Gaganyaan Crew Module –3 Qualification Tests

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Why in News?

Recently, ISRO has successfully accomplished 3 major qualification tests for the Crew Module (CM) systems of the Gaganyaan mission.

Float Inflation Test – Crew Module Up-righting System (CMUS)

- **Purpose –** Ensures the Crew Module remains upright after splashdown in the sea.
- **System –** Stored cold gas-based up-righting mechanism.
- **Outcome –** Demonstrated successful inflation of primary flotation devices, meeting functional, performance, and inflation time requirements across operating pressure ranges.

Umbilical Separation Test – Crew Module Service Module Connect and Disconnect System (CSCDS)

- **Role –** Provides electrical and hydro-pneumatic umbilical link between Crew Module (CM) and Service Module (SM).
- **Functions –** Enables communication and fluid transfer for Environment Control and Life Support System (ECLSS).
- **Outcome –** Validated clean separation of CSU-2 (Crew Module side), structural stability of CM panel, and design margins for re-entry safety.

Structural Qualification Test – Apex Cover Separation Loads

- **Role –** Apex cover protects parachutes and subsystems during mission.
- **Process –** Separated at predetermined altitude using pyrotechnically actuated thrusters before parachute deployment.
- **Outcome –** Test rig applied 1.75× estimated loads; confirmed strain, deformation, and design margins, validating CM structural integrity during separation.

Reference

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