



Vice President of India

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Vice-President of India

Occupies the second highest office in the country after President



Origin

Modelled on the lines of the American Vice-President

Const. Provisions

Article 63-71

Election

Indirectly elected by an electoral college

This electoral college consists of the elected members of LS and RS + nominated members of RS but not the members of State LAs (unlike electoral college for Presidential election)



The power of conducting elections to the office of VP rests with the ECI (Article 324)

Qualification

Citizen of India - at least 35 years of age

First VP and Current VP

Dr. S. Radhakrishnan
Jagdeep Dhankhar

Term of Office

5 years; eligible for re-election

Removal from Office

- VP may resign
- Removal by a effective majority of RS (all the then members) and LS agreeing to it (simple majority)
 - Resolution for removal is introduced only in RS
- Constitution mentions no ground for removal

Powers

- Ex-officio Chairman of RS - Powers and functions similar to the LS Speaker
- Acts as President (max 6 months) - when a vacancy occurs in his office

This is different from the office of American VP who succeeds to the Presidency when the office falls vacant

When acting as the President, VP does not perform the functions of the Chairman of RS



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Chairperson of Rajya Sabha

For Prelims: Article 89, Vice-President, Upper House, Deputy Chairman of the Rajya Sabha, Indian Constitution.

For Mains: Constitutional Provisions and Powers related to the Chairperson of Rajya Sabha.

Why in News?

Recently, [Rajya Sabha \(RS\)](#) welcomed its new Chairman, Jagdeep Dhankhar.

What are the Key Points Related to RS Chairman?

- **About:**
 - The [Vice-President](#) is the **ex-officio chairman of the Rajya Sabha**.
 - The Vice-President as Chairman of the Rajya Sabha is the **unchallenged guardian of the eminence and dignity** of the House.
- **Constitutional Provisions:**
 - **Article 64:** The Vice-President shall be ex officio Chairman of the Council of States and shall not hold any other office of profit.
 - **Article 89** of the Constitution provides provision for the **Chairman (Vice-President of India) and the Deputy Chairman of the Rajya Sabha**.
- **Power and Functions:**
 - The Chairman of the Rajya Sabha is **empowered to adjourn the House or to suspend** its sitting in the event of the absence of quorum.
 - The 10th Schedule of the Constitution empowers the **Chairman to determine the question** as to disqualification of a member of the Rajya Sabha on the ground of defection;
 - The Chairman's consent **is needed to raise a question of breach of privilege in the House**.
 - Parliamentary Committees, regardless of whether set up by the Chairman or by the House, work under the direction of the Chairman.
 - He nominates **members to different Standing Committees** and the Department-related Parliamentary Committees. He is the Chairman of the Business Advisory Committee, the Rules Committee and the General Purposes Committee.
 - It is the duty of the Chairman **to interpret the Constitution and rules so far as matters** in or relating to the House are concerned, and no one can enter into any argument or controversy with the Chairman over such interpretation.
- **Removal of Chairperson:**
 - He can only be removed as the chairman of Rajya Sabha **when he is removed from the office of Vice-President of India**.
 - While the resolution is in effect for the removal of Vice-President, he cannot preside **over the house as chairman**, although he can be part of the house.

What are the Provisions Related to the Vice-President?

