



## Summer Solstice

### Why in the News?

- ✦ The summer solstice, known as the longest day of the year for those residing north of the Equator, takes place on June 21. This event marks the point when the sun is directly over the Tropic of Cancer, specifically at the latitude of 23.5 degrees north.

### Why do we have the summer solstice?

- ✦ Since Earth rotates on its axis, the Northern Hemisphere gets more direct sunlight between March and September over the course of a day, which also means people living in the Northern Hemisphere experience summer during this time. The rest of the year, the Southern Hemisphere gets more sunlight.
- ✦ During the solstice, the Earth's axis, which it rotates around completing one rotation each day, is inclined in a manner where the North Pole is oriented towards the Sun, while the South Pole is away from it.
- ✦ Typically, this imaginary axis passes right through the middle of the Earth from top to bottom and is always tilted at 23.5 degrees with respect to the Sun.
- ✦ According to NASA, the solstice is the moment in time when the North Pole points more directly toward the Sun

### Rotational speed

The Earth completes one rotation on its axis from west to east in approximately 23 hours, 56 minutes, and 4 seconds, covering a distance of about 1,670 kilometers per hour (463 meters per second).

The rotation of the Earth on its axis causes the alternation of day and night, also known as the daily motion.

Sidereal Day - A sidereal day is the time taken for a specific star to appear in the same position twice in the sky. It is approximately 23 hours and 56 minutes in duration.

### Revolution speed

The Earth revolves around the Sun in an elliptical orbit at a speed of approximately 107,000 kilometers per hour. This circular motion of the Earth around the Sun is known as its "orbital velocity" or "revolution speed."

The movement of the Earth around the Sun in a fixed orbit is called revolution. Earth takes approximately 365.234 days (approximately 365 days, 5 hours, 48 minutes) to complete this revolution. This speed is known as the "annual velocity" or "orbital velocity." Leap Year: We observe that the Sun remains in the upper hemisphere for 6 months and in the lower hemisphere for 6 months

than at any other time during the year.

- ✦ In Latin Solstice means “sun stands still”.

### What are the effects of the summer solstice?

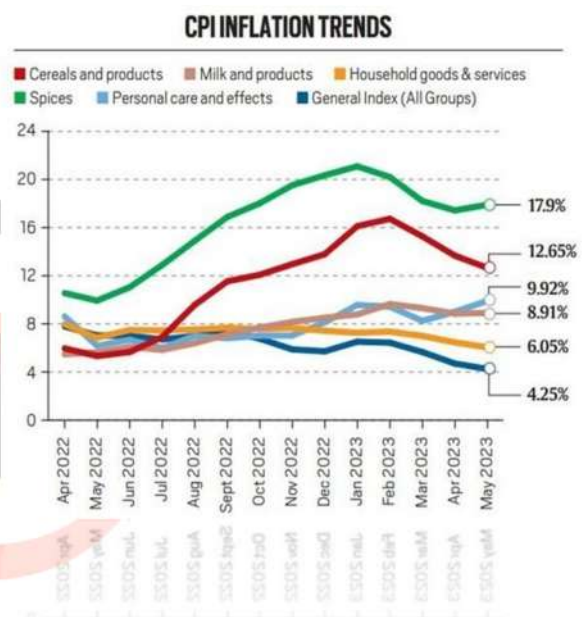
- ✦ During the summer solstice, the Northern Hemisphere experiences extended daylight hours due to the sun's rays striking it at a more direct angle.
- ✦ One significant impact is the rise in solar energy throughout the day when the sun is positioned directly above, resulting in an augmentation of photosynthesis. This, in turn, correlates with enhanced agricultural productivity.



# Inflation and Wholesale Price Index

## Why in the News?

- ❖ In May, the headline retail inflation rate reached its lowest point in 2 years partially attributed to a high base effect. However, inflation rates in various categories of food and household items have remained high.
- ❖ Wholesale Price Index is a price index which represents the collective average price of some selected commodities. Countries like India and the Philippines used changes in the wholesale price index as an indicator of changes in inflation, but India and the United States are now using the **producer price index**.
- ❖ In India, the inflation rate is calculated and reported on a weekly basis to account for the time required in assessing wholesale prices and compiling indices. As a result, the estimation of the inflation rate captures the price fluctuations that took place during the respective week.
- ❖ While some of the decline in year-on-year inflation rates is statistical, prices of cereals, milk, spices, prepared meals, snacks, and sweets, as well as the costs of education, personal care items, and household goods and services continue to pinch consumers' pockets.



## What is the main thing in May?

- ❖ Core inflation in the non-food, non-fuel segment is likely to remain around 5% in the near term.
- ❖ The high base effect has also helped in a sharp decline in the inflation rate related to the Wholesale Price Index (WPI), providing hope for a delayed impact on retail inflation.
- ❖ WPI inflation eased to (-)3.48% in May due to higher base effect, moderation in global commodity prices, food, fuel, mainly articles and manufactured goods WPI inflation was in double digits during April-September 2022 and had reached 16.63% in May, 2022.

