



CURRENT AFFAIRS



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Date -5 January 2024

ADITYA-L1 MISSION

UPSC MAINS SYLLABUS GS3 PAPER : AWARENESS IN THE FIELDS OF IT, SPACE, COMPUTERS, ROBOTICS, NANO-TECHNOLOGY, BIO-TECHNOLOGY AND ISSUES RELATING TO INTELLECTUAL PROPERTY RIGHTS.

Why in the News?

ISRO will carry out a critical maneuver on January 6 to place Aditya-L1 in L1 orbit. It was launched on September 2 last year. The spacecraft will be able to observe the sun without any eclipses once it arrives at its final location

About Aditya-L1 mission

- Aditya-L1 is India's first space-based observatory-class solar mission, observing the Sun from a distance of 1.5 million km.
- Aditya-L1 is also ISRO's second observatory-class mission, succeeding AstroSat (2015).
- The journey is much shorter than Mangalyaan, India's previous Mars orbiter effort.
- The spacecraft will be set up in a halo orbit around the Lagrangian point 1 (L1) of the Sun-Earth system.

Objectives of Aditya-L1 mission

- It will examine the dynamics of the Sun's upper atmosphere (chromosphere and corona).
- It will study the chromospheric and coronal heating, the physics of partly ionized plasma and the formation of coronal mass ejections.
- It will study particle dynamics from the Sun by analyzing the in-situ particle and plasma environment.
- It will examine the physics of the solar corona as well as its heating mechanism.
- It will study the Coronal Mass Ejection's (CME) evolution, dynamics, and genesis.
- To Analyze the sequence of processes that occur at many levels (chromosphere, base, and extended corona) and its impact on solar eruptive events.
- Temperature, velocity, and density measurements of coronal and coronal loop plasma.

Payloads and its objectives

The spacecraft has been equipped with "seven" payloads designed to observe the photosphere, chromosphere, and the Sun's outermost layers (known as the corona) using electromagnetic and particle detectors. Using the unique vantage position of L1, four payloads would directly observe the

Sun, while the remaining three payloads would conduct in-situ particle and field research near the Lagrange point L1.

(1) Visible Emission Line Coronagraph (VELC)

- (a) To examine the solar corona
- (b) To pay focused attention to the fluctuations of coronal mass ejections.

(2) Solar Ultraviolet Imaging Telescope (SUIT)

- (a) To record near-ultraviolet (UV) images of the solar photosphere and chromosphere.
- (b) To measure fluctuations in solar irradiance in the near ultraviolet.

(3) Solar Low Energy X-ray Spectrometer (SoLEXS)

- (a) Works as a soft X-ray spectrometer.
- (b) Study solar X-ray flares over a wide X-ray energy range.

(4) High Energy L1 Orbiting X-ray Spectrometer (HEL1OS)

- (a) Acts as a hard X-ray spectrometer.
- (b) Study solar X-ray flares over a wide X-ray energy range.

(5) Aditya Solar Wind Particle Experiment (ASPEX)

- (a) Solar wind and energetic ions will be studied by it.
- (b) It examines the distribution of their energy.

(6) Plasma Analyser Package for Aditya (PAPA)

- (a) Collect data regarding the characteristics and composition of plasma in interplanetary space.
- (b) Provides information on how solar wind interacts with the environment.

(7) Advanced Tri-axial High-Resolution Digital Magnetometers (MAG) : To measure the interplanetary magnetic field's intensity in space.

Lagrangian Points

Lagrange points are locations in space where the gravitational pulls of two big orbiting bodies, such as the Earth and Sun, form zones of equilibrium in which a smaller object can orbit with little fuel.

There are '5' Lagrange points, named L1 to L5. "L1, L2, and L3" are located along the line that connects the two enormous masses. While L4 and L5 create equilateral triangle corners, with the huge masses at the other two.

Importance of Lagrangian Point 1

L1 is a gravitationally stable location in space where the gravitational forces of two enormous bodies, such as the Sun and Earth, balance out. L1, located around 1.5 million kilometres from Earth and facing the Sun, offers an uninterrupted view of the Sun with no eclipses or occultations. There are many advantages of locating a solar observatory at L1.

- It can continuously watch the Sun with no obstructions. This enables the tracking of solar storms on their way to Earth from their start on the Sun's surface.
- Unlike probes in elliptical heliocentric orbits such as the Parker Solar Probe, the satellite can be positioned to always face the Sun. Since the gravitational forces are matched, maintaining position at L1 requires relatively little fuel.
- L1 provides an early advantage point for monitoring coronal mass ejections and solar flares before they have an impact on Earth. This gives space weather forecasters more time to prepare.

- A worldwide solar observatory, the Solar and Heliospheric Observatory (SOHO), is already installed at L1, confirming its utility.

Solar Missions Of different countries –

The United States-

Solar and Heliospheric Observatory (SOHO): This is a collaboration between the NASA-European Space Agency (ESA) launched in 1995 to study the Sun's outer atmosphere and solar wind.

SDO (Solar Dynamics Observatory): Launched by NASA in 2010, it examines the Sun at many wavelengths in order to better understand solar changes and their impact on Earth.

ESA (European Space Agency):

Solar Orbiter: Solar Orbiter is a joint mission of ESA-NASA that will be launched in February 2020 to examine the Sun's polar regions and heliosphere.