- **Vice President:**

- The Vice President is the **second highest constitutional office in India. He/She serves for a five-year term**, but can continue to be in office. Irrespective of the expiry of the term, until the successor assumes office.
- The Vice President **may resign his office by submitting his resignation to the President of India**. The resignation becomes effective from the day it is accepted.
- The Vice President can be removed from office by a resolution of the Council of States (**Rajya Sabha**), passed by a majority of its members at that time and agreed to by the House of the People (**Lok Sabha**). A resolution for this purpose may be moved only after a notice of at least a minimum of 14 days has been given of such an intention.
- **Eligibility:**
 - Should be a citizen of India.
 - Should have completed 35 years of age.
 - Should be qualified for election as a member of the Rajya Sabha.
 - Should not hold any office of profit under the Union government or any state government or any local authority or any other public authority.
- **Electoral College:**
 - As per Article 66 of the Constitution of India, the Vice-President is elected by the members of the Electoral College.
 - Electoral College consists of:
 - Elected members of Rajya Sabha.
 - Nominated members of Rajya Sabha.
 - Elected members of Lok Sabha.
- **Election Procedure:**
 - As per **Article 68 of the Constitution**, the election to fill the vacancy caused by the **expiration of the term of office of the outgoing vice-president** is required to be completed before the expiration of the term.
 - **Article 324** of the Constitution read with the Presidential and Vice-Presidential Elections Act, 1952 and the Presidential and Vice-Presidential Elections Rules, 1974, vests the superintendence, direction and control of the conduct of election to the office of the Vice-President of India in the Election Commission of India.
 - The notification for election shall be issued on or after the sixtieth day before the expiration of the term of office of the outgoing Vice-President.
 - Since all the electors are members of both Houses of Parliament, **the value of the vote of each Member of Parliament would be the same i.e.,1 (one)**.
 - The Election Commission, **in consultation with the Central Government, appoints the Secretary-General of Lok Sabha** and Rajya Sabha, by rotation, as the Returning Officer.
 - Accordingly, the Secretary-General, Lok Sabha will be appointed as the Returning Officer for the present election to the Office of the Vice-President of India.
 - The Commission also **decides to appoint Assistant Returning Officers** in Parliament House (Lok Sabha) to assist Returning Officers.
 - As per **Rule 8 of the Presidential and Vice-Presidential Elections Rules, 1974**, polls for the election are taken in the Parliament House.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Consider the following statements: (2013)

1. The Chairman and the Deputy Chairman of the Rajya Sabha are not the members of that House.
2. While the nominated members of the two Houses of the Parliament have no voting right in the presidential election, they have the right to vote in the election of the Vice President.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (b)

[Source: IE](#)

RBI's Monetary Policy Review

For Prelims: RBI, Monetary Policy Committee (MPC), Instruments of Monetary Policy, Various Policy Stances of RBI

For Mains: Monetary Policy, Growth & Development, Monetary policy and its instruments

Why in News?

Recently, the [Monetary Policy Committee \(MPC\)](#) of the [Reserve Bank of India \(RBI\)](#) unveiled its latest review of the **Monetary Policy**.

- RBI said “growth prospects across the world are dampening. Financial markets remain nervous and are characterised by high volatility and price swings.”

What are the Highlights of the Review?

- **GDP Growth Forecast:**
 - The MPC slashed its [Gross Domestic Product \(GDP\)](#) growth estimate to **6.8% for the fiscal year 2022-23**, from 7% earlier.
 - This comes a day after the [World Bank](#) raised its growth forecast to **6.9% for financial year 2022-23** from a revised 6.5% accounted in October 2022.
 - **Real GDP growth** is projected at 7.1% for Q1:2023-24 and at 5.9% for Q2.
 - As the data shows, in September 2022, it cut the GDP forecast for the full year but raised the quarterly GDP forecast.
- **Inflation & Interest Rates:**
 - The MPC has **maintained the forecast for headline inflation** (the total inflation in an economy) in the financial year 2022-23 at **6.7%**.
 - RBI expects headline inflation to stay above the 6% mark for 15 straight months. Even after that, hitting the 4% level will likely take time.
- **Repo Rate:**
 - The MPC **increased the repo rate by 35 basis points (bps) to 6.25%**, and the [Standing Deposit Facility](#) stands raised to 6%.

What is Monetary Policy Framework?

- **About:**
 - In May 2016, the **RBI Act was amended** to provide a **legislative mandate to the central bank** to operate the country's monetary policy framework.
- **Objective:**
 - The framework aims at **setting the policy (repo) rate** based on an assessment of the **current and evolving macroeconomic situation**, and modulation of liquidity conditions to anchor money market rates at or around the repo rate.

