

A. ELECTRONICS ENGINEERING

1. Basic Electrical & Electronic Concepts

- Voltage, current and resistance
- Ohm's law
- Kirchhoff's laws
- Series and parallel circuits
- Power and energy
- AC and DC fundamentals
- Frequency, phase and impedance
- Electrical measurements
- Basic circuit analysis

2. Electronic Components

- Resistors
- Capacitors
- Inductors
- Transformers
- Diodes
- Zener diodes
- LEDs
- Rectifiers
- Transistors
- BJT
- FET
- MOSFET
- Thyristors
- Optoelectronic components
- Semiconductor fundamentals

3. Analog Electronics

- Diode circuits
- Rectifiers and filters
- Transistor biasing
- Amplifiers
- Single-stage amplifiers
- Multistage amplifiers
- Feedback
- Oscillators
- Operational amplifiers

- Op-amp applications
- Voltage regulators
- Power amplifiers
- Wave-shaping circuits

4. Digital Electronics

- Number systems
- Binary, decimal, octal and hexadecimal
- Boolean algebra
- Logic gates
- Universal gates
- Combinational circuits
- Adders and subtractors
- Multiplexers and demultiplexers
- Encoders and decoders
- Comparators
- Flip-flops
- Registers
- Counters
- Sequential circuits
- Digital memory
- ADC and DAC
- Basic digital IC concepts

5. Communication Electronics

- Communication-system fundamentals
- Analog communication
- Digital communication
- Modulation and demodulation
- AM, FM and PM
- Pulse modulation
- Digital modulation basics
- Transmitters
- Receivers
- Antennas
- Propagation
- Noise
- Signal-to-noise ratio
- Transmission media
- Microwave communication
- Satellite communication basics

6. Microwave & Radar Fundamentals

- Microwave principles
- Microwave components
- Waveguides
- Microwave sources
- Microwave transmission
- Antenna fundamentals
- Radar fundamentals
- Radar block diagram
- Radar transmitter and receiver
- Pulse radar
- Radar range concepts
- Radar frequency and bandwidth
- Radar antennas
- Radar signal processing basics
- Defence radar awareness

7. Control Systems

- Open-loop and closed-loop systems
- Feedback
- Transfer function
- Block diagrams
- Signal-flow concepts
- Stability basics
- Time response
- Frequency response
- Controllers
- Basic industrial control systems

8. Instrumentation & Measurements

- Measurement principles
- Analog and digital instruments
- Multimeter
- CRO/oscilloscope
- Signal generator
- Frequency measurement
- Voltage/current measurement
- Sensors
- Transducers
- Temperature measurement

- Pressure measurement
- Calibration
- Measurement errors
- Instrumentation systems

9. Microprocessors & Microcontrollers

- Microprocessor fundamentals
- Microcontroller fundamentals
- CPU architecture
- Registers
- Memory
- Input/output
- Interrupts
- Timers and counters
- Serial communication
- Basic interfacing
- Embedded-system fundamentals

10. Computer & Networking Basics

- Computer fundamentals
- Hardware and software
- Operating-system basics
- Data representation
- Computer networks
- LAN, WAN
- TCP/IP basics
- Network devices
- Communication protocols
- Cybersecurity awareness
- Digital communication systems

11. Electronic Maintenance & Troubleshooting

- Preventive maintenance
- Corrective maintenance
- Fault diagnosis
- Testing procedures
- Circuit troubleshooting
- Component testing
- PCB fundamentals
- Soldering and desoldering
- Cable and connector maintenance

- Equipment calibration
- Maintenance documentation
- Safety procedures

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B. ELECTRICAL ENGINEERING

For candidates with the prescribed 3-year Diploma in Electrical Engineering or equivalent.

1. Basic Electrical Engineering

- Electrical quantities and units
- Ohm's law
- Kirchhoff's laws
- Network theorems
- AC and DC circuits
- Single-phase circuits
- Three-phase circuits
- Power factor
- Electrical power and energy

2. Electrical Machines

- Transformers
- DC machines
- DC generators
- DC motors
- Induction motors
- Synchronous machines
- Motor characteristics
- Starting and speed control
- Motor protection
- Machine maintenance

3. Power Systems

- Generation
- Transmission
- Distribution
- Substations
- Switchgear
- Circuit breakers
- Relays

- Fuses
- Busbars
- Earthing
- Power-system protection
- Electrical safety

4. Electrical Measurements

- Ammeter
- Voltmeter
- Wattmeter
- Energy meter
- Multimeter
- Megger
- CRO
- Measurement errors
- Instrument transformers
- Calibration

5. Power Electronics

- Power semiconductor devices
- SCR
- Diode
- MOSFET
- IGBT
- Rectifiers
- Inverters
- Choppers
- Converters
- Motor drives
- Industrial applications

6. Control & Automation

- Control-system fundamentals
- Feedback
- Sensors
- Transducers
- PLC basics
- Industrial automation
- Control panels
- Basic instrumentation

7. Electrical Maintenance

- Preventive maintenance
- Breakdown maintenance
- Testing
- Fault finding
- Insulation testing
- Motor maintenance
- Transformer maintenance
- Cable maintenance
- Earthing
- Electrical safety

C. DEFENCE ELECTRONICS / BEL AWARENESS

The notification states that BEL's portfolio includes military radars, naval systems, electro-optics, weapon and fire-control communication, homeland security, strategic communication and unmanned systems, electronic warfare, tank electronics and electro-optics.

Prepare:

- BEL organizational awareness
 - BEL's role under the Ministry of Defence
 - Navaratna PSU awareness
 - Network Centric Systems
 - Radar systems
 - Antennae
 - Defence communication
 - Satcom
 - Microwave components
 - Military electronics
 - Electronic warfare basics
 - Weapon and fire-control systems
 - Electro-optics
 - Unmanned systems
 - Homeland security systems
 - Strategic communication
 - Basic defence-electronics terminology
 - Make in India and indigenous defence technology awareness
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D. GENERAL TECHNICAL APTITUDE

Because the advertisement does not prescribe a detailed written-test syllabus, candidates should also revise:

- Engineering mathematics basics
- Units and dimensions
- Basic numerical calculations
- Engineering graphs
- Technical problem solving
- Logical reasoning
- Basic quantitative aptitude
- Basic computer awareness
- Technical English
- Current developments in electronics and defence technology

These are supplementary preparation areas and are NOT stated as an official BEL syllabus in the advertisement.

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E. INTERVIEW PREPARATION

Prepare specifically for:

- Self-introduction
- Diploma qualification and core subjects
- Technical project/work experience
- Indian Air Force service experience
- JW0 or above rank-related responsibilities
- Electronics/electrical equipment handled during service
- Maintenance and troubleshooting experience
- Radar/electronic/communication equipment exposure
- Safety procedures
- Team management and coordination
- Technical problem-solving situations
- BEL and its defence-electronics products
- Network Centric Systems and Radar SBU awareness
- Reasons for applying to BEL
- Readiness for PAN-India project-site posting
- Questions based on courses/cadres/resettlement courses
- Questions based on the candidate's previous work experience