

1. Officer Intelligence and Reasoning Preparation

- Verbal reasoning
- Non-verbal reasoning
- Analogy
- Classification
- Series
- Coding-decoding
- Blood relations
- Direction sense
- Ranking and ordering
- Logical sequence
- Syllogism
- Statement and conclusion
- Statement and assumption
- Basic mathematical reasoning
- Spatial reasoning
- Pattern recognition
- Observation and analytical ability
- Problem-solving ability
- Speed and accuracy

2. Picture Perception and Discussion Test (PP&DT)

- Picture observation
- Identifying important details from a picture
- Character identification
- Age, gender and mood assessment
- Situation interpretation
- Story construction
- Logical sequence of events
- Positive and realistic problem-solving
- Group discussion
- Clear expression of ideas
- Listening to other candidates
- Supporting arguments with facts

- Respectful disagreement
- Reaching a practical group conclusion

3. Psychological Test Preparation

- Thematic Apperception Test (TAT)
- Word Association Test (WAT)
- Situation Reaction Test (SRT)
- Self Description Test (SDT)
- Positive and practical thinking
- Decision-making
- Responsibility
- Initiative
- Leadership
- Emotional stability
- Team orientation
- Adaptability
- Social effectiveness
- Time management
- Handling difficult situations
- Honest and consistent responses

4. Group Testing Officer (GTO) Preparation

- Group discussion
- Group planning exercise
- Progressive group tasks
- Group obstacle tasks
- Half group task
- Lecturette
- Individual obstacles
- Command task
- Final group task
- Team coordination
- Leadership
- Cooperation
- Communication

- Initiative
- Resource management
- Practical problem-solving
- Decision-making under pressure
- Physical participation
- Helping team members

5. Personal Interview Preparation

- Personal introduction
 - Family background
 - Educational history
 - Engineering subjects
 - Academic achievements
 - Projects and internships
 - Hobbies and interests
 - Sports and extracurricular activities
 - Friends and social environment
 - Strengths and areas for improvement
 - Leadership experiences
 - Responsibilities handled
 - Current affairs
 - National issues
 - International developments
 - Defence awareness
 - Indian Army awareness
 - Why Army/officer entry
 - Career goals
 - Knowledge of TGC
 - Questions related to engineering discipline
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6. Civil Engineering

Engineering Mechanics

- Force systems
- Equilibrium

- Free-body diagrams
- Friction
- Centroid
- Moment of inertia
- Simple machines
- Work and energy

Strength of Materials

- Stress and strain
- Elasticity
- Hooke's law
- Shear force
- Bending moment
- Torsion
- Beams
- Columns
- Buckling
- Principal stresses

Structural Engineering

- Structural analysis
- Trusses
- Frames
- Reinforced concrete structures
- Steel structures
- Structural design principles
- Foundations
- Load calculations
- Earthquake-resistant structures

Geotechnical Engineering

- Soil properties
- Soil classification
- Compaction
- Consolidation
- Shear strength

- Bearing capacity
- Earth pressure
- Slope stability
- Foundation engineering

Fluid Mechanics and Hydraulics

- Fluid properties
- Pressure
- Flow measurement
- Bernoulli equation
- Pipe flow
- Open-channel flow
- Pumps
- Turbines
- Hydraulic machines

Transportation Engineering

- Highway engineering
- Pavement materials
- Traffic engineering
- Railway engineering
- Airport engineering
- Road safety
- Transportation planning

Environmental Engineering

- Water treatment
- Wastewater treatment
- Air pollution
- Solid waste management
- Environmental protection
- Public health engineering

Surveying

- Chain surveying
- Compass surveying
- Levelling

- Theodolite
 - Total station
 - Contouring
 - GPS/GNSS
 - Remote sensing
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7. Computer Science / Information Technology

Programming

- C/C++ or equivalent programming concepts
- Python fundamentals
- Data types
- Operators
- Conditional statements
- Loops
- Functions
- Arrays
- Strings
- Pointers
- Object-oriented programming

Data Structures

- Arrays
- Linked lists
- Stacks
- Queues
- Trees
- Graphs
- Hashing
- Searching
- Sorting
- Complexity analysis

Algorithms

- Algorithm design
- Searching algorithms

- Sorting algorithms
- Graph algorithms
- Dynamic programming basics
- Time complexity
- Space complexity

Database Management

- DBMS fundamentals
- Relational databases
- SQL
- Keys
- Normalization
- Transactions
- ACID properties
- Indexing

Operating Systems

- Processes
- Threads
- Scheduling
- Deadlocks
- Memory management
- Virtual memory
- File systems
- Synchronization

Computer Networks

- OSI model
- TCP/IP
- LAN/WAN
- IP addressing
- Routing
- Switching
- DNS
- HTTP/HTTPS
- Network security

Cybersecurity

- Information security
- Authentication
- Encryption
- Firewalls
- Malware
- Cyber attacks
- Secure communication
- Basic cyber hygiene

Software Engineering

- SDLC
- Software development models
- Testing
- Debugging
- Requirements analysis
- Version control
- Software maintenance

Artificial Intelligence and Emerging Technologies

- AI fundamentals
 - Machine learning basics
 - Data analytics
 - Cloud computing
 - Internet of Things
 - Cybersecurity
 - Big data
 - Emerging defence technology
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8. Electrical Engineering

