Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu

Sub: Selection criteria and Syllabus for OMR based written test for the posts of Technician (Farms/Lab)(T1) and Technician (Farms/Lab/Clinics) (T1) -reg.

As approved, the Selection Criteria and Syllabus for conducting OMR based written test for the posts of Technician (Farms/Lab)(T1) and Technician (Farms/Lab/Clinics) (T1) advertised vide University Notification No 09 (Secy.) of 2023 dated 19.07.2023 is as per detail given here under:

S. No	Post	Selection Criteria	Syllabus
1.	Technician (Farms/Lab)(T1)	i. Written test: 100 marks **Total : 100 marks**	Annexure-I
2.	Technician (Farms/Lab/Clinics) (T1)		

The other details pertaining to the conduct of Examination shall be notified separately. The candidates, in their own interest, are advised to keep visiting University Website *www.skuast.org* for updates in this regard.

No. AUJ/Secy./23-24/ 1612-24
Date:04-09-2023

I/c Registrar

Cc:-
- All Officers of SKUAST-Jammu
- I/c University Examination Cell for information and further n/a please. This is in continuation to this office earlier communication no. AUJ/Secy./23-24/1477-91 dated 30.08.2023.
- Dr. Manish Sharma, Professor (Stat.) and I/c Data Center & NKN Lab for kind information and uploading of the same on the University website.
- SVC for kind information of the Hon'ble Vice-Chancellor, SKUAST-Jammu.
- Notice Board

SKUAST
Jammu

Syllabus for the Written Test for the post of Technician (Farms/Lab)(T1) and Technician (Farms/Lab/Clinics) (T1)

Marks: 100   **Time: 02.00 Hrs.**

Subjects/ Topic	Marks Assigned
English and General Aptitude	25 Marks
Physics	25 Marks
Chemistry	25 Marks
Biology (Botany+Zoology)) Or Mathematics	25 Marks

PART A	
TOPICS	**Marks**
ENGLISH	
Pronoun and Person—Types and Uses	2
Conjunction--- Types and Uses	2
Models--- Model Auxiliaries and their uses	1
Direct and Indirect Speech	1
Clauses---Types and their Uses	1
Sentence Patterns (Sentence Variations and rewriting of sentences)	2
Past Perfect—Uses	2
To-infinitive and ING forms	2
Corrections and Cohesion	2
Total	**15**
GENERAL APTITUDE	
Current Affairs, Reasoning, General Knowledge.	**10**
Grand Total	**25**
PART B	
PHYSICS	
ELECTROSTATICS Electric charges. Conservation of charge, Coulombs law-forces between two point charges, forces between multiple charges; superposition principle and Continuous charge distribution. Electric field: Electric field due to a point charge, Electric field lines, Electric dipole, Electric field due to a dipole, Torque on a dipole in uniform electric field. Electric flux, Statement of Gausss theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside). Electric potential, electric potential due to a point charge, a dipole and system of charges; Equi-potential surfaces, Electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field.~ conductors and insulators,	3

Dielectrics and electric polarization, capacitor and capacitance, combination of capacitors in series and in parallel, capacitance of parallel plate capacitor with and without electric medium between the plates, Energy stored in a capacitor.

CURRENT ELECTRICITY

Electric current, Drift velocity, Ohms law, Electrical resistance, V-I characteristics linear & non-linear), Electrical energy and power, Electrical resistivity and conductivity, Colour code for carbon resistors; Temperature dependence of resistance. Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel/ Kirchhoffs laws and their applications/ Wheatstone bridge, Meter bridge. Potentiometer principle and its application to measure the potential difference and for comparing e.m.f. of two cells; measurement of internal resistance of a cell.

MAGNETIC EFFECTS OF CURRENT AND MAGNETISM

Biot Savart law and its application to current carrying circular loop/amperes law and its applications to infinitely long straight wire, straight and torodial solenoids. Force on moving charge in uniform magnetic and electric fields. Cyclotron. Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel current-carrying conductors-definition of ampere. Torque experienced by a current loop in uniform magnetic field; Moving coil galvanometer, its current sensitivity and conversation with examples. Current loop as a magnetic dipole and its magnetic dipole moment, magnetic field lines; Earths magnetic field and magnetic elements. Para-, dia- and ferro- magnetic substances with examples. Electromagnets and factors affecting their strength, permanent magnets.

ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS

Electromagnetic induction. Faradays law, induced emf and current- Lenzs Law/ Eddy currents. Self and mutual inductance. Alternating currents, peak and rms value of alternating current/ voltage; reactance and impedance; LC oscillations (qualitative treatment only) & LCR series circuits, resonance; power in AC circuits, wattles current. AC generators and transformer.

