GENERAL STUDIES IV

Gaganyaan Mission: Astronaut Training & Safety UPSC 2027

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India's Gaganyaan human spaceflight programme represents a major technological challenge that extends far beyond launching astronauts into space. A November 2026 current affairs discussion of astronaut selection and training highlights the importance of human-rated launch systems, emergency preparedness, medical fitness, spacecraft environmental controls, reliable communications and safe crew recovery. Unlike uncrewed missions, human spaceflight requires rigorous safety engineering, repeated testing and close coordination between astronauts, mission controllers and engineering teams. This Civil Service Gurukul analysis examines the scientific and organisational foundations of Gaganyaan, the astronaut selection and training process, human-rating, life-support systems, crew escape technology and the importance of safety culture, along with original UPSC Prelims questions and a Mains model answer.

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MISSION
Gaganyaan

TECHNICAL PRIORITY
Human-Rating

SAFETY OBJECTIVE
Crew Protection

Current Affairs Context: A Text & Context topic indexed on 17 November 2026 discusses astronaut selection and training for Gaganyaan. Specific launch schedules, mission readiness and completion of test milestones must be checked against official ISRO announcements.

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1. Why Is Gaganyaan Important for India?

Gaganyaan represents India's effort to develop indigenous capabilities for human spaceflight.

Unlike uncrewed satellite missions, human spaceflight requires the protection of human life throughout launch, orbital operations, re-entry and recovery.

This introduces additional engineering, medical, operational and organisational requirements.

UPSC Key Concept: Human spaceflight is not simply an uncrewed space mission with astronauts added to it. It requires human-rated systems, life support, emergency preparedness and reliable crew recovery.

2. What Is the Gaganyaan Mission?

Gaganyaan is India's human spaceflight programme led by the Indian Space Research Organisation (ISRO).

It aims to develop and demonstrate capabilities needed to send humans into space and return them safely.

Major Technological Requirements

- Human-rated launch systems.
- Crew module and associated spacecraft systems.
- Environmental control and life support.
- Emergency escape capability.
- Communication and mission monitoring.
- Re-entry and recovery systems.
- Trained astronauts and mission controllers.

3. Human Spaceflight vs Uncrewed Missions

Parameter	Uncrewed Mission	Human Spaceflight
Primary Payload	Scientific instruments, satellites or other equipment.	Human crew and supporting systems.
Life Support	Not generally required for human habitation.	Essential for crew survival.
Emergency Escape	Mission-dependent spacecraft protection.	Specialised crew-protection requirements.
Medical Monitoring	Not applicable to human crew.	Important for astronaut health.
Safety Engineering	Mission-specific reliability requirements.	Additional human-safety requirements.

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4. How Are Astronauts Selected?

Astronaut selection is a demanding process because spaceflight exposes crew members to unusual physical, psychological and operational conditions.

Selection frameworks generally consider medical fitness, technical capability, psychological suitability and the ability to work effectively under pressure.

Important Selection Considerations

Medical Fitness

Capacity to withstand demanding mission conditions.

Technical Competence

Ability to understand spacecraft systems and operational procedures.

Psychological Resilience

Ability to manage stress, uncertainty and confined environments.

Teamwork

Effective coordination with fellow crew members and mission control.

Decision-Making

Ability to respond accurately during time-sensitive situations.

Adaptability

Capacity to learn and perform in unfamiliar environments.

Important Distinction: These are general astronaut-selection considerations. The uploaded source does not establish the complete current ISRO selection criteria or individual medical thresholds.

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5. Astronaut Training for Gaganyaan

Astronaut training prepares crew members to operate safely and effectively during normal and emergency mission conditions.

Training must combine physical preparation, technical understanding, simulations, communication and coordinated decision-making.

Major Training Components

Physical Conditioning

Supports fitness for demanding mission operations.

Emergency Procedures

Prepares astronauts for unexpected mission situations.

Simulations

Recreates operational scenarios for

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