ICMR – NATIONAL INSTITUTE OF EPIDEMIOLOGY,
Ayapakkam, Chennai – 600 077

Advt. No. ICMR-NIE/Tech.Recruit/2023/ Date: 10.11.2023

In continuation of Addendum No. ICMR-NIE/Tech.Recruit/2023/238 dated 18.10.2023 and with reference to the Point No. 12 contained in ICMR-NIE Advertisement No. ICMR-NIE/Tech.Recruit/2023 dated 25.09.2023, **the candidates are advised to note the detailed syllabus and marking pattern for the CBT shall be as under:**

Marking Pattern:

Sl. No.	Subject	No. Questions	Max Marks	Duration
01	Subject Specialization	40	40	**120 Minutes**
02	ICMR related questions	10	10	
03	General Knowledge	50	50	
	Test of Reasoning			
	General Aptitude			
	Basic English / Basic Computer			
	Total	**100**	**100**	

The Total No. of Questions shall be 100 carrying 01 mark for each question.

Subject Specialization for the post of Technical Assistant and Laboratory Attendant – 1:

The questions will be such so as to test the ability of the candidates in the Technical Subject. The questions will be Technical and Scientific in nature depending upon the specialization and level of the post.

The indicative/suggestive syllabus for the subject specialisation may contain the following topics and is for guidance purpose only: -

S. No.	Post Code	Name of the Post
1	TA-BSTAT	Technical Assistant (Biostatistics)

Module: 1 Basic Statistics

Statistics Definition, Types of Variables and measurements – Quantitative, Qualitative, Semi-Quantitative along with measurement scales, Tabulation for different types of the data along with definition of classification, Graphical representation by types of data for univariate and bivariate presentation, Measures of Central Tendency and Location – Mean, Median, Mode and Measures of Location- Quartiles, Quintiles, Deciles and Percentiles, Measures of Dispersion – Range Deviation, Quartile Deviation etc., Mean Deviation, Variance, Standard Deviation, Coefficient of Variation, Measures of Central Tendency and Variation for Qualitative Variables

Module: 2 Probability Theory

Definition and Concepts in Probability- Classical and Relative Frequency Approach to Probability, Cramer and Kolmogorov's approaches to Probability, Merits and Demerits of these approaches, Random Experiments: Trials, Sampling Units and Sampling Space, Mutually Exclusive and Exhaustive Events. Discrete Sample Space, Conditional Probability, Bayes' theorem and its applications. Random Variables, Chebyshev's inequality and applications, Statements and Applications of Weak Law of Large Numbers and Central Limit Theorems

Module: 3 Theoretical Probability Distributions

Normal Distribution, Binominal Distribution, Poisson Distribution, Negative Binominal, and Basic Statistics

Statistics Definition, Types of Variables and measurements – Quantitative, Qualitative, Semi-Quantitative along with measurement scales, Tabulation for different types of the data along with definition of classification, Graphical representation by types of data for univariate and bivariate presentation, Measures of Central Tendency and Location – Mean, Median, Mode and Measures of Location- Quartiles, Quintiles, Deciles and Percentiles, Measures of Dispersion – Range Deviation, Quartile Deviation etc., Mean Deviation, Variance, Standard Deviation, Coefficient of Variation, Measures of Central Tendency and Variation for Qualitative Variables

Module: 4 Probability Theory

Definition and Concepts in Probability- Classical and Relative Frequency Approach to Probability, Cramer and Kolmogorov's approaches to Probability, Merits and Demerits of these approaches, Random Experiments: Trials, Sampling Units and Sampling Space, Mutually Exclusive and Exhaustive Events. Discrete Sample Space, Conditional Probability, Bayes' theorem and its applications. Random Variables, Chebyshev's inequality and applications, Statements and Applications of Weak Law of Large Numbers and Central Limit Theorems

Module: 5 Theoretical Probability Distributions

Normal Distribution, Binominal Distribution, Poisson Distribution, Negative Binominal, and Geometric Distribution along with their properties and utility in Descriptive and Inferential Statistics. Sampling Techniques and Design Concepts of Sampling and Non Sampling Errors, Population and Sample, Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling, Multistage Sampling, Multiphase Sampling, Quota Sampling, Inverse Sampling along with Sample Size Estimation for all Sampling Techniques

Module: 6 Statistical Inference

Concept of a Statistic and Sampling Distribution, Point and Interval Estimate of a Parameter, Standard errors, Null and Alternative Hypotheses, Statistical Tests and Distributions, Concepts of Type I & II Errors, p- values, Chi-square tests, t – test, Z-test and F-test.