- **Reason for Repo Rate as Policy Rate:**
 - Repo rate changes transmit through the [money market](#) to the entire financial system, which, in turn, **influences aggregate demand**.
 - Thus, it is a key determinant of inflation and growth.

What is Monetary Policy Committee?

- **Origin:**
 - Under **Section 45ZB of the amended (in 2016) RBI Act, 1934**, the central government is empowered to constitute a **six-member Monetary Policy Committee (MPC)**.
- **Objective:**
 - Further, Section 45ZB lays down that “the Monetary Policy Committee shall **determine the Policy Rate required to achieve the inflation target**”.
 - The decision of the Monetary Policy Committee shall be **binding on the Bank**.
- **Composition:**
 - Section 45ZB says the MPC shall consist of 6 members:
 - RBI Governor as its ex officio chairperson,
 - Deputy Governor in charge of monetary policy,
 - An officer of the Bank to be nominated by the Central Board,
 - Three persons to be appointed by the central government.
 - This category of appointments must be from “persons of ability, integrity and standing, having knowledge and experience in the field of economics or banking or finance or monetary policy”.

What are the Instruments of Monetary Policy?

- Repo Rate
- Standing Deposit Facility (SDF) Rate
- [Marginal Standing Facility \(MSF\) Rate](#)
- [Liquidity Adjustment Facility \(LAF\)](#)
- LAF Corridor
- [Main Liquidity Management Tool](#)
- Fine Tuning Operations
- [Reverse Repo Rate](#)
- Bank Rate
- [Cash Reserve Ratio \(CRR\)](#)
- [Statutory Liquidity Ratio \(SLR\)](#)
- [Open Market Operations \(OMOs\)](#)

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q1. If the RBI decides to adopt an expansionist monetary policy, which of the following would it not do (2020)

1. Cut and optimize the Statutory Liquidity Ratio
2. Increase the Marginal Standing Facility Rate
3. Cut the Bank Rate and Repo Rate

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Q2. With reference to Indian economy, consider the following: (2015)

1. Bank rate
2. Open market operations
3. Public debt
4. Public revenue

Which of the above is/are component/ components of Monetary Policy?

- (a) 1 only
(b) 2, 3 and 4
(c) 1 and 2
(d) 1, 3 and 4

Ans: (c)

Mains

Q. Do you agree with the view that steady GDP growth and low inflation have left the Indian economy in good shape? Give reasons in support of your arguments. **(2019)**

Source: IE

Calling Name Presentation

For Prelims: Calling Name Presentation, Telecom Regulatory Authority of India, TSP.

For Mains: Significance and Challenges related to Calling Name Presentation.

Why in News?

Recently, the [Telecom Regulatory Authority of India \(TRAI\)](#) has proposed the introduction of **Calling Name Presentation (CNAP)**.

What is Calling Name Presentation?

- The feature would provide the called individual with information about the calling party (similar to 'Truecaller' and 'Bharat Caller ID & Anti-Spam').
- The idea is to **ensure that telephone subscribers are able to make an informed choice about incoming calls and curb harassment** by unknown or spam callers.

What is its Purpose?

- Existing technologies present the number of the calling entity on the potential receiver's handset.
- Since subscribers are not given the name and identity of the caller, they sometimes choose not to answer them believing it could be unsolicited commercial communication from unregistered telemarketers. This could lead to even genuine calls being unanswered.

- **Truecaller's '2021 Global Spam and Scam Report'** revealed that the average number of spam calls per user each month in India, stood at 16.8 while total spam volumes received by its users were in excess of 3.8 billion calls in October 2022 alone.

What are the Challenges?

- **Latency:**
 - There is a likelihood of **a slight increase in the time taken to set up a call.**
 - The responsiveness might also **suffer when moving from a faster wireless network (4G or 5G) to a comparatively slower one (2G or 3G),** or vice-versa.
- **Privacy:**
 - It is not particularly clear how the (CNAP) mechanism would balance the **caller's right to remain anonymous,** an essential component of the right to privacy.
 - To put it into perspective, an individual **may opt to remain anonymous for multiple reasons,** for example, whistle-blowers or employees being harassed.
 - It would be ideal that a framework is developed along those lines rather than asking a centralized database operated by a third party to host and share data.