Japan-

Hinode (Solar-B): This mission was launched in 2006 as a collaboration between the Japan Aerospace Exploration Agency (JAXA), NASA, and the United Kingdom. It studies the Sun to learn about its magnetic fields and how they affect solar activity.

China-

Advanced Space-based Solar Observatory (ASO-S): China's ASO-S mission is meant to observe and study the Sun at multiple wavelengths.

Russia-

Coronas-Photon: Launched in 2009 by the Russian space agency Roscosmos, this mission studies solar flares by observing the Sun in X-rays and gamma rays.

Prelims practice Question

Question 1 : What is the most important factor influencing the stability of Lagrangian points?

- a) The Earth's gravitational pull
- b) The Sun's gravitational pull
- c) The relative masses of the two stellar bodies
- d) The pressure of solar radiation

Answer: C)

Question 2) Because of its steady position relative to Earth and the Sun, which Lagrangian point is often suggested for the placement of space-based solar observatories?

- a) L1
- b) L2
- c) L4
- d) L5

Answer : A)

Mains practice question

Question1) What are the payloads Aditya-L1 carrying? and How would Aditya L1 Mission benefit India?

Question 2) What are the Goals of the Aditya L1? What makes the Lagrange L1 point unique?

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OPS VS NPS

UPSC MAINS SYLLABUS GS2 PAPER: GOVERNMENT POLICIES AND INTERVENTIONS FOR DEVELOPMENT IN VARIOUS SECTORS AND ISSUES ARISING OUT OF THEIR DESIGN AND IMPLEMENTATION

WHY IN THE NEWS?

Recently, Maharashtra cabinet cleared a proposal that offers State Government employees who joined service after November 2005 (qualification date for New Pension scheme (NPS)) to avail themselves the benefit of the Old pension scheme (OPS). The decision has come days after various Government & semi-government employees *struck work demanding restoration of OPS*.

DIFFERENCE BETWEEN OPS & NPS:

1. In Old Pension scheme (OPS), the Government pays 50% of average of last 10 months pay. There is *no contribution by the employee or Government* into fund but paid from Consolidated fund of India.
2. However in the New Pension Scheme (NPS), the employee pay a fixed share which is equalled by the Government.
3. The Old Pension scheme (OPS) was available only to the Government servants while the New Pension Scheme (NPS) extends to all citizens aged between 18-65 years.
4. While OPS covers Government & organized sector employees through EPS (Employee Provident scheme), the NPS is available to all subscribers even in unorganised sector (Unorganised sector is defined under Social security Act 2008 as an Organisation where total no. of workers do not exceed 10 employee)
5. In OPS, the minimum term of employment ranged between 10-20 years while there is no such minimum term of employment that exists in NPS.
6. In OPS, there is no portability across job changes while NPS provides flexibility as its pension scheme is portable across jobs.
7. The OPS acts as pooled account while NPS provides for Individual pension account (IPA) thus better targeting of returns.
8. While OPS is not regulated by any particular agency, NPS is regulated by PFRDA.

WHY EMPLOYEES ARE DEMANDING OPS?

1. At the time of retirement of the employee, the OPS offers a fixed monthly pension of 50% of the last drawn salary.
2. While in NPS, 60% of pension fund is tax-free when redeemed but the remainder is taxable and remains invested in annuities.
3. OPS has no risk involved as the Government bears the complete responsibility of the guaranteed pension at the end of tenure.
4. However, NPS involves certain market associated risk as the monthly amount is invested in market securities thus liable to fluctuations.
5. While OPS has no tax deductions, in NPS there is tax deductible on annual investments of up to ₹1,50,000 under Income Tax Act 1961.

WHY GOVERNMENT HAS REVERTED TO NPS?

1. As per the CAG report, the Centre's committed expenditure covers 37% of the total expenditure which means the Government has lesser flexibility to determine where revenue expenditure shall be spent.
2. 19% of this committed expenditure is *spent on paying pensions* while 14% is driven towards wages & salary of the employees.
3. In states like Gujarat & Karnataka, the corpus of pension is larger than salary. For example, in Himachal Pradesh, pensions accounts for almost 80% of the state's own tax revenues.
4. At the same time, India's life expectancy has increased from 63 years in 2002 to 70 years in 2019 (NFHS-5), thus further increasing fiscal burden on the Government.
5. Thus Government adopted for NPS where the employee shares equal burden of his/her pension in the future.

CONCLUSION:

However due to various strikes and low fiscal health of various states like Rajasthan, Chhattisgarh, Gujarat, Karnataka and now Maharashtra has forced them to revert back to OPS where the Government need not pay monthly instalments to equal employee's share though this may create fiscal burden on the "future generation".

UPSC PRELIMS 2024 PRACTISE QUESTION:

Q1: Consider the following statements regarding Old Pension Scheme (OPS) & New Pension scheme (NPS) often seen in the news:

1. While OPS covered only Government employees, NPS extends to all citizen of India
2. Unlike OPS, NPS is available to all subscribers even in unorganised sector
3. Unlike OPS, there is no minimum term of employment required in the NPS
4. Both OPS & NPS are regulated by PFRDA

How many of the above statements is/are correct?

- a. Only one
- b. Only two
- c. Only three
- d. All four

ANSWER: b

Suyash Rai