Module: 7 Design of Experiments

Process of Randomization, Analysis of Variance (one/ two way), Analysis of covariance Randomized Block Design, Latin Square Designs (Cross-over Designs), Factorial Designs

Module: 8 Correlation and Multivariate Regression Analysis

Correlation Coefficient, Partial and Multiple Correlation Coefficients, Coefficient of Determination, Correlation ratio, Methods of Regression Models in Regression - Least Squares, Maximum Likelihood, Fitting of Linear Regression and related results, Appropriate Polynomials Models (Curve fittings), Logistic Regression Analysis.

Module: 9 Non-parametric tests

Definition of Order Statistics and their distributions, Non-parametric tests; Chi square (test, Goodness of Fit, Independence), Fisher's exact test, McNemar test, Sign test for univariate and Bivariate Distributions, Wilcoxon-Mann-Whitney test, Run test, Median test and Spearman's Rank Correlation test. Friedman's two way ANOVA and Concordance, Cochran Q test, Kruskal-Wallis test

Module: 10 Basic Demography

Censuses in India and World, Age and Sex Composition, Data Appraisal and adjustments, Sex Ratio, Dependency Ratio, Population Theories, Demographic Transition.

Module: 11 Registration Systems and Sample Surveys

Vital Events and Registration, Population and Health surveys – Civil Registration System (CRS), Sample Registration System (SRS), National Sample Survey (NSS), National Family Health Survey (NFHS), District Level Health Surveys (DLHS), Reproductive and Child Health Survey (RCHS) – Nature and limitation of data.

Module: 12 Health and Mortality

Concepts and definition of Health & Disease, International Classification of Disease and Mortality, Disease Burden, Disability and Rehabilitation, Prevalence and Incidence Rates, Direct and Indirect Adjustment of Mortality Rates, Concepts of Disability Adjusted Life Years (DALY), Measures of Mortality, Life Tables – Abridged and complete and their measures, Kaplan Meier Survival Method

Module: 13 Basic Epidemiology

Health and Disease Concepts, Approaches in Epidemiology – General Epidemiology and Clinical Epidemiology, Rates, Ratios and Proportion, Prevalence, Incidence, Attributable Risk, Relative Risk, Odds Ratio, Risk Ratio

S. No.	Post Code	Name of the Post
2	TA-NW	Technical Assistant (Networking)

- Linux and Windows Operating System: Design Principles – Kernel Modules – Scheduling – Memory Management – File Systems – Inter Process Communication - Security – Windows – Design Principles – System Component – File system.
- VLAN, VPN, Active directory, LDAP.
- MAC Layer: Framing - ALOHA Protocols – CSMA/CD – FDMA – TDMA – CDMA – Addressing - LANs: Ethernet, Token Ring, FDDI – SONET/SDH – ATM - Error Detection and Correction – Sliding Window Protocols.
- Fundamentals of Networking: History and development of Computer Networks – Network Topologies – Protocol Layers and Service Models – OSI - Internetworking and Routing –

Transmission Media – Analog Transmission – Digital Transmission – Multiplexing – Switching.

