

**SCIENCE AND TECHNOLOGY**

❖ **How Google blocks accounts over child sexual abuse material**

❖ **CONTEXT: A parent in San Francisco and another in Texas lost access to their Google accounts after the system flagged private images of their children as child sexual abuse material (CSAM). The story, reported by The New York Times, highlights the complicated terrains around user privacy and CSAM tracking that companies like Google deploy.**

❖ **Flagged for potential abuse**

- A father in San Francisco had taken a picture of his son's genitalia to send to a doctor. He was using an Android phone, and the picture also got backed up to his Google Photos account. But Google's system flagged this as CSAM, and his account access was suspended. The father also faced a police investigation. This is because if and when Google's systems detect CSAM they also make a "CyberTipline" report to the National Centre for Missing and Exploited Children (NCMEC) in the US.
- The NCMEC can then involve law enforcement agencies. A similar tale unfolded with another father in Texas. While police cleared both parents, Google has not given them their access back.
- This is not the first time this issue of Google automatically scanning photos and detecting CSAM has been reported. In 2020, Forbes reported how a warrant was issued against an artist based in Kansas after Google identified some of his art works as CSAM.
- According to Google's own transparency report, it sent close to 458,178 reports about CSAM to the NCMEC in the US and reported over 3.2 million pieces of content during the period of June to December, 2021. Also, 140,868 accounts were disabled during the same period.

❖ **How Google scans for CSAM**

- Google relies on "automated detection and human review, in addition to relying on reports submitted by users and third parties, such as NGOs, to detect, remove, and report CSAM on our platforms.
- But it is primarily using two main technologies to scan and tag CSAM. This applies to photos, videos, and files you might upload on Google Drive, Google Photos, etc.
- The first technology is hash matching, and this includes YouTube's CSAI (Child Sexual Abuse Imagery) match technology. CSAI Match is technology deployed on YouTube to fight videos of child abuse, and can spot "re-uploads of previously identified child sexual abuse material in videos. This particular API can also be used by other NGOs, companies to find CSAM by matching it against Google's databases.
- Basically, every time Google detects an image potentially identified as CSAM, it is assigned a hash or numeric value, and then it is matched against an earlier hash from an existing database.
- Google is not the only one using this hash matching technology. Companies like Microsoft, Facebook, Apple also deploy similar techniques.
- What hash matching does is that the company does not store the CSAM itself, but a value or hash that represents the image, video or content in question. If a similar hash is found for another photo or video, then it likely is CSAM, and the content in question is flagged.
- But Google also deploys machine learning tools to search for CSAM, and it had first announced this back in 2018. It notes that these "machine learning classifiers can discover never-before-seen CSAM".
- The technology relies on machine learning and deep neural networks for image processing. The advantage here is that one can find content that might not be part of the hashed database.
- Google made technology available for free to NGOs and its industry partners at the time of the announcement. Google also notes that content identified as CSAM by its machine learning technology is "then confirmed by our specialist review teams".
- It is not clear what technology was used to identify CSAM in the reported cases.

❖ **Google policy on the matter**

- Google's policy page mentions a list of content banned and can make you lose access to its services. Regarding the definition of child pornography, Google uses the one set by the US government. So any image sexually exploitative of a minor (under 18 years) is defined as child pornography.
- It has a detailed segment on CSAM and notes clearly that users should not "create, upload, or distribute content that exploits or abuses children," and that "this includes all child sexual abuse materials". It also encourages users to report abuse when they see content which is CSAM.
- It also prohibits the use of its products "to endanger children". The policy notes that using Google products to 'groom children' for sexual content, extortion (blackmailing or threatening a child), "sexualisation of a minor", "trafficking of a child," are all banned.

- The policy clearly states that users should also not “distribute content that contains sexually explicit material, such as nudity, graphic sex acts, and pornographic material. This includes driving traffic to commercial pornography sites”. It allows “nudity for educational, documentary, scientific, or artistic purposes.”
- ❖ **Delay in restoring access**
- While CSAM remains a serious problem, the report highlights how fighting it can often mean navigating tricky waters. Balancing user privacy and fighting problematic content is clearly easier said than done.
- In both parents’ cases, they took what was an innocent picture, and both lost access. While both were cleared by the police, Google has not restored their accounts. For parents, the case could serve as an eye-opener that they may need to delete all those accidental nude photos of their toddlers or babies.

