UNIVERSITY OF JAMMU

Notification

Syllabus of Entrance/Screening Test for the Post of Lecture Assistant (Botany)

S.No	Examination Type	Subject	No. of Question	Marks	Duration
1	Multiple Choice Questions	General English, General Knowledge, Logical Reasoning, Basic arithmetic, Analytical ability etc.	30	30	2hrs
2		Discipline Oriented	70	70	

1. General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability Etc.
2. Discipline Oriented

Cell Biology

Plasma membrane – structure & functions.
Chloroplasts – structure, function & organization.
Mitochondria, Endoplasmic reticulum and golgi apparatus-structure & function

Molecular Biology

DNA and RNA – structure, types and functions, Replication, Transcription, Splicing and Translation.
Cell cycle and apoptosis-role of cyclins and CDKs.

Cytology, Genetics and Cytogenetics

Molecular organization of centromere and telomere.
Recombination – site specific and generalized, Holliday model. Somatic cell genetics.
DNA damage and repair; Transposons in pro – and eukaryotes.
Transfer of whole genome and individual chromosomes and chromosome segments.

Microbiology

General characteristics,ultrastructure, reporoduction and economic importance of Eubacteria, Archaebacteria, Phytoplasmas, Plant viruses and Fungi.

Biology of Lower Plants

Life cycle patterns among algae, bryophytes and pteridophytes, alternation of generations and its significance; economic importance of algae, bryophytes and pteridophytes.

Gymnosperms

General characters and diversity of gymnosperms; their distribution in India, economic importance of gymnosperms.

Taxonomy of Agniosperms

Concept of artificial, natural and phylogenetic system of classifications. Taxonomic hierarchies. Taxonomic tools. Basic Knowledge of ICBN. Endemism viz a viz hotspots with respect to Indian flora.

Plant Development

Seed – dormancy and seed germination; seeding development; organization of RAM and SAM secretory ducts and laticifers.

Plant Reproduction

Flower development – MADS box concept, Male sterility-phenomenon and implications, Self-incompatibility: types and genetics. Embryo and endosperm development. Apomixis; Fruit development and ripening. Seed structure and function.

Plant Physiology and Metabolism

Concept of water potential, passive and active solute transport, physiological effects and mechanism of action of growth regulators: concept & role of photoperiodism and vernalization.

Electron and proton transport, C_3 C_4 and CAM pathways in photosynthesis, photorespiration, structure and function of lipids, fatty acid synthesis, Biological nitrogen fixation, sulphate transport and assimilation.

Genetic Engineering

Gene cloning technique, restriction endonucleases, plasmids and phages as vectors. Gene transfer methods in plants,transgenic plants for herbicide tolerance and insect resistance; Artificial chromosomes (BAC and YAC), Aims, objectives and major achievements of Human Genome Project.

Plant Tissue Culture

Concept and application of somatic embryogenesis and synthetic seed production, disadvantages of long term cultures. Protoplast isolation, culture, fusion, hybrid selection and regeneration, genetic consequences of protoplast fusion, hybrids versus cybrids, applications of protoplast research. Applications and limitations of micropropagation. Origin, prospects and achievements of somaclonal variation.

Ecology

Nature and concept of biotic communities; life forms and biological spectrum; succession-mechanism & models; concept of ecosystems, energy flow; Biogeochemical cycles; Pollution – sources, types and control. Environmental impact assessment; sustainable development, ecological management.

Plant Resource Utilization

Origin of agriculture; centers of origin of crop plants; cereals and legumes as sources of food; medicinal plants of Jammu and Kashmir; Timber and forage plants; alcoholic beverages; green revolution; sustainable utilization of plant resources.

Plant Resource Conservation

Biodiversity- concept and concerns; concept of rare, threatened and endangered plants; priorities for conservation; in situ and ex situ conservation – methods and limitations; Activities and role of IUCN, WWF, ICAR and NBPGR in plant conservation.