- Network Layer: Logical Addressing: IPv4, IPv6, IPv4 to IPv6 Address Mapping, CIDR – Inter connection of LANs: Hubs, Switches, Repeaters, Bridges, Routers, Spanning Tree, Flooding & Multicasting – Layer 3 Protocols: IP, ARP, RARP, ICMP, IGMP – Inter Domain and Intra Domain Routing.
- Network Management Applications: Configuration management, Fault management, performance management, Event Correlation Techniques Security Management, Accounting management, Report Management, Policy Based Management Service Level Management-Network Management Tools, Network Statistics Measurement Systems – Web Based Management, XML Based Network Management.
- OSI Network Management: OSI Network management model-Organizational Model-Information model - communication model - Abstract Syntax Notation - Encoding structure - Macros Functional model CMIP/CMIS.
- Network Security: TCP/IP and OSI - Pretty good privacy – S/MIME-IP Security Overview – Wireless Security and SSL.
- Firewalls: Elements of firewall design - types of security threats - responses to security attacks - best practices to design, implement, and monitor a network security plan.
- Cloud Architecture: Three-layer cloud computing architecture - On-demand provisioning - Elasticity in cloud Computing Services – Infrastructure-as-a-Service – Software-as-a-Service –Platform-as-a-Service - Cloud providers - Cloud deployment models.
- Issues in Cloud: Federation in cloud - Four levels of federation - Privacy in cloud - Security in cloud - Software-as-a-Service security, Disaster recovery.
- Public Key Cryptography & Digital Signatures: RSA algorithm – Diffie - Hellman key exchange-Digital Signature – Authentication protocols- Digital Signature.
- Message Authentication: Mac Functions, Hash Functions – Authentication requirements – authentication functions – Authentication Mechanisms.

S. No.	Post Code	Name of the Post
3	TA-PR	Technical Assistant (Programmer)

- Relational Database Management System: Relational Algebra– Tuple and Domain Relational Calculus – SQL – Views – Triggers – Domain Constraints – Referential Integrity.
- Normalization: Functional Dependencies – Inference rules – Decomposition – Properties – Normal Forms (NF) – First NF, Second NF, Third NF, Boyce-Codd NF, Fourth NF, and Fifth NF.
- Sorting and Indexing:
  Data Mining: Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. Association Rule Mining: - Efficient and Scalable Frequent Item Set Mining Methods – Mining Various Kinds of Association Rules – from Association Mining to Correlation Analysis – Constraint-Based Association Mining.
- GIS: Definition -History of GIS -Basic Components of GIS – Hardware, Software, Spatial Data, Non-spatial data, Scaling, Open-Source software.

- Functions in C++: Function Prototype - Arguments passing - Return type - Default arguments - Inline functions– Function overloading - Operator function - Operator overloading - Template functions.
- Inheritance in C++: Derived class - Single Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance - Virtual Functions - Virtual Base class - Nesting of classes.
- Markup and Scripting Languages: Introduction to HTML – Attributes, Events, Web forms, SVG, Audio and Video – DHTML – Client-Side Scripting −JavaScript – Cascading style sheets –XML – DTD – XML Schema – DOM – SAX –XSL−AJAX−JSON.
- Web Application Development: HTML, PHP, Java, JavaScript, Perl, Python
- Android: Overview – Features - activities - services - content providers - broadcast receivers.
- Information Security: Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel.
- Testing Automation Tools: Building and testing.
- R language
- Machine learning process
- AI tools
- Internet of Things

S. No.	Post Code	Name of the Post
4	TA-LAB	Technical Assistant (Laboratory)

- Historical aspects of Microbiology including theories, inventions, discoveries
- Microscopy principles, Microscope types and uses, staining methods
- Maintenance of laboratory including equipment, glassware, work areas
- Sterilization and disinfection: principles and methods
- Good Laboratory practices and biosafety principles and methods
- Bio-waste management: principles and methods
- Morphological and structural aspects of bacteria, fungi, parasites and viruses
- Microbial culture including growth requirements and kinetics, culture media, microbial preservation
- Microbial detection including microscopy, culture characteristics, biochemical testing, molecular testing
- Microbial taxonomy and classification systems
- Clinical samples: types, methods of collection and processing including culture and short/ long term storage
- DNA/RNA structure, replication, extraction, amplification and sequencing: principles and methods
- Principles and methods in centrifugation, electrophoresis, spectrophotometry; preparation of reagents and buffers
- Routine biochemical and hematological tests: CBC, ESR, CRP, Hb, blood glucose, LFT, RFT, urine albumin
- Basic concepts of immunity- Innate/ Adaptive; Humoral/ Cell-mediated; Antigens and Antibodies; Principles and methods of standard immunological techniques
- Microbial diseases in Man: etiology, clinical features, lab diagnosis, management, prevention