**CLIMATE**

❖ **Europe’s great drought**

❖ **CONTEXT:** European media has been full of dramatic pictures of drying, exposed riverbeds. Some of Europe’s biggest rivers — Rhine, Po, Loire, Danube — which are usually formidable waterways, are unable to support even mid-sized boats. As water levels have fallen, remains of sunken ships and ominously named hunger stones — rocks engraved by previous generations during earlier periods of extraordinary dryness — have come out of erstwhile depths.

- The drought has been billed as the worst in 500 years. It is being said that never has a European summer been so dry since 1540, when a year-long drought killed tens of thousands of people. The dry spell this year follows a record-breaking heatwave that saw temperatures in many countries rise to historic highs.
- The impact has been debilitating. Water transport has suffered badly, and is having cascading effects. Power production has been hit, leading to electricity shortages and a further increase in energy prices already pushed high by the war in Ukraine. Food is sharply more expensive in many countries, and drinking water is being rationed in some regions.
- ❖ **‘Worst in 500 years’**
- Earlier European droughts — such as those in 2003, 2010, and 2018 — too were compared to the 1540 event. Much like now, the 2018 drought was described as the “worst in 500 years”. According to scientists the recent could turn out to be worse than 2018, though data were still being analysed.

**TYPES OF DROUGHT**

Drought is a rainfall-scarce period, affecting the availability of water for irrigation, drinking, etc. They are classified into three types.

**METEOROLOGICAL** drought is a prolonged dry spell in periods when rainfall is expected

**HYDROLOGICAL** drought is when scarcity of water begins to hit normal supplies in the system

**AGRICULTURAL** drought is when scarcity of water begins to affect the agricultural production

In Europe, all three kinds are being observed currently, varying in degrees in different areas.

- The “worst in 500 years” description may be still not settled, but the impacts of this event are expected to be far worse than anything experienced in the recent past. Europe has been facing large scale climatic anomalies for over six months — precipitation has been far less than usual, while temperatures have soared to unprecedented levels. And this has come on top of the massive energy and food-supply implications of the Ukraine war.
- ❖ **Waterways and power**
- Apart from agriculture and drinking water supplies, the most visible impact has been the disruption in Europe’s waterways. Europe depends heavily on its rivers to move cargo in an economical manner, including coal to power plants. With water levels down to less than a metre in some stretches, most large ships have been rendered unusable.
- Supply disruptions in coal have hit power generation. Lack of adequate water has affected the operation of nuclear power plants, which use large amounts of water as coolant. The result has been a shortage of electricity

and an unprecedented rise in energy prices. Household energy costs in the UK are projected to double by October from the levels of April.

❖ **A grim outlook**

- According to an “analytical report” of the Global Drought Observatory (GDO), an agency of the European Commission, released on recently, about 64% of the continent’s landmass was experiencing drought conditions, as per data available till August 10. And the situation was only “worsening” as of that date.
- Nearly 90% of the geographical area in Switzerland and France, about 83% in Germany, and close to 75% in Italy, was facing agricultural drought. Some areas, especially the UK, have received rain in the last one week, but it has made only a marginal difference to the overall situation.
- The situation is unlikely to improve substantially in the coming months. The GDO’s report suggests that the prevailing conditions could extend up to November.

❖ **No rain, record heat**

- Droughts are part of the natural climate system, and are not uncommon in Europe. It is the severity of this drought that is making it stand out. The extraordinary dry spell has been the result of a prolonged and significant deviation from normal weather patterns.
- Rainfall has been scanty in several countries. The UK had its driest July since 1935, and France since 1959. The Netherlands, which

receives plenty of rainfall, is having one of the driest years ever, and Germany received only half its normal rain in July. In fact, rainfall has been below normal since the winter.

- In addition, unusually high temperatures have led to increased evaporation of surface water and soil moisture. The severity of the current drought can also, at least partially, be attributed to the fact that it has appeared so soon after the 2018 event. Many areas in Europe were still to recover from that drought. Soil moisture had not been restored to normal, and the current dry spell has sapped it further of moisture.

❖ **Drought in China, US too**

- Many parts of China too are headed towards a serious drought, being described as the worst in 60 years. The country’s longest river, Yangtze, which caters to about a third of the Chinese population, is seeing water levels drop to record lows, according to a report in the South China Morning Post. Two of the country’s biggest freshwater lakes, Poyang and Dongting, have touched their lowest levels since 1951, the report said.
- The water scarcity is leading to problems similar to those in Europe. Power shortages in some areas have begun to force factories to shut, adding to the strain on global supply chains.
- Over 40% of the area in the United States too is under drought conditions currently, affecting about 130 million people, according to the US government.