REGISTRAR

No. Estab./C&R/NTW/24/3468
Dated: - 23-04-2024

UNIVERSITY OF JAMMU

Notification

Syllabus of Entrance/Screening Test for the Post of Lecture Assistant (Chemistry)

S.No	Examination Type	Subject	No. of Question	Marks	Duration
A	Multiple Choice Questions	General English, General Knowledge, Logical Reasoning, Basic arithmetic, Analytical ability etc.	30	30	3 hours
B		Discipline Oriented	70	70	

A. General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability Etc.

B. Discipline Oriented

Section –I (Physical Chemistry)

Quantum Mechanics

Postulates of quantum mechanics, Eigen functions and eigen values of angular momentum; Space quantization, Hydrogenlike atoms, Angular wavefunctions and radial wavefunctions. Perturbation method (first order and nondegenerate system) and applications to He-atom. Variation method with application to He atom. Valence bond and molecular orbital models of H_2 molecule. Symmetric and antisymmetric wavefunctions. Comparison of valence bond and molecular orbital models. Huckel molecular orbital theory of ethylene and butadiene molecules. Huckel concept of bonding, antibonding and nonbonding molecular orbitals.

Solutions

Ideal solutions, Raoult's law.Gibbs-Duhem-Margules equation. Mean ionic activity, mean ionic activity coefficient and mean ionic molality of strong electrolytes, ionic strength.

Statistical Thermodynamics

Maxwell-Boltzmann Statistics, Fermi-Dirac Statistics and Bose-Einstein Statistics and their comparison, Application of Fermi-Dirac Statistics to electron gas in metals. Application of Bose-Einstein Statistics to He-atom. Concept of ensemble, macro and micro states. Partition function, Translational, Rotational and Vibrational partition function, Relationship with thermodynamic quantities.

Irreversible Thermodynamics

Transformation of generalized fluxes and forces, entropy production, States of minimum entropy production. Phenomenological relations, Onsager's reciprocity relations, principle of microscopic reversibility, electrokinetic phenomena.

Chemical Kinetics

Chemical theory of reaction rates, Steric factor, Activated Complex theory, Comparison with Arrhenius equation, Kinetic and thermodynamic control of reactions. Ionic reactions, Kinetic salt effects. Photochemical reactions between Hydrogen-Bromine and Hydrogen-Chlorine. Homogeneous catalysis. Kinetics of enzyme reactions. Features of fast reactions. Study of fast reactions by flow and relaxation methods. Unimolecular reactions, Lindemann and Hinshelwood theories, Belousov-Zhabotinsky reaction.

Macromolecules

Types of polymers, number and mass average molecular mass, molecular mass determination by ultracentrifugation, Osmometer, Viscometer and Light scattering methods.

Surface Chemistry

Capillary action, Laplace equation, Kelvin equation, Gibbs adsorption equation, BET equation, Estimation of surface area by BET equation, Surface film on liquids, Catalytic activities at surface, Surface active agents, Classification, critical micellar concentration. Factors affecting the CMC of surfactants.

Electrochemistry

Debye-huckel theoty of ion-ion interaction, Debye-Huckel-Onsager equation, Thermodynamics of electrified interface, Lippman equation, Method of determination of surface excess. Stducture of electrified interface: Helmholtz parallel plate model,Guoy-Chapmann model, Stern model. Derivation of Butler _volmer equation, Tafel plot. Polarography thery, Ilkovice equation.Half wave potential and its significance.

Solid State Chemistry

Crystal Systems, Bravis lattices, Symmetry, point symmetry and point groups, Defects in solids, intrinsic and extrinsic defects, line and place defects. Vacancies- Shottkey and Frenkel defects. Thermodynamics of Shottkey and Frankel defect formation. Colour centres. Non-stoichiometry and defects.

Electronic Properties of Solids: Free electron theory and Band theory. Metals, insulators and semiconductors. Band structure of metals, insulators and semiconductors, intrinsic and extrinsic semiconductors, doping semiconductors, p-n junctions. Superconductivity. Types of superconductors.

