Selection Pattern & syllabus for various positions vide advertisement No. inStem/04/2023

Selection Pattern

Sl	Post Name	Post Code	Level of the post	Mode of selection
1	Technical Officer-I (HVAC)-OBC	05/23	Level 7	The candidates who score a minimum of 60%, and 55% marks for UR and OBC categories respectively in the written test will be called for a skill test, which will be qualifying in nature and will not be counted for the final merit list.
2	Technical Officer-I (Lab Support)-UR	06/23	Level 7	
3	Lab Technician-UR	07/23	Level 4	
4	Clerk-UR	08/23	Level 3	

Syllabus

Technical Officer-I (Lab Support)	**Total 100 Marks**
General Aptitude (English, Logical reasoning, Numerical Ability, and General knowledge/Current affairs)	**30 Marks**
Subject & Experience Based	**70 Marks**
Concepts and Applications of Biotechnology, Biomolecules: Structure, function and application of monomeric and polymeric carbohydrate, protein, lipids and nucleic acid; Multiple Alleles, Linkage and Crossing Over, Genetic Mapping, DNA Replication, Transcription, Translation, Mutations, Human Genetic Disorders, Cell Structure and Components, Cell Division, Cell Cycle, Cell Communication, Nutrition, Reproduction, host immune responses, Tool and technology of rDNA technology, Polymerase chain reaction (PCR), Hybridization techniques, DNA library, DNA sequencing, Site directed mutagenesis and protein engineering, comparative genomics, Functional genomics, Proteomics, Tools and techniques in Bioinformatics, Microbial culture techniques, Measurement and kinetics of microbial growth, Scale up of microbial process, Isolation of microbial products, Strain isolation and improvement, Applications of microbial culture technology, Biosafety issues in microbial technology, Cell and tissue culture techniques, Applications of cell and tissue culture, transformation in bacterial and transfection in eukaryotic cells, Animal cell culture techniques, Characterisation of cell lines, Methods of gene delivery into cells, Scaleup of animal culture process, Applications of animal cell culture, Stem cell technology, Tissue engineering. Application and basic concept of modern analytical technique in biotechnology ex. ELISA, western blot, dot blot, Southern blot, sanger sequencing, Edman degradation, mass spectrometry, Iso thermal calorimetry, Size exclusion chromatography and multiangle light scattering, Ultracentrifugation, Surface plasma resonance, Differential light scattering, high content imaging, confocal imaging etc., Enzyme kinetics, binding constant for ligand-protein interaction. Basics of electron microscopy, Human viruses and its compositions. Basics of computer application (MS word, Excel, PowerPoint)	

Technical Officer-I (HVAC)	Total 100 Marks

General Aptitude (English, Logical reasoning, Numerical Ability, and General knowledge/Current affairs)
30 Marks

Subject & Experience Based	**70 Marks**

Air Conditioning & Refrigeration and Mechanical - (30 Marks)

- Basics & Principles of Heating, Ventilation, Air Conditioning & Refrigeration.
- Psychrometry & Heat Load Calculation
- Components, Operation & Maintenance of Central Air Conditioning system with water- & air-cooled chillers, VRF & Packaged system, Unitary products.
- Basics of Mechanical Measurement & devices – Pressure, Temp, Flow, Vibration.
- Thermodynamics – Sensible Heat, Latent Heat, Enthalpy, Entropy, Isochoric, Isobaric, Adiabatic processes.
- Basics of Belt drives, Fans, Bearings.
- Basics of Pumping, Piping system & Components.
- Chilled and Condensate Water Hygiene & critical parameters.
- Refrigerant properties, application & environmental impact.
- Energy Efficiency measures.

Electrical - (15 Marks)

- Fundamentals of Electrical components & circuits.
- Basics of Electric Motors & starter configurations and control panels including protection devices.
- Basics of Electrical Measurement & devices – Voltage, Current, Insulation, resistance.
- Design of Electrical system comprising Cables, Starters & Distribution Electrical Panels etc. for HVAC Project/ Work.

Building Management System (BMS/BAS) – (15 Marks)

- Basics & Operation of Variable Frequency Drives, transducers, sensors.
- Operation & Maintenance and components of BMS.
- PID Controllers & Basics of Networking like AS, MODBUS, BACNET etc.
- Field Devices

Works/ Contract Management (10 Marks)

- Cost estimate/ Market rate analysis of HVAC components.
- CPWD/ GFR Procedures & Provisions for execution of Work, Public Procurement of Goods.
- Material Management.
- Maintenance Techniques.
- Computer Literacy - working knowledge on MS Office products.

Lab Technician (Level-4)	Total 100 Marks
General Aptitude (English, Logical reasoning, Numerical Ability and General knowledge/Current affairs)	30 **Marks**
Subject-specific:	**70 marks**
Mole concept in chemistry, concept of sterilization of media and glassware, Gram staining, basics of cell culture techniques, basics of microscopy (Light, Phase contrast, and Fluorescence), Basics of genetic material manipulation, PCR, western-blot, concept of centrifugation (RPM To g conversion). Difference of g force in swing out vs fixed angle rotor, Measurement and kinetics of microbial growth, Type of bacterial media for propagation, Application of biotechnology, Basics of mass spectrometry, Basics of heterologous protein expression in E.coli and basic of protein purification, basic of buffer preparation and pH measurement, Animal cell culture techniques, enzyme kinetics. Biosafety procedure in lab and bio waste disposal. DNA replication, transcription and translation, structure of cells, component and function of organelles in cells. Basics of computer application (MS word, Excel, PowerPoint)	

Clerk (Level-3)	Total 100 Marks
Language Awareness English and Hindi	10 Marks
Numerical Ability & Quantitative Aptitude	20 Marks
Logical Reasoning	10 Marks
General Knowledge/Current Affairs	10 Marks
Office procedures as per Central Govt Rules	20 Marks
Basic Administration, Accounts, and Purchase Rules	30 Marks

Note: Every correct answer will carry one mark and no mark will be allotted for unattempt questions. There will be a negative marking of .25 marks for each wrong answer.