

WHAT IS THE MOMENT MAGNITUDE SCALE?

An extremely large earthquake with a magnitude 7.8 out of 10 on the moment magnitude scale occurred in the southeast of Turkey, near the border with Syria.



About Moment Magnitude Scale:

- It is a **logarithmic scale** that measures the total amount of energy released by an earthquake.
- It is the **only scale** capable of reliably measuring the magnitudes of the largest, **most destructive earthquakes** (that is, greater than magnitude 8).
- It was **developed in the 1970s** by Japanese seismologist **Hiroo Kanamori** and American seismologist **Thomas C. Hanks**.
- **How is it calculated?**
- The moment magnitude scale is **based on the total moment release of the earthquake**.
- **Moment is a product of the distance a fault moved and the force required to move it.**
- **It is derived from modeling recordings** of the earthquake at multiple stations.
- **Moment magnitude estimates are about the same as Richter magnitudes** for small to large earthquakes. But only the moment magnitude scale is **capable of measuring M8** (read "magnitude 8") and **greater events accurately**.

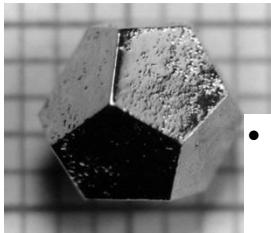
What is the Richter scale?

- It was **invented in 1935** by **Charles F. Richter** as a mathematical device **to compare the size of earthquakes**.
- The Richter scale is **used to rate the magnitude of an earthquake**, that is, the **amount of energy released during an earthquake**.
- The Richter scale is a **base-10 logarithmic scale**, meaning **each order of magnitude is 10 times more intensive than the last one**.
- It is **most effective** for regional earthquakes **no greater than magnitude 5**.
- **How is it calculated?**

- The Richter scale involves measuring the **amplitude (height) of the largest recorded wave at a specific distance from the seismic source.**
 - **Adjustments are included for the variation in the distance** between the various seismographs and the epicenter of the earthquakes.
 - The Richter scale **doesn't measure quake damage.**
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QUASICRYSTALS

Recently, scientists have discovered a third natural source of quasicrystals.



About Quasicrystal:

- Quasicrystal, also called **quasi-periodic crystal**, matter formed atomically in a manner somewhere between the **amorphous solids** of glasses and the precise pattern of crystals.
- In quasicrystals, the atoms are arranged in a **pattern that repeats itself at irregular, yet predictable, intervals.**
- The American-Israeli **scientist Dan Shechtman** discovered quasicrystals in the lab in 1982.
- The first natural quasicrystal found was as microscopic grains in a fragment of the Khatyrka meteorite lying in the **Koryak mountains of Russia.**
- The second time scientists found natural quasicrystals in the remains of the **Trinity test of the Manhattan Project.**
- Recently in the **Sand Hills dunes** in northern Nebraska, where scientists found silicate glass which is a **dodecahedral quasicrystal**, rare even for quasicrystals.

Applications of Quasicrystals

- They are used in **surgical instruments, LED lights and nonstick frying pans.**
 - They have poor heat conductivity, which makes them good insulators.
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PRIMARY AGRICULTURAL CREDIT SOCIETIES

The Union Budget has recently announced Rs 2,516 crore for the computerisation of 63,000 Primary Agricultural Credit Societies (PACS) over the next five years



About Primary Agricultural Credit Societies:

- These are village-level **cooperative credit societies** that serve as the last link in a three-tier cooperative credit structure.
- These are headed by the **State Cooperative Banks (SCB)** at the state level.
- Credit from the SCBs is transferred to the **district central cooperative banks**, or DCCBs, that operate at the district level.
- These district central cooperative banks work with PACS, which deals directly with farmers.
- Individual farmers are members of the PACS, and office-bearers are elected from within them. A village **can have multiple PACS**.
- PACS are involved in **short-term lending** — or what is known as crop loans.
- At the start of the cropping cycle, farmers avail credit to finance their requirement of seeds, fertilisers etc.
- Banks extend this credit at 7 per cent interest, of which 3 per cent is subsidised by the Centre, and 2 per cent by the state government. Effectively, farmers avail the crop loans at 2 per cent interest only.

