UNIVERSITY OF KASHMIR

NAAC ACCREDITED GRADE A++

UNIVERSITY CAMPUS, HAZRATBAL, SRINAGAR 190006, KASHMIR.

NOTICE

It is notified for the information of all the candidates who had applied for the post of **Senior Technical Assistant (Electronics)** in the Department of Electronics and Instrumentation Technology advertised vide Advertisement Notice No. 06 of 2026 dated: 28-03-2026 that the **Selection Criteria, Scheme and Syllabus** for the said post shall be as under:

Scheme & Selection Criteria

Selection Criteria	**Maximum Marks**
1. Objective Type Written Test (OMR based)	100 Marks
Total Marks	**100**

- The selection shall be made strictly on the basis of merit secured in the **OMR-based written examination**.
- The written examination shall consist of **100 objective-type questions**, carrying **one mark each**.
- There shall be **negative marking of 0.25 marks for each wrong answer**.

Scheme for Objective-Type Written Test (OMR Based)

- **Number of objective-type questions:** 100
- **Marks allotted to each correct answer:** 01
- **Negative marks for each incorrect answer:** 0.25
- **Time allowed:** 110 minutes

Syllabus for Objective-Type Written Test for the post of Senior Technical Assistant (Electronics)

Unit-I: Circuit Theory and Network Analysis

Voltage and current sources; ideal voltage source and ideal current source with their V- I characteristics; controlled (dependent) sources. Passive circuit elements- resistor, inductor and capacitor (R, L and C); V- I characteristics and ratings of R, L and C elements. Source transformation. Series, parallel and series- parallel combinations of resistances and determination of equivalent resistance. Colour coding of resistors. Ohm's law. Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL) with simple applications. Concept of node and loop; nodal and mesh analysis. Star- Delta and Delta- Star transformations. Introduction to network theorems: Superposition, Thevenin's, Norton's, Reciprocity and Maximum Power Transfer theorems. Basic concept of one- port and two- port networks. Two- port Network Parameters: Z, Y, ABCD and h parameters, Transfer functions, Signal representation, State variable method of circuit analysis, AC circuit analysis, Transient analysis, Zero and Poles, Bode Plots.

Unit-II: Semiconductor Fundamentals and Diodes

Introduction to semiconductors and classification of materials, Energy band concept in semiconductors; charge carriers (electrons and holes) and effect of temperature on conductivity. Intrinsic and extrinsic semiconductors. Formation and working of P- N junction diode; V- I characteristics under forward and reverse biasing; concept of knee voltage and breakdown voltage; basic diode equation. Diode numbering system, polarity identification. and basic ratings including maximum forward current, peak inverse voltage (PIV) and power dissipation. Zener diode: working, characteristics and application as a voltage regulator; Introduction to regulator ICs. Special purpose diodes LED, photodiode, Tunnel Diode- basic working principles, characteristics and applications. Rectifier circuits: definition and types; basic working principle and output waveforms. Concept of rectifier efficiency and ripple factor for half- wave and full-wave rectifiers. Wave- shaping circuits: clippers- unbiased and biased (positive and negative), and clamps- positive and negative; basic working and applications.

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Unit-III: Transistors and Biasing

Introduction to transistors as semiconductor devices. Bipolar Junction Transistor (BJT): construction and working of PNP and NPN transistors. Transistor configurations; input and output characteristics. Regions of operation (cut- off, active and saturation). Transistor as a switch. Current gains in CB and CE configurations. DC load line and operating point (Q- point). Introduction to transistor biasing. Voltage divider bias, Stabilization of Q point. Introduction to other transistors: Field Effect Transistor (FET) and Metal Oxide Semiconductor Field Effect Transistor (MOSFET)- basic structure and working (qualitative).

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Unit - IV: Amplifiers and Oscillators

Transistor as an amplifier: basic principle of amplification. Single- stage and multistage amplifiers; need for cascading. RC- coupled amplifier: basic circuit and working. Concept of positive and negative feedback.

Oscillators: basic concept and need; essentials of oscillation and Barkhausen criterion. Sinusoidal oscillators- Hartley, Colpitts, RC phase shift and Wien bridge oscillators: basic working principle and frequency of oscillation. Crystal oscillator: basic idea and applications.

