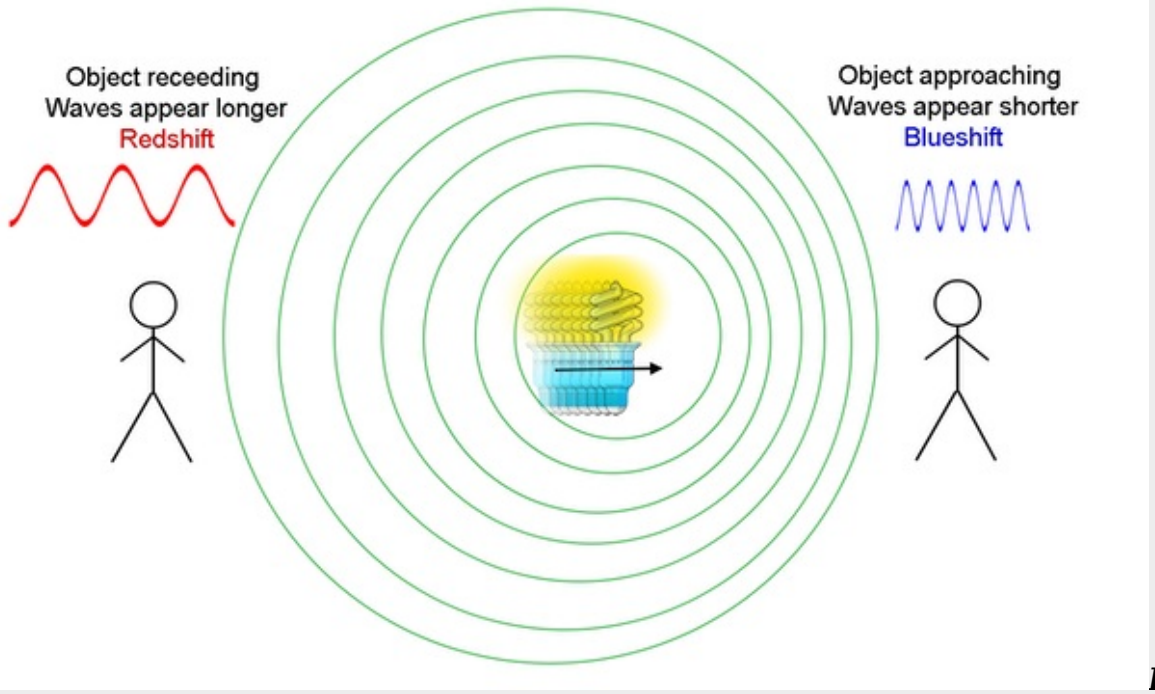
Prelim Bits 22-01-2023 & 23 -01-2023 | UPSC Daily Current Affairs

Doppler radar

As on January 15, 2023, India has 37 Doppler Weather Radar (DWR) and by 2024-25, it is expected to have 25 more DWRs taking the total number to 62 radars.

- **RADAR** (Radio, Detection and Ranging) is used for detection of objects and their distance from them based on the principle of electromagnetic waves.
- Its basic components are a transmitter, receiver, antenna, power supply system, signal processing and high computing devices.
- The electromagnetic waves are sent out by the transmitter which strikes an object/dense medium and is reflected back to the receiver.
- The distance up to the object is determined based on the speed of the electromagnetic wave, and the time to travel to the object and back.
- **Doppler radar** is a specialised radar that uses the Doppler Effect to produce velocity data about objects at a distance.



Doppler Effect
When the source and the signal are in relative motion to each other, there is a change in the frequency observed by the observer. If they are moving closer, the frequency increases and vice versa.

- A **Doppler Weather Radar** (DWR) is designed to improve precision in long-range weather forecasting and surveillance using a parabolic dish antenna and a foam sandwich spherical radome.
- DWR has the ability to detect air motion, wind, wind speed, rains, temperature, thunderstorms, hail, lightning, cyclones and cloud movements, among others.

Advantages of DWRs

- They cover the entire country.
- They give the most precise detection of weather parameters including dynamic weather events turbulences.
- They help in the quantification of rain forecasts and cyclonic intensity and precipitation.
- They are best used is in cyclone forecasting, long-time lightning forecast.

References

1. Business Line - All about Doppler Weather Radars

Charaideo Maidams

The Centre has decided to nominate Assam's Charaideo Maidams for the UNESCO World Heritage Centre this year

> *Currently, there are 3 World Heritage Sites in the northeast, but none of them in the category of cultural heritage.*
> 1. *Kaziranga National Park, Assam - Natural heritage site*
> 2. *Manas Wildlife Sanctuary, Assam - Natural heritage site*
> 3. *Khangchendzonga National Park, Sikkim - Mixed heritage site*

- Charaideo is located in Assam at the foothills of Nagaland.
- Charaideo, a Tai-Ahom word which means 'a prominent city on the hill top'.
- The maidams enshrine the mortal remains of the members of the Ahom royalty, who used to be buried with their paraphernalia.
- Therefore Charaideo Maidams are considered as the Ahom equivalent of the ancient Egyptian pyramids and famously called as the "Pyramids of Assam".
- Architecturally it comprises a massive underground vault with one or more chambers having domical superstructure which appears a hemispherical mound externally.

- **Period of the site** - The maidams represents the late medieval (13th-19th century CE) mound burial tradition of the Tai Ahom community in Assam.
- After the 18th century, the Ahom rulers adopted the Hindu method of cremation and began entombing the cremated bones and ashes in a Maidam at Charaideo.
- **Ahoms** - Ahom dynasty was founded by Chao Lung Siu-Ka-Pha in 1253.
- Charaideo was the first capital of the Ahom dynasty.
- The Ahom rule lasted for about 600 years until the British annexed Assam in 1826.