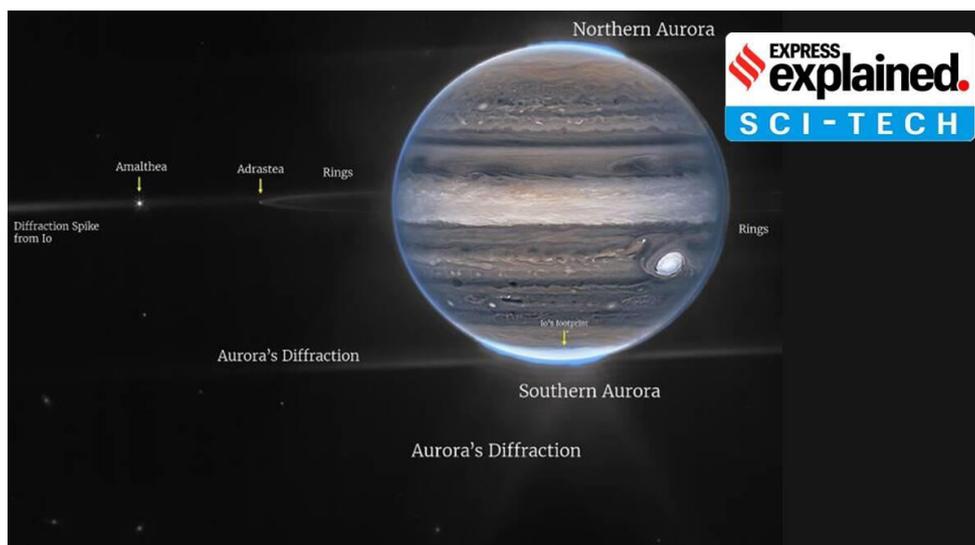
**PRELIMS**

**1. Jupiter like never seen before, through the Webb telescope**

❖ **CONTEXT:** The James Webb Space Telescope, NASA’s latest and most powerful telescope, has captured new images of our solar system’s largest planet, Jupiter, presenting it in a never before seen light. The photographs published recently have captured a new view of the planet, presenting in detail its massive storms, colourful auroras, faint rings and two small moons — Amalthea and Adrastea.

❖ **Unprecedented view**

- According to NASA, while most are familiar with the yellow and reddish-brown gas giant, the telescope’s Near-Infrared Camera, with its specialized infrared filters, has shown Jupiter encompassed in blue, green, white, yellow and orange hues. Since infrared light is not visible to the human eye, the images were artificially coloured to match those on the visible spectrum, so that the planet’s distinctive features could stand out.



- Jupiter's famous Great Red Spot, a storm so big that it could swallow Earth, appeared bright white in the image, since it was reflecting a lot of sunlight.
- According to NASA blog post quoted Heidi Hammel, the brightness here indicates high altitude — so the Great Red Spot has high-altitude hazes, as does the equatorial region. The numerous bright white 'spots' and 'streaks' are likely very high-altitude cloud tops of condensed convective storms.

❖ **The Webb telescope**

- NASA's \$10 billion James Webb Telescope was developed with the assistance of the European Space Agency and the Canadian Space Agency.
- It was launched to space on December 25, 2021 and is currently observing from Lagrange point 2, approximately 1.5 million km beyond Earth's orbit around the Sun. The telescope released its first image on July 11 2022.

❖ **The technology**

- The images taken by the James Webb telescope don't arrive on Earth as we currently see them, according to NASA's blog post. Instead, scientists receive raw data about the brightness of the light captured on Webb's detectors, which is then processed and translated into images by the Space Telescope Science Institute (STScI), Webb's mission and science operations centre.

**2. Overseas investment rules: The changes**

❖ **CONTEXT: The Finance Ministry released the Foreign Exchange Management (Overseas Investment) Rules, 2022 subsuming extant regulations for Overseas Investments and Acquisition and Transfer of Immovable Property outside India Regulations, 2015.**

- The new rules stipulate that any Indian resident who has an account appearing as a non-performing asset; or is classified as a wilful defaulter by any bank; or is under investigation by a financial service regulator or by investigative agencies in India, will have to seek a no objection certificate before making any overseas financial commitment.