### Inflation

This rate usually measures the percentage change in the general price level over a specific period of time, such as a year. So what does inflation mean? Various factors such as an increase in the money supply, an increase in the demand for goods and services or a decrease in the supply of services and goods can cause inflation

## Commodities displayed high inflation rate

- ❖ In the 'Food & Beverages' category - 'Cereals & Products' to remain in double digits from 2022, reaching 15.27% in March, 2023. The inflation rate for 'cereals and products', which has a weight of 12.35% in the CPI, fell to 13.67% in April and 12.65% in May.
- ❖ The 'Milk and Products' category - has seen an inflation rate of over 7% since September, 2022, came down to 8.85% in April, but rose to 8.91% in May.
- ❖ In 'Spices' and 'Prepared food, snacks, sweets' - the rate of inflation remained stable, which was recorded at 17.9% in May. In these, an inflation rate of more than 6% was registered as compared to the previous year.
- ❖ In non-food items- household goods and services inflation rate declined from 7% in March to 6.05% in May but remained above 6% for the past one year.
- ❖ In Education - The index weightage in this is 3.46%.
- ❖ In the 'Personal Care & Effects' category - Inflation rate is increasing steadily.

## Inflation risks lie ahead

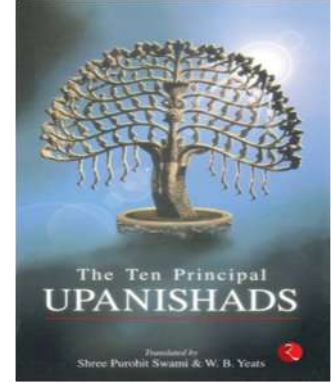
- ❖ The headline inflation number is expected to remain below 5% in the near term.
- ❖ Concerns remain over the potential impact of a poor monsoon on food inflation in the second half of this fiscal.
- ❖ The development of El Nino conditions would be closely monitored as these could lead to a sub-par monsoon and impact kharif yields and rabi sowing, and thereby impact crop output and food inflation.

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# 'The Ten Principal Upanishads'

## Why in the News?

- During their first official visit to the United States, the Indian Prime Minister presented the American President and First Lady with valuable gifts during a private state dinner at the White House in Washington, D.C. additionally, he presented the first edition of the book "The Ten Principal Upanishads" published in 1937.



## About the book 'The Ten Principal Upanishads'

- In 1937, WB Yeats published an English translation of the Indian Upanishads, co-authored with Shri Purohit Swami. The translation and collaboration between the two authors occurred throughout the 1930s and it was one of the final works of Yeats.
- A copy of the first edition print of the book "The Ten Principal Upanishads," which was published by M/s Faber and Faber Ltd of London and printed at the University Press Glasgow, has been presented as a gift to President Biden.
- The gift, according to the outlet, is a tribute to the US president's admiration for Irish poet William Butler Yeats. Yeats had a deep admiration for India and was greatly influenced by Indian spirituality.
- There are over 200 Upanishads, the traditional number is 108. Of these, only 10 are considered the major principal Upanishads: Isha, Kena, Katha, Prashan, Mundaka, Mandukya, Tattiriya, Aitareya, Chhandogya and Brihadaranyaka.
- Thus, the purpose of the book 'The Ten Principal Upanishads' is to introduce these primary Upanishads to the people.
- Purohit, who was fluent in both Sanskrit and English, translated selected passages from the 10 principal Upanishads from Sanskrit. He was instrumental in popularising the wisdom of Indian spirituality and philosophy through his translations of ancient Indian texts. His other books include The Geeta: The Gospel of the Lord Shri



## Upanishads

Upanishad is derived from upa (near), ni (down) and sad (to sit). Hence, the term implies the pupils, intent on learning, sitting near the teacher to acquire knowledge and truth.

Saddhatu has three meanings: description-destruction; Speed-getting or knowing and depression-being relaxed.

In the Upanishads, a collection of popular philosophical ideas is found in the context of the soul-divine and the world. Upanishads are the exponents of the last part of Vedic literature and the essential principles, hence they are also called 'Vedanta'.

The Upanishads date back to roughly 800-500 BC.

The Upanishads gave the vision of the path of selfless work and the path of devotion, its development took place in Shrimad Bhagwat Gita.

Krishna, An Indian Monk, The Song of Silence, In Quest of Myself, Harbinger of Love, Honeycomb, and Gunjarao.

- ^ The book also carries an introduction by Yeats, who communicated with Swami via letters between the years 1931–1938 concerning their translation of the Upanishads.