Way Forward

- Just by showing the identity would not mean much, once the system (to identify and mark spammers) gets built and hundreds of people are able to utilize the system, only then would the system have a meaningful impact.
- The interface should be user friendly with an effective mechanism. Active participation from the **subscribers would ensure that spammers are rightly identified** and are unable to make further calls.
- The government must **also invest in digital literacy, skilling citizens to navigate and use the tech better,** ensuring they do not share their data indiscriminately and are informed about dangers such as financial frauds and spoofing.

[Source: TH](#)

ChatGPT Chatbot

For Prelims: Chatbot and Types, Artificial Intelligence.

For Mains: ChatGPT Chatbot, its usage and limitations.

Why in News?

Recently, OpenAI has introduced a new [chatbot](#) called **ChatGPT, which is** a 'conversational' AI and will answer queries just like a human would.

What is ChatGPT?

- **About:**
 - The ChatGPT can answer **"follow-up questions",** and can also "admit its mistakes, challenge incorrect premises, and **reject inappropriate requests.**"
 - It is based on the **company's GPT 3.5 series of language learning models (LLM).**
 - GPT stands for Generative Pre-trained Transformer 3 and this is a kind of **computer**

language model that relies on deep learning techniques to produce human-like text based on inputs.

- The model is trained to predict what will come next, and **that's why one can technically have a 'conversation' with ChatGPT.**
- The chatbot was also trained using **Reinforcement Learning from Human Feedback (RLHF).**

▪ **Usage:**

- It can be used in **real-world applications** such as digital marketing, online content creation, answering customer service queries or as some users have found, even to help debug code.
- The bot can respond to a large range of questions **while imitating human speaking styles.**
- It is being seen as a replacement for the basic emails, party planning lists, CVs, and even college essays and homework.
- It can also be used **to write code, as examples have shown.**

▪ **Limitations:**

- The chatbot **displayed clear racial and sexist biases**, which remains a problem with almost all AI models.
- The chatbot gives answers which are grammatically correct and read well- though some have pointed out that **these lack context and substance**, which is largely true.
- ChatGPT occasionally produces inaccurate information and that **its knowledge is restricted to global events** that occurred before 2021.

What is a Chatbot?

▪ **About:**

- Chatbots, also called chatterbots, is a form of [Artificial Intelligence \(AI\)](#) used in messaging apps.
- This tool helps add convenience for customers—**they are automated programs that interact with customers like a human would** and cost little to nothing to engage with.
 - Key examples are **chatbots used by businesses in Facebook Messenger, or as virtual assistants**, such as Amazon's Alexa.
- Chatbots tend to operate in one of two ways—either via **machine learning or with set guidelines.**
- However, due to advancements in AI technology, chatbots using set guidelines are becoming a historical footnote.

▪ **Types:**

◦ **Chatbot with Set Guidelines:**

- It can only respond to a **set number of requests and vocabulary and is only as intelligent** as its programming code.
- An example of a **limited bot is an automated banking bot** that asks the caller some questions to understand what the caller wants to do.

◦ **Machine Learning Chatbot:**

- A chatbot that functions through machine learning have an [artificial neural network](#) inspired by the neural nodes of the human brain.
- The bot is programmed to self-learn as it is introduced to new dialogues and words.
- In effect, as a **chatbot receives new voice or textual dialogues**, the number of inquiries that it can reply to and the accuracy of each response it gives increases.
 - Meta (as Facebook's parent company is now known) has a machine learning chatbot that creates a platform for companies to interact with their consumers through the Messenger application.

▪ **Advantages:**

- Chatbots are convenient for **providing customer service and support 24 hours a day, 7 days a week.**
- They also free up phone lines and are far less expensive over the long run than hiring people to perform support.
- Using AI and **natural language processing, chatbots are becoming better at understanding what customers want** and providing the help they need.
- Companies also like chatbots because they can collect data about customer queries,

response times, satisfaction, and so on.