❖ **What are the tweaks in overseas investment norms?**

- Any resident in India acquiring equity capital in a foreign entity or overseas direct investment (ODI), will have to submit an Annual Performance Report (APR) for each foreign entity, every year by December 31.
- No such reporting shall be required where a person resident in India is holding less than 10% of the equity capital without control in the foreign entity and there is no other financial commitment other than equity capital or a foreign entity is under liquidation.
- Any resident individual can make ODI by way of investment in equity capital or overseas portfolio investment (OPI) subject to the overall ceiling under the Liberalised Remittance Scheme (LRS) of the Reserve Bank. Currently, the LRS permits \$2,50,000 outward investment by an individual in a year.
- According to the Finance Ministry these norms make it easier for domestic corporate to invest abroad. In view of the evolving needs of businesses in India, in an increasingly integrated global market, there is a need of Indian corporates to be part of the global value chain. The revised regulatory framework for overseas investment provides for simplification of the existing framework for overseas investment and has been aligned with the current business and economic dynamics.

- Clarity on Overseas Direct Investment and Overseas Portfolio Investment has been brought in and various overseas investment related transactions that were earlier under approval route are now under automatic route, significantly enhancing “ease of doing business.
- In 2021, the government of India, in consultation with the Reserve Bank, undertook a comprehensive exercise to simplify these regulations. With regard to corporate an Indian entity can make OPI not exceeding 50% of its net worth as on the date of its last audited balance sheet.
- ESOPs have been permitted for Indian employees in foreign parent or subsidiary of Indian parent. Gift of foreign securities permitted from a non-resident to any resident, subject to FCRA compliance, currently gift is permitted only to a relative.
- ❖ **What are the prohibitions for overseas investments?**
- Any Indian resident, who has been classified as a wilful defaulter or is under investigation by the CBI, the ED or the Serious Frauds Investigation Office (SFIO), will have to obtain a no-objection certificate (NOC) from his or her bank, regulatory body or investigative agency before making any overseas “financial commitment” or disinvestment of overseas assets.
- The rules also provide that if lenders, the concerned regulatory body or investigative agency fail to furnish the NOC within 60 days of receiving an application, it may be presumed that they have no objection to the proposed transaction.
- Additionally, the new rules also prohibit Indian residents from making investments into foreign entities that are engaged in real estate activity, gambling in any form, and dealing with financial products linked to the Indian rupee without the specific approval of the RBI.
- 3. **Sex ratio at birth normalises slightly: Study**
- ❖ **Context: The latest study by the Pew Research Center has pointed out that son bias is on the decline in India as the average annual number of baby girls missing in the country fell from 480,000 (4.8 lakh) in 2010 to 410,000 (4.1 lakh) in 2019.**
- The “missing” refers to how many more female births would have occurred during this time if there were no female-selective abortions.
- The problem began in the 1970s with the availability prenatal diagnostic technology allowing for sex selective abortions.
- Among the major religions, the biggest reduction in sex selection seems to be among the groups that previously had the greatest gender imbalances, particularly among Sikhs.
- The world over, boys modestly outnumber girls at birth, at a ratio of approximately 105 male babies for every 100 female babies.
- That was the ratio in India in the 1950s and 1960s, before prenatal sex tests became available across the country.
- India legalised abortion in 1971, but the trend of sex selection started picking up in the 1980s due to the introduction of ultrasound scan technology.
- In the 1970s, India’s sex ratio was at par with the global average of 105-100, but this widened to 108 boys per 100 girls in the early 1980s, and reached 110 boys per 100 girls in the 1990s.
- From a large imbalance of about 111 boys per 100 girls in India’s 2011 census, the sex ratio at birth appears to have normalised slightly over the last decade, narrowing to about 109 in the 2015-16 wave of the National Family Health Survey and to 108 boys in the latest wave of the NFHS, conducted from 2019-21.
- The Pew Research Center report points out that between 2000 and 2019, nine crore female births went “missing” because of female-selective abortions.
- The report has also analysed religion-wise sex selection, pointing out that the gap was the highest for Sikhs.
- In the 2001 census, Sikhs had a sex ratio at birth of 130 males per 100 females, far exceeding that year’s national average of 110.
- By the 2011 census, the Sikh ratio had narrowed to 121 boys per 100 girls.
- It now hovers around 110, about the same as the ratio of males to females at birth among the country’s Hindu majority (109).
- Both Christians (105 boys to 100 girls) and Muslims (106 boys to 100 girls) have sex ratios close to the natural norm, and this trend is holding.
- The study points out that while the Sikhs make up less than 2% of the Indian population, they accounted for an estimated 5%, or approximately 440,000 (4.4 lakh), of the nine crore baby girls who went “missing” in India between 2000 and 2019.