ELECTROMAGNETIC WAVES

Electromagnetic waves and their characteristics. Transverse nature of electromagnetic waves.
Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, Xrays, gamma rays) including elementary facts about their uses.

OPTICS

Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and its applications, Refraction at spherical surfaces, thin lens formula, Lens-makers Formula, Magnification, Power of a Lens. combination of thin lenses in contact, Microscopes and Astronomical Telescope (reflecting and refracting) and their magnifying powers. Wave optics: wave front and

Content	
Huygens principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proofs of laws of reflection and refraction using Huygen's principle. Interferences, Coherent sources, Young's double slit experiment and expression for fringe width, Diffraction due to a single slit, width of central maximum. Resolving power of pes and astronomical telescopes, Polarization, plane polarized light; Mallus's law, Brewester's law, uses of plane polarized light and Polaroids.	
DUAL NATURE OF MATTER AND RADIATION Dual nature of radiation/ Photoelectric effect, Hertz and Lenard's observations, Einstein's - photoelectric equation- particle nature of light/Mater waves-wave nature of particle, de Broglie relation. Davisson-Germer experiment.	3
ATOMS AND NUCLEI Alpha-particle scattering experiment- Rutherford's model of atom- Bohr's model energy levels, hydrogen spectrum. Composition and size of nucleus, masses, isotopes, isobars; isotones. Radioactivity-alpha, beta and gamma 'rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number, nuclear fission and fusion.	3
ELECTRONIC DEVICES Semiconductors; semiconductor diode: I-V characteristics in forward and reverse bias; diode as a rectifier; I-V characteristics of LED, photodiode, solar cell and Zener diode; Zener diode as a voltage regulator. Junction transistor and its action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT) concept of NAND and NOR gates. Transistor as a switch.	2
COMMUNICATION SYSTEM Basic elements of communication system (block diagram only), Bandwidth of signals (speech, TV and digital data); Bandwidth of Transmission medium, Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Need for modulation: Production and detection of an amplitude modulated wave.	2
Total	**25**
CHEMISTRY	
SOLID STATE & STATES OF MATTER	3
Boyle's Law, Charle's law, Dalton's law of partial pressure, Graham's law of diffusion of gases, causes of deviation from ideal behaviour, ideal gas equation and nature of R, Vander Waals equation, surface tension and viscosity of liquids, crystalline and amorphous solids, crystal lattice, crystal types, Packing efficiency, calculation of density of unit cell, number of atoms per unit cell in a cubic cell, co-ordination number, stoichiometric defects (Schottky, Frenkel and interstitial defects.), Properties of solids(electrical, magnetic & dielectric).	

SOLUTIONS

Different ways of expressing the concentration of solutions (molarity, molality, mole fraction, ppm and normality), vapour pressure, Raoults law, ideal and non - ideal solutions, colligative properties, determination of molecular masses of non- volatile solutes using various colligative properties, abnormal molecular masses and Vant Hoff factor.	2

REDOX REACTIONS AND ELECTROCHEMISTRY

Determination of oxidation numbers, oxidation and reduction in terms of electron transfer, dependence of electrode and cell potential on concentration (Nernst Equation), electrode potential as a criteria for product formation in electrolysis. E.M.F. of Galvanic cell, relationship between free energy change and E.M.F. of a cell, definition and units of equivalent, molar and specific conductivity.	2

CHEMICAL KINETICS

Effect of concentration and temperature on rate of chemical reactions, Arrhenius equation) temperature co-efficient, Concept of activation energy, first and second order reactions, half-life period, Units of rate constants for zero, first and second order reactions.	2

SURFACE CHEMISTRY & POLYMERS

Freundlich absorption isotherm, preparation of colloidal solutions by physical and chemical methods, electrical properties (cataphoresis, electorosmosis, coagulation and protective colloids) homogeneous and heterogeneous catalysis. Classification of polymers, addition and condensation free radical cationic and anionic polymerization, commercially important polymers.	3

CO-ORDINATION CHEMISTRY AND ORGANOMETALLICS

Werner's coordination theory, nomenclature, isomerism in co -ordination compounds (ionization, linkage, hydrate, co-ordination, geometrical and optical), bonding in co-ordination compounds on the basis of V.B. theory, stability of co- ordination compounds in solution, Ferrocene and Zeises salt.	3

ORGANIC CHEMISTRY BASED ON FUNCTIONAL GROUP-I

Haloalkanes, haloarenes, alcohols and phenols, General methods of preparation properties of haloalkanes, choloroform, iodoform.	2