S. No.	Post Code	Name of the Post
5	TA-RM	Technical Assistant (Research Management)

- Understanding the role of research management in academia and industry
- Overview of project life cycles and methodologies
- Developing a comprehensive project plan and timeline
- Writing effective research proposals and securing funding
- Identifying necessary resources (funding, personnel, equipment)
- Budget development and allocation strategies
- Mitigating financial and resource constraints
- Building and managing research teams
- Effective communication and conflict resolution
- Strategies for fostering collaboration among researchers
- Implementing the research plan efficiently
- Monitoring progress and identifying potential risks
- Developing risk management strategies
- Preparing and presenting research reports
- Research integrity and research ethics
- National biomedical research funding authorities

S. No.	Post Code	Name of the Post
6	TA-COM	Technical Assistant (Communications)

- Video and audio recording hardware and software
- Knowledge in handling and recording on DSLR Cameras using tripod and gimbal.
- Post-production – Editing, titles, colouring, and rendering of the videos on Abobe Premiere pro (or) Final Cut Pro
- Principles of design: layout, colour theory, typography, and composition
- Knowledge in using Adobe Photoshop, Adobe lightroom, Adobe In Design, Adobe Illustrator or Corel Draw
- Visual communication for websites and social media in creating posts, generating campaigns, polls, and reels primarily on Facebook, Twitter, and Instagram
- Animation and interactive design
- Infographics and Data Visualization
- Implementing UX best practices in web design
- Creating custom graphics and icons
- Principles of responsive design and adaptive layouts
- Fundamentals of UI design and user interaction
- Typography for different media and platforms

S. No.	Post Code	Name of the Post
7	TA-SS	Technical Assistant (Social Science)

- Overview of medical sociology and its relevance to healthcare
- Basic concepts in medical anthropology and its cultural perspective on health and illness
- Social Determinants of Health
- Cultural beliefs and practices surrounding illness and healing
- Cross-cultural perspectives on health-seeking behaviors
- Medical pluralism and the integration of traditional and modern medicine
- Social construction of health identities (e.g., gender, race, ethnicity)
- Dynamics of communication and power in the patient-provider relationship
- Stigma and discrimination related to mental health conditions
- Assessing psychosocial needs of patients and families
- Ethical considerations and professional challenges in medical social work

S. No.	Post Code	Name of the Post
8	TA-PH	Technical Assistant (Public Health)

- Defining public health and its core functions
- Understanding determinants of health and the social-ecological model
- Basics of epidemiology
- Practice of disease/public health surveillance
- Measures of disease frequency and association
- Measurement errors
- Identifying environmental health hazards
- Social determinants of health and health disparities
- Strategies for promoting health behavior change
- Health policy development and implementation
- Healthcare systems and their organization
- Healthcare financing and health insurance
- Principles of infectious disease prevention and control
- Approaches to NCD prevention and management
- Steps in program planning, implementation, and evaluation
- Assessing program effectiveness and sustainability
- Public health ethics

S. No.	Post Code	Name of the Post
9	TA-FA	Technical Assistant (Field Activities)

- Health system in India
- Research methods
- English language
- Quantitative aptitude
- Reasoning ability
- Current affairs
- General knowledge
- Computer knowledge

S. No.	Post Code	Name of the Post
10	TA-EE	Technical Assistant (Electrical Engineering)

- DC Circuits
- AC Circuits
- Transformers
- Electrical Machines
- Electromagnetic Fields
- Electronic Devices and Circuits
- Power Electronics
- Measurements and Instrumentation
- Transmission and Distribution
- Control Systems
- Electrical Machine Design
- Power System Engineering
- Power System Protection and Switch Gear
- High Voltage Engineering
- FACTS
- HVDC and AC Transmission
- Power Quality
- Energy Engineering
- Renewable Energy Systems
- Electric and Hybrid Vehicles

S. No.	Post Codes	Name of the Post
11	LA-LAB, LA-AC, LA-PL & LA-GR	Laboratory Attendant-1

- **Basic Science and Laboratory related Science.**

ADMINISTRATIVE OFFICER
ICMR-NIE, CHENNAI