- The share of missing girls among Hindus is above their respective population share.
- 4. **Tensions mar a mission to Tiangong**
- ❖ **CONTEXT: Tensions between India and China since May 2020 is worrying Indian astrophysicists involved in an ambitious project to install an Indian-made spectroscope aboard the developing Chinese space station Tiangong.**
- Scientists at the Indian Institute of Astrophysics (IIA), Bengaluru, were among nine groups selected from 42 applicants in 2019 as part of a UN-led initiative that invites research teams from all over the world to compete for an opportunity to design payloads that will be shuttled to Tiangong aboard rockets of the Chinese Manned Space Agency.
- The project, called Spectrographic Investigation of Nebular Gas (SING), also involves collaboration with the Institute of Astronomy, Russian Academy of Sciences, and has been designed and developed by research students at the IIA.
- The plan is to have it ready by the year-end so that it can be launched in the summer of 2023.
- Though the plan is on schedule, scientists at the IIA are now consulting with the Indian Space Research Organisation (ISRO) and the External Affairs Ministry whether they are in the clear to go ahead with the project.
- The SING project will be the first space collaboration involving India and China, and primarily deals with sending and positioning a spectrograph - an instrument that splits light into constituent frequencies and wavelengths, to study ultraviolet radiation.
- This will help analyse the make-up and sources of interstellar gas in the region that swept by the space station as it orbits around the earth.
- ❖ **Tiangong space station**
- Tiangong is the successor to China's Tiangong-1 and Tiangong-2 space laboratories, launched in 2011 and 2016, respectively.
- It will be built on a modular design, similar to the International Space Station operated by the United States, Russia, Japan, Canada and the European Space Agency.
- When complete, Tiangong will consist of a core module attached to two laboratories with a combined weight of nearly 70 tonnes.
- The core capsule, named Tianhe (Harmony of Heavens), is about the size of a bus.
- Containing life support and control systems, this core will be the station's living quarters.
- At 22.5 tonnes, the Tianhe capsule is the biggest and heaviest spacecraft China has ever constructed.
- The Tianhe module will form the core of the space station, with other modules to be added later to increase the size of the station and make more experiments possible.
- The capsule will be central to the space station's future operations.
- Two slightly smaller modules are expected to join Tianhe to extend the space station and make it possible to carry out various scientific and technological experiments.
- Tianhe will be just one-fifth the size of the International Space Station, and will host up to three crew members at a time.

#### **ANSWER WRITING**

**Q. How far is Integrated Farming System (IFS) helpful in sustaining agricultural production.**

The Integrated Farming System (IFS) is a combined approach aimed at efficient sustainable resource management for increased productivity in the cropping system. The IFS approach has multiple objectives of sustainability, food security, farmer's security and poverty reduction by involving livestock, vermicomposting, organic farming etc.

- Indian farm sector needs to address the twin challenges of productivity and sustainability along with augmentation of farmer's income. For this, IFS emerges as one of the most viable options, as it ensures:
- **Productivity:** IFS provides an opportunity to increase economic yield per unit area by virtue of intensification of crop and allied enterprises especially for small and marginal farmers.
- **Profitability:** It has the capability to make the sector profitable by reducing the use of chemical fertilizer and recycling nutrients.
- **Sustainability:** In IFS, subsystem of one byproduct works as an input for the other subsystem, making it environmentally sustainable. Moreover, IFS components are known to control the weed and regarded as an important element of integrated pest management and thus minimize the use of weed killers as well as pesticides and thereby protect the environment.

- **Recycling:** Effective recycling of products, by-products and waste material in IFS is the cornerstone behind the sustainability of farming system under resource poor condition in rural areas.
- **Income round the year:** Due to interaction of enterprises with crops, eggs, meat and milk, IFS provides flow of money round the year amongst the farming community.
- **Best utilization of small landholdings:** Indian farmers in many regions such as in north-eastern part, practice subsistence agriculture. They also have a rich traditional base in water harvesting, soil management etc. which could be efficiently utilized under IFS.
- **Meeting fodder crisis:** Byproduct and waste material of crop are effectively utilized as fodder for livestock (Ruminants) and products like grain, maize are used as feed for monogastric animals (pigs and poultry).
- **Employment generation:** Combining crop with livestock enterprises would increase the labour requirement significantly and would help in reducing the problems of underemployment and unemployment to a great extent. IFS provides enough scope to employ family labour round the year.