INDIA EXTENDS A HELPING HAND TO EARTHQUAKE HIT TURKEY

Why in news?

- India has sent rescue and medical teams, including an Army medical team and National Disaster Response Force (NDRF) personnel, along with medical supplies to quake-hit Turkey.
 - More than 7000 people have been killed and thousands injured by a huge earthquake which struck south-eastern Turkey, near the Syrian border.
- India also sent relief materials, including lifesaving medicines and medical items, in a transport aircraft of the Indian Air Force (IAF) to Syria.

India-Turkey Relation

Background:

- Diplomatic relations were established and Ambassadors exchanged in 1948.
- Since the establishment of diplomatic relation, political and bilateral relations have been warm and cordial.
- However, some sporadic tensions remain in the relationship due to Turkey's support for Pakistan. Its stand on Kashmir has also been a problem area between the two countries.

Political relation

- After the diplomatic relations were established, the visit by the first PM Nehru in 1960 was the first prime ministerial visit to Turkey
- Most recent political level contacts include a bilateral meeting between PM Modi and Turkish President Recep Erdogan in September 2022 on the side-lines of the SCO Summit in Samarkand (Uzbekistan).

Economic & Commercial Relations

- Bilateral Trade Agreement between India and Türkiye was signed in 1973.
- It was followed by an Agreement on setting up an India–Türkiye Joint Commission on Economic and Technical Cooperation (JCETC) in 1983.

Cultural Relations

- India and Türkiye have traditionally shared cultural linkages. There is a formally agreed arrangement for cultural cooperation through a Cultural Exchange Programme (CEP).

Indian Community

- Türkiye has a small Indian community of around 2000 people. They are mostly in Istanbul and working in commercial organizations, banks and computer firms, universities etc.
- There are currently around 200 Indian students in Türkiye.

Challenges in the relationship

- **Tukey's stand on Kashmir**
 - In 2022, Turkish PM Erdogan, in his UN General Assembly speech, criticized India for failing to resolve ties with Pakistan and establish a fair, permanent peace and prosperity in Kashmir.

- **Abrogation of Article 370 by India**

- After the abrogation of Article 370 in 2019, which abolished the special status of Jammu and Kashmir, India-Turkey ties have deteriorated.

- **Turkey has fast emerged as a hub of anti-India activities**

- Turkey follows a three-pronged approach to in this regard:
 - employment of Kashmiri journalists,
 - providing scholarships to Indian Muslims, and
 - funding NGOs in India to influence Indian Muslims.
 - Turkey also encourages radical Kashmiri youth to shift base to Istanbul and Ankara.
 - Moreover, Turkey-made pistols were recovered from Pakistani terrorists earlier this year.
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DICKINSONIA

Recently, an alleged fossil discovered near Bhopal about two years ago and thought to be of the extinct Dickinsonia turned out to be the impression of a decayed beehive.



About Dickinsonia:

- Dickinsonia is an extinct genus of basal animal that lived during the late **Ediacaran period** on ocean floors around present-day's **Australia, Russia and Ukraine**.
- The individual Dickinsonia typically resembles a bilaterally **symmetrical ribbed oval**.
- Its affinities are presently unknown; its mode of growth is consistent with a stem-group **bilaterian affinity**, though some have suggested that it belongs to the fungi or even an “extinct kingdom”.
- The discovery of cholesterol molecules in fossils of Dickinsonia lends support to the idea that **Dickinsonia was an animal**.
- It is believed to be one of the key links between the early, simple organisms and the explosion of life in the Cambrian Period, about 541 million years ago.

Key facts about the Ediacaran period

- It consisted of tubular and frond-shaped organisms that lived during this period.
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- The Edicarian Period was about 20 million years before the emergence of modern animal life — a period known as the Cambrian explosion.
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WHAT ARE VERMINS?