ORGANIC CHEMISTRY BASED ON FUNCTION GROUP-II

(Ethers, aldehydes and ketones, monocarboxylic acids). General methods of 3ration and properties of ethers, aldehydes, ketones and monocarboxylic I derivatives of monocarboxylic acids like, acid halides, acid anhydrides acid amides and esters, relative strength of carboxylic acids.	3

ORGANIC CHEMISTRY BASED ON FUNCTIONAL GROUP-III	2
(Cyanides, isocyanides, nitro compounds and amines)General methods of preparation and properties of cyanides, Isocyanides, nitro compounds and amines, relative basic character of amines	
MOLECULES OF LIFE (BIOMOLECULES)	3
Carbohydrates: definition, classification, muta-rotation, structure of animoacids, peptides and proteins (Molish and ninhydrin tests). classification and uses of vitamins. Chemicals in medicine and health care, dyes and drugs, chemical reactions in atmosphere, ozone depletion and its effects. acid rain, green house effect & global warming.	
Total	**25**

BIOLOGY (BOTANY)	
REPRODUCTION IN FLOWERING PLANTS	3
Modes of reproduction in flowering plants (Vegetative, asexual and sexual); flower structure, development of male and female gametophytes; Pollination types, agencies and examples; in-breeding and out-breeding, factors promoting out-breeding, pollen-pistil interaction; double fertilization; post-fertilization events; development of endosperm, embryo, seed and fruit; apomixis and polyembryony; types and importance.	
GENETICS	
Heredity and variation (somatic and germinal)- Mendel's laws of inheritance- I deviations from Mendelism; incomplete dominance; co-dominance; multiple/alleles; pleiotropy; chromosomal theory of inheritance. Evidence for DNA as genetic material; structure of DNA and RNA; DNA packaging; I DNA replication; Protein synthesis transcription, translation, genetic code; gene expression and regulation (lac-operon).	4
ECOLOGY AND ENVIRONMENT	4
Meaning of ecology, community, ecosystem and niche. Population and ecological adaptations: Characteristics of populations (birth rate (natality /fecundity), death rate (mortality) and age distribution; population interactions; competition, predation, parasitism and mutualism. Ecosystems: Biotic and abiotic components; energy flow, nutrient cycling (carbon and phosphorus), litter decomposition and primary productivity; pyramids of number, biomass and energy; ecological succession types. Biodiversity and its conservation: Levels of biodiversity; threats to biodiversity; mega-biodiversity countries and biodiversity hotspots; IUCN threat categories; in situ and ex situ methods of biodiversity conservation. Environmental issues: Causes and consequences of air and water pollution and their control; solid waste management; agro-chemicals and their effect; greenhouse effect and global warming; stratospheric ozone layer depletion causes and consequences.	

	2

BIOLOGY AND HUMAN WELFARE

Plant breeding: Introduction, steps in plant breeding and application of plant breeding.
Tissue culture: Cellular toti potency; technique and application of tissue culture. Microbes
in human welfare: Role of microbes in food processing; industrial production; sewage treatment; energy production (biogas); bio-pesticides and bio-fertilizers Elementary idea of Genetically Modified Organisms (GMOs); bio-piracy and patents.

Total	**13**

BIOLOGY
(ZOOLOGY)

REPRODUCTION ... 4

Asexual reproduction:- Characteristics and types of asexual reproduction (binary fission, sporulation, budding, gemmules, fragmentation, regeneration) Human reproduction:- male and female reproductive system, microscopic anatomy of testis and ovary, spermatogenesis and oogenesis, menstrual cycle, fertilization, embryo development upto blastocyst formation, implantation, pregnancy and placenta formation, parturition and lactation, Reproductive health:- need for reproductive health, sexually transmitted diseases and their control and prevention, birth control, (its need and methods), contraception and medical termination of pregnancy (MPT), amniocentesis, infertility and associated reproductive technologies (IVF,ZIFT,GIFT).

GENETICS AND EVOLUTION ... 3

Sex determination in humans, birds and honey bee. Inheritance pattern of Mendelian disorders in humans (colour blindness, haemophilia, cystic fibrosis, sickle- cell anemia, phenylketonuria, thalesemia). Chromosomal disorders in humans:- Down's syndrome, Turner's syndrome and Klinefelter's syndrome. Genome and human genome project. DNA fingerprinting. Origin of life, theories and evidences for evolution with special reference to Darwinian theory, and Modern synthetic theory, Hardy-Weinberg principle, Adaptive radiation.