IFS provides multiple benefits that are sustainable and can pave the way for climate-smart agriculture. India needs to adopt a “well designed” Integrated Farming System (IFS) to realise the vision of doubling farmers’ income by 2022 and having sustainable agricultural practices.

**MCQs**

1. Consider the following pairs:

Programme/Project Ministry

1. Drought-Prone Area Programme

Ministry of Agriculture

2. Desert Development Programme

Ministry of Environment and Forests

3. National Watershed Development Project for Rainfed Areas

Ministry of Rural Development

Which of the above pairs is/are correctly matched?

a) 1 and 2 only

b) 3 only

c) 1, 2 and 3

d) None

2. Drought is the situation occurring in any area when the mean annual rainfall is less than 75% of the normal rainfall. In this regard, consider the following statements?

1. Meteorological drought is a situation where there is a reduction in rainfall for a specific period below a specific amount.

2. Hydrological drought is associated with reduction of water.

3. Agricultural drought is concerned with the impact of meteorological/hydrological drought on crop yield.

4. Soil moisture drought is a situation of inadequate soil moisture particularly in rainfed area which may not support crop growth

Which of the following statements is/are correct?

a) 1 and 2 only

b) 2 and 4 only

c) 1, 2 and 3 only

d) All of the above

3. Consider the following statements regarding 'Drought Management in India'

1. Drought will be classified as a "disaster" under the Disaster Management Act of 2005.

2. When it comes to calling an area drought-affected, the Central Government has the final say.

Which of the above statements is/are incorrect?

a) 1 only

b) 2 only

c) Both 1 and 2

d) Neither 1 nor 2

4. Consider the following statements, With reference to James Webb Space Telescope

1. It is a joint venture between of USA, CANADA and Europe space agencies

2. Like the Hubble Space Telescope, it doesn't orbit around the Earth rather it orbits around second Lagrange point or L2.

3. It aims to see the first galaxies that sprung up in the young universe after the Big Bang

Select the correct answer using the code given below:

- a) **1 and 3 only**
  - b) 2 and 3 only
  - c) 2 only
  - d) 1, 2 and 3
5. Consider the following statements:  
Non-performing assets (NPAs) decline in value when
1. Demand revives in the economy.
  2. Capacity utilization increases.
  3. Capacity utilization, though substantive, is yet sub-optimal.
  4. Capacity utilization decreases consequent upon merger of unit.
- Which of the above statement are correct?
- a) **1, 3 and 4 only**
  - b) 1, 2 and 4 only
  - c) 1, 2 and 3 only
  - d) 1, 2, 3 and 4
6. Both Foreign Direct Investment (FDI) and Foreign Institutional Investor (FII) are related to investment in a country. Which one of the following statements best represents an important difference between the two?
- a) FII helps bring better management skills and technology, while FDI only brings in capital
  - b) **FII helps in increasing capital availability in general, while FDI only targets specific sectors**
  - c) FDI flows only into the secondary market, while FII targets primary market
  - d) FII is considered to be more stable than FDI
7. International Space Station operated by which of the following country/es?
1. United States
  2. Russia
  3. Japan
  4. Canada
  5. European Space Agency
- Choose the correct answer using the codes given below
- a) All except 5
  - b) All except 2
  - c) All except 4
  - d) **All of the above**
8. Consider the following statements:
1. Jupiter has the largest number of satellites.
  2. Being the largest planet, it takes more time to spin than other planets.
  3. NASA sent the Juno probe to the orbit of Jupiter.
- Select the correct answer using the code given below:
- a) 1 and 2 only
  - b) 2 and 3 only
  - c) **1 and 3 only**
  - d) All of the above
9. The terms like “Amalthea” and “Adrastea” often mentioned in news can be associated with which of the following?
- a) Mars
  - b) **Jupiter**
  - c) Saturn
  - d) Uranus
10. Which of the following river flows through maximum countries
- a) Rhine
  - b) Po
  - c) Loire
  - d) **Danube**