The Wildlife Institute of India (WII) is working to develop immuno-contraceptive measures for population management of species that have become problematic for humans in many parts of the country.



About Vermins:

- Vermin are usually considered problem or nuisance animals that attack humans, crops, livestock or property.
- Species which are classified as Vermin are placed under **Schedule V** of the Wildlife Protection Act, of 1972.

Key facts about the Wildlife Protection Act, 1972.

There are **Six Schedules** in this act. These Schedules give a different standard of protection.

- The Listed breeds and types of animals in **Schedule I and part II of Schedule II** get **supreme protection**. Offences under these are prescribed the highest penalties.
 - For example Himalayan Brown Bear, Indian Elephant etc.
 - The Listed breeds and types of animals **in Schedule III and Schedule IV** are also secured, but the **penalties are comparatively much lower**.
 - For example, Barking Deer, Falcons, Kingfisher, Tortoise etc.
 - **Schedule V** includes the animals which can be hunted.
 - For example, Common Crow, Mice, Rats, Fruit Bats etc.
 - The **plants, trees and crops mentioned in Schedule VI** are banned from Cultivation and Planting. For example, Kuth, Red Vanda, Pitcher Plant etc.
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WHAT IS BARD, GOOGLE'S ANSWER TO 'CHATGPT'

Why in News?

- Google has finally decided to answer the challenge and threat posed by Microsoft-backed OpenAI and its AI chatbot,
- The search giant confirmed it will soon start public testing for a new AI chatbot of its own called **Bard**, based on the company's Language Model for Dialogue Application (LaMDA).

What is ChatGPT (Chat Generative Pre-trained Transformer)?

- Technically, ChatGPT can be categorised as a **type of generative AI** - a broad label that's used to describe any type of artificial intelligence (AI) that can be used to create new text, images, video, audio, code or synthetic data.
- Thus, ChatGPT is a complex **machine learning model** developed by **OpenAI** (a research firm founded by Elon Musk), that is able to carry out natural language generation (NLG) tasks with a very high level of accuracy.
- It is built on a large language model (LLM - a type of deep neural network that uses billions of parameters and is trained with petabytes of data) called **GPT-3** (Generative Pre-trained Transformer 3).
- **Tasks ChatGPT excels at include** - providing answers to questions, completing a given text or a phrase, writing fiction and non-fiction content from prompts, producing humanlike **chatbot** responses, translating text from one language to another, etc.

What is Bard?

- Bard is **Google's** own conversational **AI chatbot** and is based on LaMDA. It draws on information from the web to provide fresh, high-quality responses.
- In short, it will **give in-depth, conversational and essay-style answers** just like ChatGPT does right now.
- **A user will be able to ask Bard** to explain new discoveries from NASA's James Webb Space Telescope to a 9-year-old, or learn more about the best strikers in football right now, and then get drills to build your skills.

Is Bard Better than ChatGPT?

- Bard is built on **Transformer technology** - which is also the backbone of ChatGPT and other AI bots.
- Transformer technology, pioneered by Google and made open-source in 2017, is a neural network architecture, which is **capable of making predictions based on inputs**.
- Currently, **Bard looks like a limited rollout** and it is hard to say whether it can answer more questions than ChatGPT.
- Google has also not made clear the amount of knowledge that Bard possesses. **For instance**, with ChatGPT, we know its knowledge is limited to events till 2021.

Why has Google Announced Bard Right Now?

- It comes as Microsoft has invested \$10 billion this year in OpenAI and is preparing to -
 - Announce an **integration of ChatGPT into its Bing Search engine**.
 - Offer ChatGPT to its enterprise customers as part of the Azure Cloud services.
- Google might have invented the ‘Transformer’ technology, but it is now being seen as a **latecomer to the AI revolution**.
- For Google, **whose core business is search**, this has resulted in a ‘code red’ at the company, calling in founders to review plans around AI.