Unit V: Linear Integrated Circuits and Number Systems

Introduction to operational amplifiers (op- amps); basic idea and ideal characteristics of an op-amp. Block diagram of IC 741 and basic working principle. Concept of open- loop and closed-loop operation of an op- amp. Computational applications, Comparators, Schmitt trigger, Instrumentation amplifiers, wave shaping circuits, Phase locked loops, Active filters and Oscillators, Multivibrators- 555 Timer, Voltage to frequency converters (V/F), frequency to voltage converters (F/V).

Number systems, base conversions. Representation of signed and unsigned numbers. Binary arithmetic: addition and subtraction using 2's complement method. Introduction to BCD code.

Unit-VI: Digital Electronics and Microprocessors

Logic gates: numbering, truth tables and logic symbols. Boolean algebra: basic postulates and fundamental theorems. Combinational logic circuits: standard representation of logic functions (SOP and POS forms). Karnaugh map minimization. Half adder and full adder; half subtractor and full subtractor. Multiplexers, demultiplexers, encoders and decoders—basic operation and applications. Sequential logic circuits: flip- flops, Counters, Registers and memories: registers and shift registers—Memory devices: ROM, PROM, EPROM and EEPROM. RAM: static and dynamic. Introduction to Logic Families.

Introduction of Microprocessor 8086: Architecture, Addressing modes, instruction set, interrupts, Programming, Memory and I/O interfacing. Introduction of Microcontrollers - 8051

Unit-VII: Communication Electronics

Introduction to communication systems and their basic elements; Modulation techniques: Amplitude Modulation (AM)—basic principle, modulation index, generation and detection using envelope detector. Frequency Modulation (FM)—basic concept, advantages over AM, generation and detection.

Digital modulation and demodulation - PCM, ASK, FSK, PSK, BPSK, QPSK and QAM, Time and Frequency- Division Multiplexing, Multiple Access techniques, Data Communications - Modems, Codes, Principles of Mobile and Satellite Communication, Optical communication, Optical sources - LED, spontaneous and stimulated emission, semiconductor Lasers, Detectors - PIN photodiodes, Avalanche photodiodes (APD), Optical fibers - attenuation and dispersion characteristics, Bandwidth, Wavelength division multiplexing.

Unit-VIII: Power Electronics and Control Theory

Power devices - characteristics of SCR, DIAC, TRIAC, power transistors, Protection of thyristors against over voltage and over current. SCR triggering - dv/dt and di/dt, triggering with single pulse and train of pulses, A.C. and D.C. motors - construction and speed control. Switched Mode Power Supply (SMPS). Uninterrupted Power Supply (UPS). Open loop and closed loop control system, Block Diagram reduction techniques, transfer function and signal flow diagram, Stability criterion: Routh- Hurwitz and Nyquist plot, On- off controller, Proportional (P), Proportional- Integral (PI), Proportional- Derivative (PD), PID controllers.

Unit- IX: Electromagnetics and Microwave Engineering

Electrostatics - vector calculus, Gauss's Law, Laplace and Poisson's equations, Magnetostatics - Biot Savert's law, Ampere's law and electromagnetic induction, Maxwell's equations and wave equations, Plane wave propagation in free space, dielectrics and conductors, Poynting theorem, Reflection and refraction, polarization, interference, coherence and diffraction, Transmission lines and waveguides - line equations, impedance, reflections and voltage standing wave ratio, rectangular waveguides. Antennas - retarded potential and Hertzian dipole, half wave antenna, antenna patterns, radiation intensity, gain, effective area and Frii's free space receiver power equation. Microwave Sources and Devices -Reflex Klystron, Magnetron, TWT, Gunn diode, IMPATT diode, Crystal Detector and PIN diode.

Unit-X: Electronic Instruments and Measurements

Introduction to measurement and basic concepts of errors. Definition and classification of transducers. Basic idea of resistive, inductive and capacitive transducers. Working principles and applications of piezoelectric, thermoelectric, photoelectric and Hall- effect sensors. Applications of transducers in the measurement of temperature, pressure, displacement and light. Measurement of voltage, current and resistance using analog instruments. Digital measuring instruments: Digital Voltmeter (DVM) and Digital Multimeter (DMM)- basic principle and applications. Cathode Ray Oscilloscope (CRO): basic block diagram, principle of operation and applications; measurement of voltage and frequency using CRO.

Sd/-

No. F(Syllabus-STA-Electronics-Rectt.)KU/26
Dated: 15-06-2026

Deputy Registrar
(Recruitment)