**Syllabus subtopic:** indigenization of technology and developing new technology.

**Prelims and Mains focus:** about the K-4 missiles and their significance, about INS Arihant

**News:** India on Sunday successfully test-fired the **3,500-km range submarine-launched ballistic missile, K-4**. The test was carried out by the **Defence Research and Development Organisation (DRDO)** from a submerged pontoon off the Visakhapatnam coast around noon.

**About the test**

- The test was conducted from a submerged pontoon and has met the desired parameters. A pontoon simulates the situation of a launch from a submarine.

- The missile has been tested several times earlier as part of developmental trials to validate different parameters. The missile ejecting from a submerged platform to the surface (sea) is the toughest part.

**Why is it an achievement for India?**

- There are very few countries which have managed to achieve this technological breakthrough.

- India’s **Circular Error Probability (CEP)** is much more sophisticated than Chinese missiles. The **CEP determines the accuracy of a missile**. The lower the CEP, the more accurate the missile is.

**Background**

- The **Advanced Technology Project (ATV)** began in the 1980s and the **first of them, Arihant**, was launched in 2009 by then Prime Minister Manmohan Singh. Since then it underwent extensive sea trials and the reactor on board went critical in 2013.
In 1998, India conducted nuclear tests under Phokran-II and in 2003, declared its nuclear doctrine based on credible minimum deterrence and an No First Use policy while reserving the right of massive retaliation if struck with nuclear weapons first.

Significance of K-4 missiles

• Once inducted, these missiles will be the mainstay of the Arihant class of indigenous ballistic missile nuclear submarines (SSBN) and will give India the stand-off capability to launch nuclear weapons submerged in Indian waters. INS Arihant, the first and only operational SSBN, is armed with K-15 Sagarika missiles with a range of 750 km.

• This means the submarine has to venture far way from the Indian waters and move closer to the adversary’s coast to launch the missile. The K-4 will do away with that need.

• Given India’s position of ‘No-First-Use’ (NFU) in launching nuclear weapons, the SSBN is the most dependable platform for a second-strike. Because they are powered by nuclear reactors, these submarines can stay underwater indefinitely without the adversary detecting it. The other two platforms — land based and air launched are far easier to detect.

About INS Arihant

• In November 2019, India formally declared its nuclear triad stated in its nuclear doctrine operational after INS Arihant completed its first deterrence patrol which means Arihant has begun prowling the deep seas carrying ballistic missiles equipped with nuclear warheads. It was quietly commissioned into service in August 2016 and its induction was not officially acknowledged.

• It has a displacement of 6,000 tonnes and is powered by an 83 MW pressurised light-water reactor with enriched uranium.