What are the Limitations of such AI Chatbots?

- They sometimes write plausible-sounding but **incorrect or nonsensical answers**.
- The models are often **excessively verbose and overuse certain phrases**.
- While efforts have been made to make these models refuse inappropriate requests, it will sometimes **respond to harmful instructions or exhibit biased behaviour**.
- Running these models requires significant computing power (ChatGPT is powered by Microsoft’s Azure Cloud services).
 - This explains why the service often runs into **errors at times, because too many people are accessing it**.

[ASSAM CRACKDOWN ON CHILD MARRIAGE – WHAT DOES THE LAW SAY](#)

Why In News?

- Over the last few days, Assam has arrested over 2,000 men in a state-wide crackdown on child marriages that have taken place in the state.

Child Marriages in India:

- In India, child marriage reduced from 47.4% in 2005-06 to 26.8% in 2015-16.
- In the last five years, it declined by 3.5% points to reach 23.3% in 2020-21, according to the latest **National Family Health Survey-5**
- There is a growing trend for decline in the overall prevalence of child marriage, but 23.3% is still a disturbingly high percentage in a country with a population of 141.2 crore.
- Eight States have a higher prevalence of child marriage than the national average —
 - **West Bengal, Bihar and Tripura** top the list with more than 40% of women aged 20-24 years married below 18, according to NFHS data.
- Some States have shown a reduction in child marriages, like **Madhya Pradesh** (23.1% in 2020-21 from 32.4% in 2015-16), **Rajasthan** (25.4% from 35.4%) and **Haryana**.

Global Scenario:

- According to data from UNICEF, the **total number of girls married in childhood stands at 12 million per year**.
- The 2030 UN Sustainable Development Goals aim to eliminate all harmful practices, such as child, early and forced marriage and female genital mutilations, under **goal 5**.

Legal Interventions:

- There are several laws including the **Prohibition of Child Marriage Act, 2006** and the **Protection of Children from Sexual Offences Act, 2012**, which aim at protecting children from violation of human and other rights.
- In 2021, **Child Marriage (Amendment) Bill, 2021** was introduced in the Lok Sabha. Currently, it is studied by the Standing Committee.
 - The Bill seeks to amend the Prohibition of Child Marriage Act and **increase the marriage age of women from existing 18 years to 21 years**.

Schemes/ Policies for preventing Girl child marriage:

- **Sukanya Samridhi Yojana (SSY)** –

- Sukanya Samriddhi Yojana (SSY), was launched in 2015, in order to promote the welfare of girl child.
- It encourages parents **to invest and build funds for the future studies and marriage expenses of the girl's children.**
- **Balika Samriddhi Yojana –**
 - This central government scheme ensures the enrolment and retention of girl child in primary and secondary schools.
 - It aims at the **prosperity of a girl's child and provides them with a better quality education.**
- **Beti Bachao Beti Padhao –**
 - This scheme celebrates girl children, literally translating to Save the Girl Child, Educate the Girl child. It believes in women empowerment and creating an inclusive ecosystem for the same.
 - This scheme is **to promote girl children's safety before and after they are born.**

News Summary:

- The Assam Government has arrested over 2,000 men in a state-wide crackdown on child marriages.
- Chief Minister Himanta Biswa Sarma said that the **police will retrospectively book people who participated in child marriage in the last seven years.**
- Assam has a high rate of maternal and infant mortality, with child marriage being the primary cause, according to reports by the National Family Health Survey (NFHS).

Under what Law are the arrests being made?

- Men who married girls below 14 years of age would be booked under the Protection of Children From Sexual Offences Act, 2012 (commonly known as **POCSO Act**).
- The POCSO Act criminalises sex between a minor and an adult.
- The law does not recognize a minor's consent as valid.
- Meanwhile, those marrying girls between 14 and 18 years would be booked under the **Prohibition of Child Marriage Act, 2006.**