

# UNIVERSITY OF JAMMU

## NOTIFICATION

### Syllabus of Entrance/Screening Test for the post of Electronic Assistant

**Total Marks: 120**

**Time: 2:30 Hours**

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	2:30 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**

#### **Unit: I Basic Electronics (Marks 20)**

Types and characteristics of basic electronic components: Resistor, Capacitor, Inductor, Transformer, Battery.

Voltage source, Current source, Thevenins equivalent circuit, Nortons Equivalent circuit. Series and parallel combination of components, Inductive circuits, Capacitive circuits, Voltage and current divider circuits, Star and Delta connections and their conversion, Fundamentals of AC circuits.

Kirchoff's Laws, Maximum power transfer theorem, Superposition theorem, Millman's Theorem.

#### **Unit: II Analog Electronics (Marks 20)**

Fundamentals of semiconductors: Intrinsic, Extrinsic, PN junction & characteristics, Equivalent circuits, Rectifiers: Half Wave and Full Wave, Zener diode and its application as voltage regulator, LED, Photodiode, Solar Cell, Different types of power supplies.

BJT: Types, configurations-Common base (CB), common emitter (CE), common collector (CC), characteristics, applications.

JFET and MOSFET: Types, Characteristics, application

Operational Amplifier: Characteristics of Ideal and practical Op-amp, Open loop and closed loop configurations, characteristics, design and applications, 741 OP-Amp and its characteristics.

Oscillators: Principle of operation, RC and LC oscillators.

**Unit: III Digital Electronics**

**(Marks 20)**

Boolean algebra and Minimization techniques: Laws and rules of Boolean algebra, SOP and POS forms of Boolean expressions and their conversions, Logic gates, K-maps (upto 4 variables).

Combinational circuits: Half adder, Full adder, Half subtractor, Full subtractor, Encoders, Decoders, ADC and DAC.

Sequential circuits: Latch, Flip flops, Registers, Counters (Mod 8 and 10 counters).

Semiconductor memories: Basics of ROM and RAM and their types, PROM, EPROM and EEPROM, virtual and cache memories.

Microprocessor: Types, Assembly language, Architecture and components of 8085, Instruction set and programming techniques of 8085, Microcontrollers, PLDs.

**Unit: IV Instrumentation**

**(Marks 20)**

Galvanometer, Voltmeter, Ammeter and Conversions.

Multimeter: Analog and digital, testing of various components using multimeter.

Oscilloscope: Cathode Ray Oscilloscope, Digital storage oscilloscope, Calibration, Testing of components and measurement.

Bridges: Wheatstone bridge, Wein Bridge, Hay's Bridge, De-Sauty's Bridge.

Transducers: Characteristics, classification and applications.

No. Estab./C&R/NTW/24/3514  
Dated: 30-05-2024

  
REGISTRAR

# UNIVERSITY OF JAMMU

## NOTIFICATION

### Syllabus of Entrance/Screening Test for the post of Micro-Photographer

**Total Marks: 100**

**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.	30	2 Hours
2.	Multiple Choice Questions	B	Discipline Oriented	70	

#### **SECTION-A**

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

#### **SECTION-B**

##### **Unit-I Microscopy-I**

- 1.1 History and principles of microscopy; fundamentals of optics, optical microscope and its instrumental details.
- 1.2 Simple, compound, bright field (transmitted) and stereomicroscope: principles, working, applications and limitations.
- 1.3 Bright and dark field microscopy: resolving power, numerical aperture, limit of resolution, contrast, magnification.
- 1.4 Visualization of cellular and sub cellular components by light microscopy;, fixation techniques and staining procedures for anatomical studies.

##### **Unit-II Microscopy-II**

- 2.1 Construction, working, principles and applications of phase contrast, polarized light, differential interference contrast microscopy.
- 2.2 Electron microscopy- principles, standard patterns, aberrations: specimen preparations- fixation, embedding, section cutting, mounting methods.
- 2.3 Working, principles, applications and limitations of Scanning Electron Microscopy.
- 2.4 Working, principles, applications and limitations of Transmission Electron Microscopy.

##### **Unit-III Microscopic Procedures-I**

- 3.1 Fixation, scanning and staining of subcellular details for SEM and TEM.
- 3.2 Freeze-etch and freeze fracture methods for electron microscope image processing; negative staining, ultrathin sectioning, localization of cell constituents, and enzymes, autoradiography.

- 3.3 Modifications of electron microscopy: principles and visualization of immunoelectron microscopy; cryoelectron microscopy.
- 3.4 Principles, working and applications of fluorescence and immune-fluorescence microscopy; concept of fluorescence nanoscopy.

#### **Unit-IV Microscopic Procedures-II**

- 4.1 Microscopes and digital photography, role of filters in microphotography.
- 4.2 Concept of shutter speed, image softwares and their role in image capture and processing.
- 4.3 Visualization of 3-D objects; confocal and De convolution microscopy.
- 4.4 Concept, principles and applications of epifluorescence, scanning tunneling/acoustic and atomic force microscopy.

#### **Unit-V Research Techniques-I**

- 5.1 Principles, working and applications of flow cytometry.
- 5.2 Handling and maintenance of various types of microscopes and gel imaging systems.
- 5.3 Microbiological staining techniques: negative, differential, Gram's positive staining: procedures, specificity with respect to specimen type, applications and limitations.
- 5.4 Fixation and staining techniques for cytological preparation (acetocarmine, acetoorcein, Feulgen, FDA, Quinacrine, Giemsa).

#### **Unit-VI Research Techniques-II**

- 6.1 In situ hybridization- concept, methods and applications; specific techniques of ISH, FISH and GISH.
- 6.2 Radioactive versus fluorescent probes used for genome, chromosomes and specific segments, their merits and demerits.
- 6.3 Principles, working and applications of wax and resin based microtomes.
- 6.4 Preparation of samples for microtomy, sectioning and staining procedures, photography and image analysis.

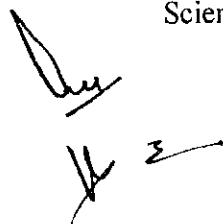
#### **Unit-VII Photography and Web Search Tools**

- 7.1 Methods in field biology-Field photography; methods of estimating population density of animals and plants.
- 7.2 Concept of stereo and digital photogrammetry and its applications; aerial photography: classification, geometry and scale of vertical aerial photographs, aerial triangulation.
- 7.3 Need, architecture working and types of Search Engines; searching for multiple words and phrases, AND/OR/ NOT/NEAR searches, parentheses and nested searches using wildcards, stopwords, stemming.
- 7.4 Directories and their importance, implementation, difference between search engines and directories; keywords- choice of right keywords, tools and services required, keyword density, optimizing keyword density for search engines.

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