Optical Properties- Optical reflectance. Photoconduction and photoelectric effect.

Origin and theory of diamagnetism.Quantum theory of paramagnetism – Co-operative phenomenon, Magnetic domains and magnetic hysteresis.

Solid state reactions, kinetics of solid state reactions. Methods of synthesis of solid state materials.

Organic solids. Electrically conducting solids, organic charge transfer complexes. Organic metls, organic superconductors.

Section –II (Organic Chemistry)

Hyperconjugation, resonance and tautomerism. Aromaticity in non-benzoid compounds; antiaromaticity, pseudoaromaticity and homoaromaticity: enantiomerism and diastereoisomerism, racemic modification, determination of absolute configuration, atropisomerism.

Kinetic v/s thermodynamic control, Curtion-Hammelt principle, Kinetic isotopic effect, Hammett equation and linear free-energy relationship. Different aspects of SN1, SN2 and mixed SN1 & SN2 mechanism, neighbouring group participation, classical and non-classical carbocations, nucleophilic substitutions at an allylic, aliphatic trigonal and vinylic carbons.

Aromatic nucleophilic sunstitutions (the SNAr, SNI and Benzyne Mechanism). The Von-Ritcher, Sommelet-Hauser and Smiles rearrangements, Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals. Hydroboration & asymmetric epoxidation of olefins. Mechanism, orientation and stereochemistry in E2 and pyrolytic eleminations.Peterson and wittig olefination. Tandem reaction consisting of Michael addition & consecutive reactions.

Addition of Grignard reagents, organozinc and organolithium compounds to carbonyl and unsaturated carbonyl compounds.

FMO and PMO approach for pericyclic reactions (electrocyclic and cycloadditions: 4n and 4n+2 systems). Mechanism of free- radical substitutions including aromatic substrates. The effect of solvent on the reactivity in free-radical substitutions.

Enzyme mechanism for chymotrypsin and carboxypeptidase-A. Nucleophilic displacement on phosphorous atom and β-cleaves. Mechanism of action of NAD=,FAD, thiamine pyrophosphate and Co-enzyme A.

Photochemical Intermolecular reactions of the olefinic bond (geometrical isomerisms, cyclization reactions), rearrangement of 1,4- and1,5-dienes. Photochemistry of cyclohexadienones.

Applications of UV, IR, NMR (^{1}H & ^{13}C) and mass spectrometry in structural elucidation of organic compounds.

Principle of protection of alcohol and carbonyl groups.

Applications of the following in organic synthesis: Swern oxidation, MPV reduction, thalium (III) nitrate, DIBAL-H and Wolf-Kishner reduction.

Section – III (Inorganic Chemistry)

Angular Momentum and Term Symbols

Electronic Angular Momentum: Orbital angular momentum, electron spin angular momentum, total electronic angular momentum, the angular momentum of many-electron atoms, summation of orbital contributions, summation of spin contributions, Total angular momentum, L-s and j-j coupling scheme, determination of all Terms of p^n and d^n ions, determination of ground state term

for p^n and d^n ions using L-S scheme, determination of total degeneracy of terms, concept of microstates, splitting of Terms in Octahedral complexes.

Energetics of hybridization, Crystal Field Theory and its limitations, The splitting of d-orbitals in different fields (octahedral,tetrahedral, tetragonally distorted ochahedral, square planer, complexes), Crystal field stabilization energy, Factors affecting extent of splitting and spectrochemical series.

Molecular Orbital Theory for Octahedral, Tetrahedral and Square Planer Complexes, Factors affecting the stability of metal complexes, Chelate effect and its thermodynamic origin, energy profile of a reaction,

Reactivity of metal complexes, inert and labile complexes, Mechanism of electron transfer reactions in transition metal complexes (outer-sphere and inner-sphere), Trans effect.

Electron Spin Resonance Spectroscopy: Basic Principle, spin Hamiltonian, Hyperfine coupling, spin polarization and McConnell relationship, Isotropic and anisotropic hyperfine coupling constants, spin-orbit coupling and significance of g-tensor, Application to transition metal complexes (having one unpaired electron) including biological systems and inorganic free readical viz. BF_2, F_2, PH_4 etc.