▪ **Disadvantages:**

- Even with natural language processing, they may **not fully comprehend a customer's input and may provide incoherent answers.**
- Many chatbots are also limited in the scope of queries that they are able to respond to.
- Chatbots can be **expensive to implement and maintain**, especially if they must be customized and updated often.
- The challenges of AI metamorphosing **into sentient are far in the future; however, unethical AI perpetuating historical bias** and echoing hate speech are the real dangers to watch for.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q1. With the present state of development, Artificial Intelligence can effectively do which of the following? (2020)

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

- (a) 1, 2, 3 and 5 only
(b) 1, 3 and 4 only
(c) 2, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Q2. Consider the following pairs: (2018)

	Terms sometimes seen in news	Context/Topic
1.	Belle II experiment	Artificial Intelligence
2.	Blockchain technology	Digital/Cryptocurrency
3.	CRISPR-Cas9	Particle Physics

Which of the pairs given above is/are correctly matched?

- (a) 1 and 3 only
(b) 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

Ans: (b)

Source: IE

Amalgamation of ODOP with DEH Initiative

For Prelims: One District One Product (ODOP), Districts as Export Hub (DEH) Initiative, PMFME Scheme, GeM Portal.

For Mains: Significance of One District One Product and Districts as Export Hub (DEH) Initiative, Ways to Improve Agricultural Marketing.

Why in News?

Recently, [One District One Product \(ODOP\)](#) approach has been operationally merged with 'Districts as Export Hub (DEH)' initiative.

What is the ODOP Approach?

▪ About:

- ODOP is an approach adopted under the [Pradhan Mantri Formalisation of Micro food processing Enterprises \(PMFME\) Scheme](#).
- It will **provide for the framework for value chain development and alignment of support infrastructure of the PMFME scheme**. There may be more than one cluster of ODOP products in one district.
- There **may be a cluster of ODOP products consisting of more than one adjacent district in a State**.
- The States would **identify food products for districts** keeping in view the existing clusters and availability of raw material.
- The **ODOP could be a perishable produce** based or cereal based or a food item widely produced in an area. E.g., mango, potato, pickle, millet-based products, fisheries, poultry, etc.
- Certain other **traditional and innovative products** including waste to wealth products could be supported under the Scheme.
 - For example, **honey, [minor forest products](#) in tribal areas, traditional Indian herbal edible items like turmeric, amla, haldi**, etc.

▪ Significance:

- **Adopting a cluster approach** will help in the **development of specific agriproducts in districts having a comparative advantage**.
- It would lead to easing in providing **common facilities and other support services**.

What are the Achievements of ODOP?

- The **ODOP [Government e-Marketplace \(GeM\) Bazaar](#)** was launched in August 2022 with over **200 product categories to promote sales and procurement of ODOP products** across the country.
- ODOP products were **showcased in various International forums** such as [World Economic Forum's Davos Summit](#), [International Yoga day \(IYD\)](#), etc.
- The ODOP initiative was identified for the **prestigious Prime Minister's Award for Excellence in Public Administration in Holistic Development**.
- **Related to DEH:**
 - **State Export Promotion Committee (SEPC) and District Export Promotion Committee (DEPC) have been constituted** in all States/Union Territories (UTs).
 - **Products/services with export potential have been identified** in 734 Districts across the country.
 - **State Export Strategy** has been prepared in 28 States/UTs
 - **Draft District Export Action Plan (DEAP)** has been prepared for 570 Districts
 - **A web portal to monitor the progress of DEAP** in all the Districts has been developed by the **Director General of Foreign Trade (DGFT)**.

What is 'Districts as Export Hub' Initiative?