BIOLOGY AND HUMAN WELFARE ... 3

Health and Diseases:- basic concepts of immunology, vaccines, common diseases in human beings (their causative agents, symptoms and prevention and control) with reference to thyphoid, hepatitis, malaria, filariasis, bubonic plague, ascariasis, common cold, amoebiasis and ring worm, Detailed account of diseases like cancer and HIV/ AIDS. Insects and human welfare:- Silk, honey and lac producing insects, their life- cycle and usefulness of their products. Adolescence and drug and alcohol abuse (effects of drug/ alcohol abuse, prevention and control.

	2
BIOTECHNOLOGY AND ITS APPLICATIONS Genetic engineering (recombinant DNA technology), cloning. Biotechnological production of human insulin, vaccines and growth hormone. Gene therapy. Bio safety/ ethical issues regarding recombinant DNA technology.	
Total	12
Grand Total(Biology)	25

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OR

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MATHEMATICS

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SETS, RELATIONS AND FUNCTIONS Sets and their representation, finite and infinite sets, empty set subsets, subset of real numbers especially intervals, power set, universal set. Venn diagram, union and intersection of sets .Difference of sets, Compliment of a set. Ordered pairs, Cartesian product of sets, number of elements in the Cartesian product of two finite sets .Cartesian product of real with itself (up to RxRxR). Relation , Domain , co-domain and range of relation, types of relations ,reflexive, symmetric, transitive an d equivalence relations. Function as special kind of relation from one set to another, domain, co-domain and range of a function. One to one, on to functions. Real valued functions of the real variable, constant identity, polynomial, rational modulus sign m and greatest integer functions with their graph. Sum, difference, product and quotients of functions. Composite of functions, inverse of a function, binary operations.	5
LIMIT, CONTINUITY AND DIFFERENTIATION Concept of limit of a function. Theorems on Limits, Evaluation of limits using standard results Continuity of a function at a point. Continuity of Sum, product and quotient of functions. Derivative: definition of a derivative of a function, geometrical interpretation of the derivative. Derivative of sum, difference, product and quotient of two or more functions. Derivative of algebraic and composite functions. Derivative of trigonometric and inverse trigonometric functions. Chain rule, derivative of implicit functions. Derivative of logarithmic and exponential functions. Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagrange's Mean Value Theorem and their geometrical interpretation and their simple applications. Chain Rule, derivative of implicit functions. Application of Derivative: rate of change, increasing and decreasing functions, tangents and normals, approximation, maxima and minima (first derivative and second derivative test). Simple problems.	5

INTEGRATION AND DIFFERENTIAL	
Integration as inverse process of differentiation. Integration of variety of functions by Substitution, by parts, by partial fractions. Simple integrals. Definite integrals as a Limit of a sum. Fundamental Theorem of calculus. Basic properties of definite integrals Evaluation of definite integrals. Application of integrals: Application in finding the area under simple curves, especially lines. Areas of circles, parabolas and ellipses (in standard form) Area under the curvey =Sin x, y=Cos x, area between the above two curves. Differential Equations: Definition, order and degree of a differential equation. General and particular solutions of a differential equation. Formation of a differential equation whose general solution is given. Solution of differentiation equation by method of separation of variables. Solution of Homogeneous differential equation of first order and first degree. Solution of linear differential equation of the type: $$\frac{dy}{dx} + py = q$$ $$\frac{dx}{dy} + px$$,where p and q are functions of x alone and =q, where p and q are functions of y alone.	5
STATISTICS AND PROBABILITY	
Measure of dispersion, mean, deviation, variance and standard deviation of ungrouped/ grouped data. Analysis of frequency distribution with equal means but different variances. Random Experiment: outcome, sample spaces. Events: Mutually exclusive events. Axiomatic (set theoretic) probability, probability of an event, probability of "Not" and "Or" events. Multiplication theorem on probability, conditional probability, independent events, total probability, Baye's theorem, random variable and its probability, distribution, mean and variance of a random variable. Repeated independent (Bernouli) trials and Binomial distribution.	5
VECTORS ANDTHREEDIMENSIONALGEOMETRY	
Vectors and scalers, magnitude and direction of a vector Direction Cosines and ratios of a vector. Types of vector, equal, zero, unit, parallel and collinear vectors. Position vector of a point, negative of a vector, components of a vector, addition of vectors, Scalar multiplication, position vector of a point dividing a line segment in a given ratio.	5
Total	**25**

Important Notes:

- *Candidates have the option to attempt either Biology or Math as per their subject of choice at 10+2 level.*