Mossbauer Spectroscopy: Basic Principles, spectral parameters and spectrum display, Application of the technique to the studies of :

(a) Bonding and structure of Fe^{2+} and Fe^{3+} compounds including those of intermediate spin,
(b) Sn^{2+} and Sn^{4+} compounds, nature of M-L bond, coordination number, and structure and
(c) Detection of oxidation state and inequivalent MB atoms.

Environmental Chemistry: Chemical composition of atmosphere, Biogeochemical cycles of C, N, O and S, Soil pollution due to fertilizers, pesticides, plastics and metals, Aquatic pollution due to inorganic, organic pesticides, industrial sewage, detergent etc. Water quality parameter such and DO, BOD, COD and contents of Chlorde. Environmental implications and abatements of cement industry, sugar industry, distillery, paper and pulp mill, thermal and nuclear power plant and polymer/plastic industry, chlorofluoro hydrocarbons, green house effect, acid rain.

Hazardous wastes and chemical treatment of hazardous wastes. Bioderadation and principles of decomposition.

REGISTRAR

No. Estab./C&R/NTW/24/3480
Dated: -29-04-2024

UNIVERSITY OF JAMMU

NOTIFICATION

Syllabus of Entrance/Screening Test for the post of Pharmacist

Total Marks: 120 **Time: 120 Minutes**

S.No.	Examination Type	Section	Units	Marks	Duration
1.	Multiple Choice Questions	A	General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc.	40	2 Hours
2.	Multiple Choice Questions	B	Discipline Oriented	80	

SECTION-A

I. General English, General Knowledge, Logical Reasoning, Basic Arithmetic, Analytical Ability etc. **40 Marks**

SECTION-B

I. Anatomy and Physiology, Public Health & Hygiene, Diseases. (Marks 20)

- Elementary Physics and Chemistry
- Characteristics of living matter
- The Structure of living matter
- The Tissues
- Systems and various parts of Human Body
- Development and types of Bones
- Bones of Head and Trunk
- Bones of the limb
- Joints and Articulations
- Structure and action of Muscles
- The Chief Muscles of the Body
- The Blood
- The Heart and Blood Vessels
- The Circulatory System
- The Lymphatic System
- The Respiratory System
- The Digestive System
- The Liver, Biliary System and Pancreas
- Nutrition and Metabolism
- Endocrine Glands and Exocrine Glands
- The Urinary System
- The Nervous System
- The Ear

- The Eye
- The Skin
- The Reproductive System etc.

National Health Programmes:- There should be practical internship training for six months as recommended by PCI 1080 hours, after two years successful by course before Diploma Pharmacy is awarded.

II. **Basic Medical Information Drugs & Antibiotics Basic Medical Information, Drugs & Antibiotics their preparation & Uses:-** **(Marks 20)**

- Kinds of drugs, characteristics of drugs, Balsems, Gums etc
- Pharmaceutical Process and Methods
- General directions on dispensing, weighing and measuring. How prescriptions are written, prescriptions reading. How to calculate doses weights and measures, formulae for converting from one scale to other abbreviations used in prescriptions
- Doses of drugs, pharmacoepial preparation and their doses, incompatibility, physical, chemical physiological and therapeutical
- **Suppositories:-** How to prepare suppositories of special medicines pessaries, bougies, plasters etc
- Ointments, Spray solutions or Nebulas, Inhalations, General rule about preparation of Mixtures
- Ordinary bazaar medicines, their recognition, doses and uses

III. **Records Keeping:-** **(Marks 05)**

Stores Records & Procedures:- Clerical procedure in the good inward section. Record and procedures in main stores, classification and codification, keeping of stocks books, preparation of indents and methods of storing drugs.