- DEH aims to **convert each district into an export hub** for which Department of Commerce, Ministry of Commerce & Industry through DGFT is engaging with State / UT Governments.
- As part of this initiative, **an institutional mechanism is being set up in each District in the form of DEPCs** that may be headed by the District Magistrate/Collector/Deputy Collector/District Development Officer of the District and various other stakeholders as its members.
- The primary function of the DEPC will be **to prepare and act on DEAP in collaboration with all the relevant stakeholders** from the center, State and the District level.
- DEAP will include **clear identification of products (goods and services) with export potential in the District**. It may include:
 - **Institutional/other responsibilities**
 - **Specifics of policy**, regulatory and operational reform, and infrastructure/utilities/logistics interventions
 - **Import export formalities**
 - **Identification of bottlenecks/Issues** in [Geographical Identification \(GI\)](#) production, registration, marketing and its exports.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Can the strategy of regional-resource based manufacturing help in promoting employment in India? **(2019)**

Q. What are the main bottlenecks in upstream and downstream process of marketing of agricultural products in India? **(2022)**

[Source: PIB](#)

Import & Smuggling of Gold

For Prelims: Import of Gold, Smuggling of Gold, North East Smuggling Route

For Mains: Smuggling of Gold, Role of North East Area in Gold Smuggling

Why in News?

Recently, the **Finance Minister of India** has said that officials should find out whether there is a **correlation between higher gold imports and smuggling**, and whether a **pattern is emerging in the detection of smuggling**.

- It has been noted that **whenever there is a surge in gold imports**, gold smuggling also **typically goes up**.

How much Gold is Smuggled into India?

- **About:**

- According to the Directorate of Revenue Intelligence's (DRI's) **Smuggling in India Report 2021-22**, a total **833 kg of smuggled gold**, worth around Rs 500 crore, was **confiscated in FY 2021-22**.
 - 2020-21 had witnessed a decline in smuggling from the Gulf region because flights were cancelled due to the **Covid-19 pandemic**.
- More than 11 tonnes of gold have been seized in 16,555 smuggling cases at airports across India in the five years ending August 2020.
- The figures reported was of the gold that was seized, the smuggling that succeeded could be much more than what the agencies confiscated.
- According to the **World Gold Council (WGC)**, smuggling could increase by 33% to touch 160 tonnes in 2022 compared to the pre-Covid period due to the increase in the import duty on gold to 12.5% from 7.5%.
- In the last 10 years, Maharashtra has smuggled most of the Gold in India followed by Tamil Nadu and Kerala.
- **North East Smuggling Route:**
 - According to the DRI Report, 73% of the gold caught had been **brought through Myanmar and Bangladesh**.
 - 37% of all the gold seized in FY22 was from Myanmar. 20% of it originated from West Asia.
 - Many international reports suggest that smuggled gold is brought into Myanmar from **China through the towns of Ruili and Muse** on the Chinese and Myanmar sides of the border respectively.
 - Muse is located in the **Shan State in Northeastern Myanmar** and Ruili is in the **Dehong Dai Prefecture of Yunnan Province, China**.

How much Gold does India Import?

- Gold imports through official channels, involving a major outflow of foreign exchange, have also been rising.
 - Imports worth **Rs 3.44 lakh crore** were reported in 2021-22, up from **Rs 2.54 lakh crore** in 2020-21.
- According to the **World Gold Council**, India, the world's second-biggest gold consumer after China, imports about **900 tonnes of gold a year**, consumption in India was 797.3 tonnes in 2021 (Highest in past 5 years).
- India imports **gold dore bar** as well as **refined gold**.
 - In the last five years, imports of gold dore bars made up 30% of the total official imports of the yellow metal in India.

What is the Directorate of Revenue Intelligence?

- It is India's chief **anti-smuggling intelligence, investigations and operations agency**.
- It works under the **Central Board of Indirect Taxes and Customs (CBIC)**, Ministry of Finance.
- It is headed by a **Director General** of the rank of **Special Secretary** to the Government of India.
- DRI works to **secure India's national and economic security** by preventing the outright smuggling of firearms, gold, narcotics, fake Indian Currency notes, antiques, wildlife and environmental products.
 - Moreover, it also works to prevent the proliferation of black money, commercial frauds and trade-based money laundering.
- It is headquartered in **New Delhi**.