References

1. The Hindu - Ahom burial mounds to vie for UNESCO-WHS tag
2. Sentinel Assam - Charaideo maidams chosen for UNESCO WHS

Chargesheet

The Supreme Court held that chargesheets are not 'public documents' and denied their free public access.

- A chargesheet is the final report prepared by a police officer or investigative agencies after completing their investigation of a case, as defined under Section 173 CrPC.
- The officer-in-charge of the police station forwards the chargesheet to a Magistrate.
- **Contents** - The chargesheet should contain details of names, the nature of the information, offences and the status of the accused - arrested, released or forwarded in custody.
- **Timeframe** - The charge sheet is to be filed within 60 days from the date of arrest of the accused in cases triable by lower courts and 90 days in cases triable by Court of Sessions.
- Failing to do so, the arrest is deemed illegal and the accused is entitled to bail.

Chargesheet and FIR

Chargesheet	FIR (First Information Report)
Defined under Section 173 of the CrPC.	Comes from the police regulations/ rules under Section 154 of CrPC, which deals with 'Information in Cognizable Cases'.
Final report filed towards the end of an investigation	Filed at the 'first' instance' that the police is informed of a cognizable offense
Often used during the trial to prove the offenses the accused is charged with	The investigation takes place after filing FIR and does not decide a person's guilt.

- **Zero F.I.R.** - Another amendment which came after Nirbhaya Case.
- In Zero FIR any police station can register FIR irrespective of the jurisdictional area but the investigation will be taken up by the police in the place of occurrence reported in the FIR.
- **SC Rulings** - It is not a 'public document' under Sections 74 and 76 of the Evidence Act.
- Enabling free public access of chargesheets violates the provisions of the CrPC as it compromises the rights of the accused, victim, and the investigation agencies.
- The court also held that copies of the chargesheet and the relevant documents do not fall within Section 4(1)(b) of the RTI Act.

References

1. IE - 'Chargesheets are not public documents': Supreme Court
2. India Today - SC: A chargesheet is not a public document
3. Legal Service India - What is FIR and Chargesheet?

Purana Qila

The visiting delegates of the G20 Summit in Delhi will be taken to the Purana Qila.

- The Purana Qila is located on the banks of river Yamuna in Delhi.
- The fort has been an important site for trade and industrial activity in all periods.
- The 16th-century fort complex was believed to be built by Sher Shah Suri and renovated by the Mughal emperor Humayun.

- The Archaeological Survey of India conducted excavations at this site in 1954–55 and 1969 -1973.
- The cultural deposits discovered in its various layers confirms that the site had a long and unbroken chain of habitation for 2500 years.
- It revealed the existence of stratified layers belonging to 8 periods starting from the 4th century CE to the 19th century.
- At 8 metres below the ground level on the excavated trench are traces of pre-Mauryan era (6th to 4th century BC), and the ground level denotes the Mughal era.
- The soil layers have cultural deposits of various other kingdoms of Delhi that existed before the Mughals.
- **Pandavon ka Qila** - A strong tradition believes that the area in which the Purana Qila stands today is the site of Indraprastha.
- Indraprastha was the capital of the Pandavas of the great epic Mahabharata and the fort is often called the 'Pandavon ka Qila'.
- They excavation also revealed a few shards of Painted Grey Ware (PGW) which traced back to the Mahabharata period.

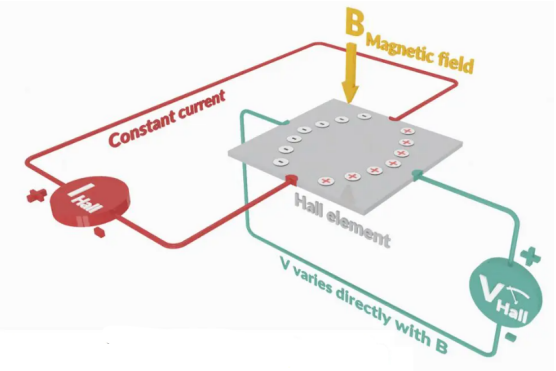
References

1. IE - 2,500 years in layers: Purana Qila prepares for G20 guests
2. Indian Culture - Purana Qila: The Grand Old Fort of Delhi

Phonons and Thermal Hall Effect

Scientists have observed the thermal Hall Effect in insulators, leading to an important open question in condensed-matter physics.

Hall Effect



When a current carrying conductor is placed in a transverse magnetic field, a potential difference (Hall voltage) arises across the conductor perpendicular to both magnetic field and the electric current.

Thermal Hall Effect in conductors

- In the presence of a magnetic field, electrons are deflected from their paths in a perpendicular direction.
- When a temperature gradient is applied in the conductor in one direction, another temperature gradient appears in a perpendicular direction in the presence of a magnetic field.
- The electrons in the material carry both electric charges and thermal energy, and the magnetic field deflects them, giving rise to the perpendicular gradient.

Thermal Hall Effect in insulators

- Scientists have observed the thermal Hall effect in insulators as well, especially terbium oxides and strontium titanate.
- Not the electrons but the phonons in insulators are involved in transferring heat or electricity.
- Phonons do not have electric charge hence can’t be deflected directly by the magnetic field.
- Phonons are affected by the electrons that are deflected by the magnetic field.
- They are deflected in a perpendicular direction as well.

Phonons

- A phonon is a quasiparticle of vibrational energy.
- These packets of energy behave like particles in a system.
- When the grid of atoms that make up the material vibrates, it releases this energy, and physicists encapsulate it in the form of phonons.

References

1. The Hindu - A twisting mystery of electrons, vibrations and heat

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