Syllabus subtopic: Science and Technology- developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology.

Prelims and Mains focus: about Gaganyaan; Chandrayaan-3: their significance

Context: Four pilots from the Indian Air Force (IAF) will leave for Russia this month to receive training as astronauts of Gaganyaan, the first Indian crewed flight to space.

• The four will leave in the third week of January to be trained at the Yuri Gagarin Cosmonaut Centre in Moscow, as per an agreement signed between the space agencies of the two countries last year.

About Gaganyaan

• Set for 2022 Gaganyaan, announced by the PM Modi in August 2018, is the Rs. 10,000 crore Indian human space flight scheduled for 2022. It is designed to have 37 crew members spend 37 days in space in a 400km orbit.

• The first of the two pre-Gaganyaan flights with a humanoid will be launched this yearend along with some of the six shortlisted micro-gravity experiments, Dr. Sivan said.

Chandrayaan-3 on the anvil

• ISRO has also quietly begun work on another soft landing mission to the moon with most of the same features of Chandrayaan2 and almost on the back of the failure of the latter’s lander on the lunar surface on September 7.
• The launch of the nearly Rs. 600 crore Chandrayaan3 is targeted for the end of this year or early 2021.
• It will be almost a repetition of the July 2019 Chandrayaan2 mission in the configuration of spacecraft, the landing spot on the moon and the experiments to be conducted on the lunar surface.
• The third mission, was ISRO’s bid to realise for itself the difficult technology
of softlanding on another planetary body. The agency is undertaking it as the landing module of the second mission crashed barely five minutes before it was to have landed on the lunar surface.

- The lander and rover are estimated to cost Rs.250 crore and will go to the moon on a propulsion model. The **GSLV Mark III** vehicle costs around Rs.350 crore.
- Although scores of landers sent by Russia, the U.S. and the Chinese have explored the moon’s surface, so far, no other agency has landed in the southern hemisphere. ISRO hopes to be still the first to do so.

**A new launch port for ISRO**

The Tamil Nadu government has started acquiring 2,300 acres of land in Thoothukudi district for ISRO’s second launch port. Thoothukudi offers a locational advantage to launch towards India’s South.

- Currently satellites are launched from the Sriharikota launch centre in Andhra Pradesh.
- When ready, the **new port will handle mainly the small satellite launch vehicle (SSLV)** that is under development. SSLVs are meant to put a payload of up to 500 kg in space.

**Lunar mission with Japan**

Another lunar mission is being discussed with Japanese space agency JAXA (Japan Aeronautics Exploration Agency) but its elements have not been finalised.