit, stool, stomach wash and residual food. Introduction to bioterrorism, general properties of various biological agents and their mechanisms, Popular case studies of bioterrorism.

#### **14. Wildlife Forensics**

Definition and advances in wildlife forensics; Threats to the natural resources and wild species inhabiting globally; Importance of Wildlife Conservation; Classification of Species as per IUCN Red Data Book; CITES; Wildlife (Protection) Act, 1972 of India and other related acts; Different Methods of Poaching; Conventional methods of species identification; Morphological identification and examination of wildlife parts and products; Application of DNA technologies used in Wildlife Forensics.

#### **15. Quality Control and Quality Assurance in Forensic Laboratory**

Introduction to Quality Management, Total Quality Management (TQM) principles and their application in forensic laboratories, Accreditation in Forensic Science Laboratories: ISO standards and their role in accreditation, The process of accreditation and its impact on forensic science practice. International Accreditation Cooperation: International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Laboratory Accreditation Cooperation (APLAC), American Society of Crime Laboratory Directors (ASCLD), Traceability and Validation: Methods for the validation of new analytical procedures, Measurement of uncertainty in forensic measurements. Equipment Maintenance and Calibration in forensic laboratory. Proficiency Testing Programs, Internal Audit and External Audit

#### **16. Current trends and recent advancements in the above fields.**