IV. **First-AID & Home Nursing: Health Education including different types of Bandages, Emergency Health Care Services, Sterilization process & Disinfection procedures.** **(Marks 15)**

- Outline of the First-Aid
- Structure and Functions of the body.
- Dressing and Bandages (Use of Triangular Bandages and Cotton Roller Bandage, Rubber Bandage and different types of Dresssing)
- Cardio- pulmonary resusciration
- Wounds
- Haemorrhage
- shock
- Electric Stock
- Different methods of artificial respiration
- Asphyxia
- Fractures and Dislocation
- Unconsciousness and Fainting
- Epilepsy and Hysteria
- Poisons including food poisoning

- **Common Conditions:**
  - Foreign body in ear, eye and nose
  - Cramps
  - Frost – Bite
  - Bites and Stings
  - Epistaxis
  - Snake Bite
  - Dog Bite
- Transport of injured persons
- **Use of Common medicines**

V. Home Nursing:- **(Marks 10)**

Introduction to Home Nursing:

- Nurse
- Sick Room
- Bed Making
- Patient's Toilet
- Observation of the Sick
- Infection
- Surgical Techniques
- Diet
- Medicines
- Special Conditions & Treatments
- Bandaging
- Further Observations
- Immunity & Infectious Diseases
- Care of the Aged and Long term patient Person
- Care of the Mentally ill Healthy Patient
- Special Drugs their Control & Administration
- Preparation of the Patient for Operation and the after care
- Shock and Blood Transfusion
- Special Treatment
- Nursing in Special Diseases
- The Hospital Services
- Preparation for Special Treatment
- Child Birth and its Management

VI. Sterilization & Disinfection **(Marks 10)**

- Physical, Chemical and Mechanical Methods etc. Disposal of contaminated Media, Sterilization of Syringes, Glass Wares, apparatus etc.

REGISTRAR

No. Estab./C&R/NTW/24/3467
Dated: 23-04-2024

UNIVERSITY OF JAMMU

Notification

Syllabus for Entrance/Screening Test for the post of Telephone Operator

Marks – 100
Time: 90 Minutes

The whole syllabus consists of 4 different sections as follows:

1. General English
2. General Knowledge
3. Logical Ability
4. Subject Related Knowledge

Section Name & Weightage	---	**English**
10%	a	Grammar (Synonyms, Antonyms, Spelling, Punctuation, Tenses)
	b	Vocabulary (Use of idioms and Phrases and their meaning, Expressions)
	c	Fill in the blanks in the sentence
	d	Simple sentence structure
Section Name	---	**General Knowledge**
10%	a	Current Affairs (India and J&K)
	b	Indian History - Civics
	c	Indian Geography
	d	Indian Constitution
	e	General Science
	f	Sports and Culture
	g	Right to information Act 2005
	h	Information and Technology Related Basic Knowledge
Section Name	---	**Logical Ability**
10%	a	Aptitude Test
	b	Basic Arithmetic Knowledge
	c	Mathematics (Numeric, Algebra, Geometry, Statistics)
	d	General Science (Physics, Chemistry, Biology, Environmental Science)
Section Name	---	**Subject Related Knowledge**
70%	a	Record maintenance
	b	Use of telephone diary and directory
	c	Telephone System fundamentals, ISDN, Types of ISDN, BRI and PRI, Private Branch Exchange (PBX) system overview, PBX Vs PABX Technology, PABX system components, Uses and applications, EPABX, PBX Types, VoIP PBX, Cloud based or Hosted PBX, Hybrid PBX systems
	d	Standard set of features: Automated attendant, call holding, call forwarding, conference calling, call parking, call camp on, barge in, voice mail and voice mailboxes, Direct Inward Dialing (DID), follow-me, Do Not Disturb (DND), Handling of Basic fault of digital exchange
	e	Basic of Computer Concepts, Computer terminology, Internet, World Wide Web (WWW), Web Browsing Software, Search Engines, Role of INTERCOM/EPABX/FAX/E-MAIL System

REGISTRAR

24/04 24/04

No. Estab./C&R/NTW/24/3479
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