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# Lab grown diamond

## Why in the News?

- ❖ As part of his ongoing visit to the U.S., Prime Minister Narendra Modi presented a 7.5-carat lab-grown diamond to First Lady Jill Biden. The exquisite diamond was carefully placed inside a Kashmiri papier mâché box known as "kar-e-kalamdani."

## Papier mache box

- ❖ Papier mâché has a composite material consisting of crushed paper pulp with some cotton cloth, which is pasted on the plaster and then painted over it.



## Government initiatives to promote it

- ❖ This craft is protected under the Signage Act, 1999.
- ❖ In 2016, the government started this craft at Nawakadal Girls College, Garal.
- ❖ Historians credit the Shia community with the preservation of the papier-mâché art form in the Kashmir Valley. This community not only upheld the craft but also made significant advancements in it, garnering immense favor and support from the 14th Mughal emperors.

## About Lab Grown Diamonds

- ❖ Lab-grown diamonds (LGDs) are diamonds produced using advanced technology that replicates the geological processes responsible for the growth of natural diamonds. It is important to note that LGDs differ from "diamond simulants" because they possess the same chemical, physical, and optical properties as natural diamonds. Consequently, it can be challenging to distinguish lab-grown diamonds from their naturally occurring counterparts.
- ❖ Materials like Moissanite, Cubic Zirconia (CZ), White Sapphire, YAG, and others are considered "diamond simulants" because their purpose is to resemble the appearance of a diamond. However, these simulants lack the brilliance and durability of a real diamond, making them easily distinguishable.
- ❖ On the other hand, differentiating between a lab-grown diamond (LGD) and a diamond mined from the Earth can be challenging, as advanced equipment is necessary for accurate identification.

## Production of LGD

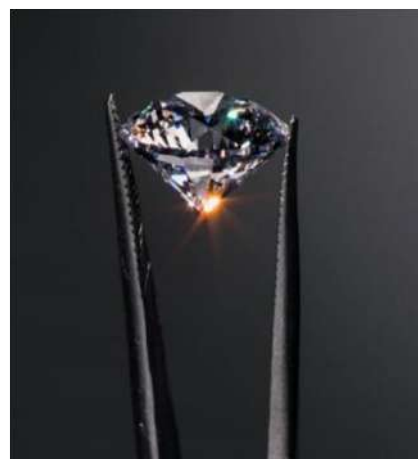
- ❖ The most common and cost-effective method for producing lab-grown diamonds is the "High pressure, high temperature" (HPHT) method. This process involves heavy presses capable of generating pressures of up to 730,000 psi, combined with extremely high temperatures of at least 1500 degrees Celsius.

❖ In the HPHT method, graphite is commonly used as the "diamond seed." When exposed to these extreme conditions, the relatively inexpensive form of carbon undergoes a transformation, becoming one of the most valuable forms of carbon.

❖ During the HPHT process, seeds containing pure graphite carbon are subjected to high pressure and temperatures reaching approximately 1,500 degrees Celsius.

❖ In the Chemical Vapor Deposition (CVD) process, a seed is placed inside a sealed chamber and exposed to carbon-rich gas. The chamber is heated to around 800 degrees Celsius. Over time, diamonds begin to form as the gas bonds with the seed. These diamonds are often referred to as Nano diamonds.

❖ One significant advantage of lab-grown diamonds is their potential to utilize renewable or clean energy sources, contributing to their superior environmental sustainability compared to traditional diamond mining. Additionally, the production of lab-grown diamonds eliminates the socially exploitative aspects often associated with diamond mining.



### **Application:**

❖ Lab-grown diamonds (LGDs) have significant industrial applications, being utilized in machinery and equipment. Their exceptional strength and hardness make them highly valuable as cutters.

❖ Pure synthetic diamonds find application in electronics as efficient heat spreaders for high-power laser diodes, laser arrays, and high-efficiency transistors.

### **What are the properties of LGDs?**

❖ Lab-grown diamonds (LGDs) possess fundamental properties similar to natural diamonds, including their optical dispersion, which gives them the signature diamond sheen. However, being created in controlled environments allows for the enhancement of many of their properties for various purposes.

❖ LGDs find extensive use in industrial applications, particularly in machines and tools. Their exceptional hardness and strength make them well-suited for cutting purposes. Additionally, pure synthetic diamonds exhibit high thermal conductivity while having negligible electrical conductivity.

❖ This combination of properties proves invaluable in the field of electronics, where such diamonds can serve as efficient heat spreaders for high-power laser diodes, laser arrays, and high-power transistors.

❖ As the Earth's natural diamond reserves continue to deplete, LGDs are gradually replacing the coveted gemstone in the jewelry industry. Crucially, similar to natural diamonds, LGDs undergo comparable processes of polishing and cutting that are necessary to impart diamonds their characteristic brilliance and luster.

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