Annexure-III

Department of Biotechnology

Technical Assistant

Stage-I (Screening Test)

Stage-I (Screening Test): A screening test shall be conducted in the first phase in form of multiple choice written test. Written test shall be of **90 minutes'** duration comprising of **75 questions**. Each **correct answer will be awarded One [1] mark** and for each **wrong answer One-fourth [1/4] mark shall be deducted**. Screening test shall consist of questions on **General English**(Tenses, Active and Passive, Direct and Indirect speech, Punctuation, Correction of sentences, One word substitutes, Modals, Articles, Clauses, Synonyms, Antonyms, Idioms and Phrases); **Numerical Aptitude Arithmetic**(Simplification of Fractions, Simple and Compound Interest, Profit and Loss, Percentage, Averages, Number System, Time and Work, Problems on Trains, Calendar, Area, Problems on Numbers, Square root, Cube root, Time and Distance and Other basic Arithmetic related matters);**Reasoning and Data Interpretation** (Number Series Compilation, Missing Number finding, Pattern series, Direction Sense Test, Series Compilations, Classification, Missing Character finding, odd man out, Blood relations, Analogy, Coding and Decoding, Letter and Symbol Series, Verbal reasoning, Statement and Conclusions, Letter and Symbol Series, Logical Problems, Arithmetic reasoning, Logical Sequence of words, Pie Chart and Bar Chart).

Eligible candidates **Ten Times** of the positions in each category will be screened for the Stage-II subject to the fulfillment of all educational qualification etc. as per the Recruitment Rules-2019.

Stage-II (Skill test)

Stage-II (Skill Test): The skill test will be of qualifying nature.

Laboratory Experiments etc. as per nature of the postshall be conducted in the respective laboratories/field. Minimum qualifying marks in the skill test will be [UR:30%; EWS:27%; OBC:27%; SC;20%; ST:20%; PwD:15%].

The candidates, who will qualify the skill test, will be called for the final written test. The Candidates appearing in the written test must ensure their eligibility for the particular category of post. The documents in support of their eligibility shall be verified before the Final test. If

any candidate will not have requisite qualification etc. as per the post for which he is appearing will not be allowed to sit in the final test (Stage-III).

Stage-III (Final test)

Stage-III (Final Test): **Final written test** shall be of 2 hours duration comprising of 100 multiple choice questions.

Each **correct answer will be awarded One [1] mark** and for each **wrong answer One-fourth [1/4] mark shall be deducted**. Only those who are screened in after the Screening test [Stage –I] and qualify the Skill Test [Stage-II] will be allowed to appear in the Final Test [Stage III]. The minimum passing marks in Final test will be [UR:30%; EWS:27%; OBC:27%; SC;20%; ST:20%; PwD:15%].

The final merit list shall be drawn on the basis of the stage-III written test.

SYLLABUS FOR SKILL TEST AND FINAL WRITTEN TEST IS AS PER ANNEXURE-IV.

Annexure-IV

Department of Biotechnology

Syllabus for the Skill test (Technical Assistant)

1) Growing of Bacterial culture in solid media using the spread plate and streaking methods.
2) Estimation of Protein content in the given sample by Lowry's method.
3) Estimation of reducing sugar in the given sample by dinitro-salicylic (DNS) method.
4) Extraction of amylase from the given sample.
5) Determination of COD (chemical oxygen demand) of given wastewater sample.
6) Preparation and running of Agarose gel electrophoresis of the given DNA sample and the recovery of the DNA from the gel.
7) Restriction Digestion of DNA using restriction enzymes.
8) Release of the intracellular products/components from the given microbial cells into the solution by sonication; determination of enzyme activity and protein content of the intracellular products
9) Determination of the Blood Group of an individual
10) Immobilization of enzyme using calcium alginate beads and determination of enzyme activity.
11) Retrieval of gene/protein sequences from biological databases, multiple sequence alignment, and construction of the phylogenetic tree.
12) Basic Knowledge of Microsoft office tools like Word, Excel and Powerpoint. Data analysis in excel and plotting different kinds of graphs like scatter plot, bar and pie chart etc.

Department of Biotechnology

Syllabus for Final written test (Technical Assistant)

Biochemistry: Biomolecules-structure and functions; Biological membranes, structure, action potential and transport processes; Enzymes- classification, kinetics and mechanism of action; Basic concepts of metabolism (carbohydrates, lipids, amino acids and nucleic acids) photosynthesis, respiration and electron transport chain; Bioenergetics.

Microbiology: Viruses- structure and classification; Microbial classification and diversity (bacterial, algal and fungal); Methods in microbiology; Microbial growth and nutrition; Aerobic and anaerobic respiration; Nitrogen fixation; Microbial diseases.

Molecular Biology and Genetics: Molecular structure of genes and chromosomes; Mutations and mutagenesis; Nucleic acid replication, transcription, translation and their regulatory mechanisms in prokaryotes and eukaryotes; Microbial genetics (plasmids, transformation, transduction, conjugation).

Analytical Techniques: Principles of microscopy-light, electron, fluorescent and confocal; Centrifugation- high speed and ultra; Principles of spectroscopy-UV, visible; Principles of chromatography- ion exchange, gel filtration, hydrophobic interaction, affinity, GC,HPLC, FPLC; Electrophoresis.

Recombinant DNA Technology: Restriction and modification enzymes; Vectors; plasmid, bacteriophage and other viral vectors, cosmids, Ti plasmid vectors; cDNA and genomic DNA library; Gene isolation, cloning and expression ; DNA sequencing; Polymerase chain reactions; Southern and northern blotting; In-situ hybridization; Gene transfer technologies.

Bioprocess Engineering and Process Biotechnology: Chemical engineering principles applied to biological system; Principle of reactor design, multiphase bioreactors, mass and heat transfer; Rheology of fermentation fluids, Aeration and agitation; Media formulation and optimization; Kinetics of microbial growth, substrate utilization and product formation; Sterilization of air and media; Batch, fed-batch and continuous processes; Various types of microbial and enzyme reactors; Unit operations in solid-liquid separation and liquid-liquid extraction; Process scale-up.
Production of biomass and primary/secondary metabolites; Biofuels, industrial enzymes, antibiotics; Large scale production and purification of recombinant proteins; Industrial application of membrane based bioseparation methods; Immobilization of biocatalysts (enzymes and cells) for bioconversion processes; Bioremediation-Aerobic and anaerobic processes for stabilization of solid / liquid wastes.