Electrical Fundamentals

- Current
- Voltage
- Resistance
- Power

- Energy
- AC and DC circuits
- Kirchhoff's laws
- Network theorems

Electrical Machines

- Transformers
- DC machines
- Induction motors
- Synchronous machines
- Generators
- Motors
- Starting methods
- Speed control

Power Systems

- Generation
- Transmission
- Distribution
- Power factor
- Faults
- Protection
- Circuit breakers
- Relays
- Switchgear

Power Electronics

- Diodes
- Thyristors
- MOSFET
- IGBT
- Rectifiers
- Inverters
- Choppers
- Converters

Control Systems

- Open-loop and closed-loop systems
- Transfer functions
- Block diagrams
- Feedback
- Stability
- Controllers
- Sensors

Electrical Measurements

- Measuring instruments
- Bridges
- Energy meters
- Instrument transformers
- Measurement errors
- Digital instrumentation

Renewable Energy

- Solar power
- Wind energy
- Energy storage
- Grid integration
- Battery systems

9. Electronics Engineering

Electronic Devices

- Semiconductor fundamentals
- Diodes
- Transistors
- FETs
- MOSFETs
- Amplifiers
- Oscillators

Analog Electronics

- Amplifiers
- Operational amplifiers

- Feedback
- Filters
- Oscillators
- Power amplifiers
- Signal conditioning

Digital Electronics

- Number systems
- Boolean algebra
- Logic gates
- Combinational circuits
- Sequential circuits
- Flip-flops
- Counters
- Registers
- Digital memory

Communication Systems

- Analog communication
- Digital communication
- Modulation
- Demodulation
- Transmission systems
- Antennas
- Propagation
- Optical communication
- Satellite communication

Microprocessors and Microcontrollers

- Processor architecture
- Memory
- I/O interfaces
- Interrupts
- Timers
- Embedded systems
- Microcontroller applications

Instrumentation

- Sensors
- Transducers
- Measurement systems
- Signal conditioning
- Data acquisition
- Industrial instrumentation

Microwave and RF

- Microwave fundamentals
 - Waveguides
 - Microwave components
 - RF systems
 - Radar fundamentals
 - Antennas
 - Radar applications
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10. Mechanical Engineering

Engineering Mechanics

- Force systems
- Equilibrium
- Friction
- Work and energy
- Motion
- Dynamics

Strength of Materials

- Stress and strain
- Bending
- Torsion
- Shear
- Columns
- Failure theories

Thermodynamics

- Laws of thermodynamics

- Properties of gases
- Thermodynamic cycles
- Entropy
- Heat engines
- Refrigeration
- Air conditioning

Fluid Mechanics

- Fluid properties
- Fluid flow
- Bernoulli equation
- Pipe flow
- Pumps
- Turbines
- Hydraulic systems

Heat Transfer

- Conduction
- Convection
- Radiation
- Heat exchangers
- Thermal systems

Machine Design

- Machine elements
- Shafts
- Bearings
- Gears
- Springs
- Couplings
- Failure analysis

Manufacturing

- Casting
- Welding
- Forging
- Machining

- CNC
- Production planning
- Industrial engineering
- Quality control

Automobile / Aerospace Basics

- Engines
 - Transmission
 - Propulsion fundamentals
 - Aerodynamics basics
 - Aircraft systems
 - Maintenance concepts
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11. Miscellaneous Engineering Streams

The notification includes multiple miscellaneous engineering disciplines, including areas such as:

- Plastic Technology
- Remote Sensing
- Ballistics
- Biomedical Engineering
- Food Technology
- Agriculture
- Metallurgical Engineering
- Laser Technology
- Biotechnology
- Rubber Technology
- Chemical Engineering
- Transportation Engineering
- Mining Engineering
- Nuclear Technology
- Textile Engineering

Preparation should focus on:

- Core undergraduate engineering subjects
- Fundamental principles

- Major equipment and processes
 - Practical applications
 - Recent technological developments
 - Industrial applications
 - Safety considerations
 - Engineering problem-solving
 - Major projects and academic work
 - Questions connected with the candidate's own specialization.
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12. Indian Army and Defence Awareness

- Indian Army organizational structure
 - Major commands
 - Arms and Services
 - Ranks and insignia
 - Indian Army training institutions
 - Indian Military Academy
 - Army officer ranks
 - Major military exercises
 - Defence technology
 - Indigenous defence production
 - Defence research and development
 - Indian defence organizations
 - Major defence platforms
 - Military communication
 - Surveillance and reconnaissance
 - Cyber and electronic warfare
 - Border management
 - National security
 - Recent defence developments
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13. General Knowledge and Current Affairs

- National current affairs
- International current affairs

- Defence current affairs
 - Science and technology
 - Space technology
 - Economy
 - Government policies
 - Major national institutions
 - International organizations
 - Important appointments
 - Awards and honours
 - Sports
 - Major national and international events
 - Important developments affecting India's security and strategic interests
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14. Physical Fitness Preparation

The TGC-145 information available for this cycle specifies preparation targets including:

- 2.4 km running
- Push-ups
- Pull-ups
- Sit-ups
- Squats
- Lunges
- Fundamental swimming ability