[Source: IE](#)

SpaceTech Innovation Network: ISRO

Why in News?

The [Indian Space Research Organisation \(ISRO\)](#) has signed an MoU with Social Alpha, a multistage innovation curation and venture development platform to launch **SpaceTech Innovation Network (SpIN)**.

What is SpIN?

▪ About:

- SpIN is India's **first dedicated platform for innovation, curation, and venture development** for the burgeoning [space entrepreneurial ecosystem](#).
- The SPIN platform would create a **level playing field for various stakeholders to collaborate and contribute to the space ecosystem** in the country.
- SpIN will **primarily focus on facilitating space tech entrepreneurs in three distinct innovation categories:**
 - Geospatial Technologies and Downstream Applications
 - Enabling Technologies for Space & Mobility
 - Aerospace Materials, Sensors, and Avionics.

▪ Significance:

- Innovative technologies are expected **to bring a paradigm shift in utilising the space applications to maximise the economic, social, and environmental benefits** for the larger society.

▪ Innovation Challenge:

- SpIN has launched its first innovation challenge **for developing solutions in areas of maritime and land transportation**, urbanization, mapping, and surveying.
- The selected start-ups and innovators **will be able to access both Social Alpha's and ISRO's infrastructure** and resources as per the prevailing guidelines.
- They will be provided active hand-holding in critical areas, including access to product design, testing and validation infrastructure, **and [intellectual property management](#)**.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. In the context of space technology, what is "Bhuvan", recently in the news? (2010)

- (a) A mini satellite launched by ISRO for promoting the distance education in India
- (b) The name given to the next Moon Impact Probe, for Chandrayan-II
- (c) A geoportal of ISRO with 3D imaging capabilities of India
- (d) A space telescope developed by India

Ans: (c)

[Source: TH](#)

Binary Merger of Gamma Ray Burst with Kilonova

Why in News?

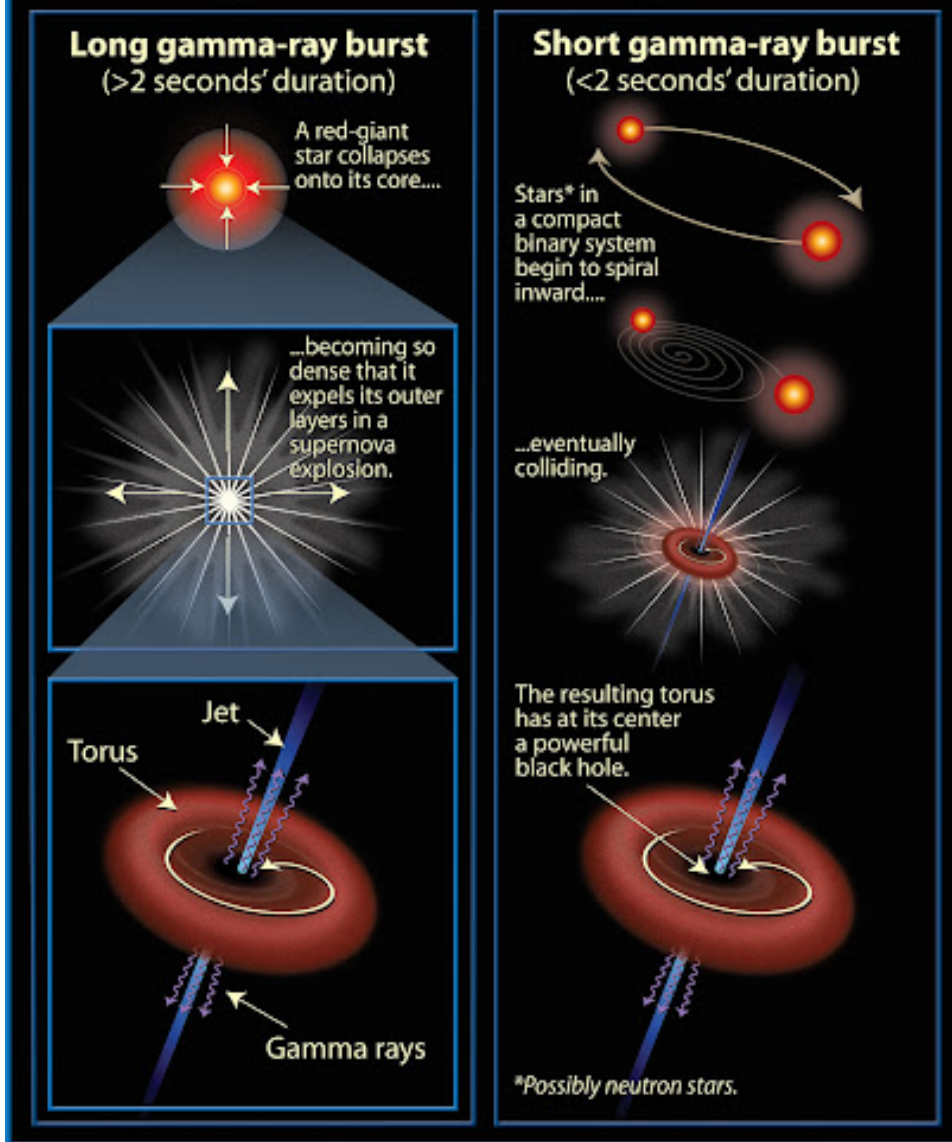
Recently, a **rare astronomical event** involving a **compact binary merger emitting long [Gamma Ray Burst \(GRB\)](#) twinned with a kilonova emissions** was reported. This **never before scientifically accepted or proven combination** was also confirmed by **India's largest optical telescope, [Devasthal Optical Telescope \(DOT\)](#)**.

