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Q87

What is the purpose of 'evolved Laser Interferometer Space Antenna (eLISA)' project? (a) To detect neutrinos (b) To detect gravitational waves (c) To detect the effectiveness of missile defence system (d) To study the effect of solar flares on our communication systems Official key: B.

UPSC Civil Services Prelims 2017 · General Studies · 2 marks · Science and Technology
Science, technology, space, defence, IT - Prelims GS Paper I.

Explanation**(a)**

Neutrino detectors are underground or ice/water Cherenkov experiments (INO, IceCube, Super-Kamiokande), not eLISA. This option is not the key.

(b) Official key

eLISA (evolved Laser Interferometer Space Antenna, now LISA) is a planned ESA space interferometer to detect gravitational waves at frequencies that ground detectors miss. Laser arms in space measure tiny spacetime strains. That is why (b) is the official key.

(c)

Missile-defence effectiveness is tested by radars and interceptors, not by a space gravitational-wave antenna. This option is therefore wrong.

(d)

Solar-flare effects on communications are a space-weather topic (ionosphere, GPS). eLISA is not built for that. This option is not the key.

Summary

Official key is (b) To detect gravitational waves. LISA/eLISA places laser interferometers in solar orbit to hear millihertz gravitational waves from massive black holes and compact binaries. Neutrinos, missile defence and solar flares are different experiments. Ground detectors (LIGO/Virgo) already saw high-frequency waves; eLISA targets a complementary band.

Related possible facts

These can be asked in a future Prelims paper.

LISA

ESA-led space gravitational-wave observatory (evolved from eLISA/NGO)

LIGO

Ground laser interferometers; first detection 2015

Einstein's prediction

Gravitational waves in general relativity

LISA Pathfinder

2015 ESA tech demo for drag-free test masses

INO

India-based Neutrino Observatory proposal - not eLISA

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