- The GRB lasted for over 50 seconds and **identified as GRB211211A**.
- Kilonovae occur when two compact objects, like **binary neutron stars or a neutron star and a black hole, collide**.

What are Gamma-Ray Bursts?

- **About:**
 - GRBs are **massive but extremely bright, high-energy short gamma radiations** which get released **when massive stars collapse or die in the Universe**.
 - They are the **most powerful events** in the universe, detectable across billions of **light-years**.
 - A light-year is the **distance a beam of light travels in a single Earth year**, or 9.5 trillion kilometers.
 - Astronomers classify them as **long or short based on whether the event lasts for more or less than two seconds**.

Gamma-Ray Bursts (GRBs): The Long and Short of It



▪ Long GRBs:

- They observe long bursts **in association with the demise of massive stars.**
- When a star much more massive than the Sun **runs out of fuel, its core suddenly collapses and forms a [black hole](#).**
 - Black hole refers to a **point in space where matter is so compressed** as to create a gravity field from which even light cannot escape.
- As matter swirls toward the black hole, some of that **escapes in the form of two powerful jets** that rush outward at almost the speed of light in opposite directions.
- Astronomers only detect a GRB **when one of these jets happens to point almost directly toward Earth.**
- Each jet drills through the star, producing a pulse of gamma rays - the highest-energy form of light - that can last up to minutes. **Following the burst, the disrupted star then rapidly expands as a [supernova](#).**
 - A supernova is the name given to an **exploding star that has reached the end of its life.**

▪ Short GRB:

- Short GRB, on the other hand, forms when pairs of compact objects - such as **[neutron stars](#), which also form during stellar collapse - spiral inward over billions of years and collide.**
 - A neutron star comprises one of the **possible evolutionary end-points of high mass stars.**

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. Recently, scientists observed the merger of giant 'blackholes' billions of light-years away from the Earth. What is the significance of this observation? (2019)

- (a) 'Higgs boson particles' were detected.
- (b) 'Gravitational waves' were detected.
- (c) Possibility of inter-galactic space travel through 'wormhole' was confirmed.
- (d) It enabled the scientists to understand 'singularity'.

Ans: (b)

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