Daily Current Affairs Prelims Quiz 01-12-2023 (Online Prelims Test)

1) Consider the following statements with respect to Piezoelectricity

1. It is the process of using crystals to convert mechanical energy into electrical energy or vice versa.
2. Bone and tendons have the capacity to support Piezoelectricity.

Which of the above statement(s) is/are correct?

a. 1 only

b. 2 only

c. Both 1 and 2

d. Neither 1 nor 2

Answer : c

Piezoelectricity

- Piezoelectricity was discovered in 1880 by Pierre and Paul-Jacques Curie.
- Piezoelectricity is a phenomenon in which certain materials can generate an electric charge in response to mechanical stress.
- The certain materials includes quartz, ceramics such as lead zirconate titanate (PZT) and even certain biological substances like bone and the tendons.
- Usually, the charges on atoms in the molecules that make them up are symmetric on two sides of an axis.
- But in certain materials when some stress is applied, the molecule becomes distorted and the asymmetry of charges gives rise to a small electric current.
- Some materials also display an inverse piezoelectric effect, where the application of an electric current induces a mechanical deformation.
- **Working mechanism** – A piezoelectric crystal is placed between two metal plates. At this point, the material is in perfect balance and does not conduct an electric current.
- Mechanical pressure is then applied to the material by the metal plates, which forces the electric charges within the crystal out of balance.
- Excess negative and positive charges appear on opposite sides of the crystal face.
- The metal plate collects these charges, which can be used to produce a voltage and send an electrical current through a circuit.
- **Application** – Both direct and inverse piezoelectric materials are widely used in pressure sensors, accelerometers, and acoustic devices, where their ability to convert mechanical signals into electrical signals is crucial.
- The piezoelectric effect is also what made quartz watches so common and over time, affordable.

2) Consider the following statements with respect to X-Ray Polarimeter Satellite (XPoSat)

1. It is India’s first dedicated polarimetry mission to study various dynamics of bright astronomical X-ray sources.
2. It will be stationed at the Geostationary Orbit (GEO) using the GSLV.

Which of the above statement(s) is/are **incorrect?**

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Answer : d

X-Ray Polarimeter Satellite (XPoSat)

Indian Space Research Organisation (ISRO) will soon launch X-Ray Polarimeter Satellite (XPoSat) to investigate the polarisation of intense X-Ray sources.

- X-Ray Polarimeter Satellite (XPoSat) is the 1st such satellite by ISRO that aims to investigate the polarisation of intense X-Ray sources.
- It focuses predominantly on imaging, time-domain studies and spectroscopy.
- The Mission objectives include:
  - Measurement of X-Ray polarization in the energy band of 8-30 keV emanated from X-Ray sources,
  - Long-term spectral and temporal studies of cosmic X-Ray sources in the energy band of 0.8-15 keV.
- The XPoSat will be launched by the Polar Satellite Launch Vehicle (PSLV), from the Satish Dhawan Space Center in Sriharikota.
- The XPoSat spacecraft is designated for observation from Low Earth Orbit, on non-sun synchronous orbit of approximately 650 km altitude, low inclination of approximately 6 degree.
- The mission life is expected to be approximately 5 years.
- The payloads of the XPoSat includes:
  1. POLIX – Polarimeter Instrument in X-rays.
  2. XSPECT – X-ray Spectroscopy and Timing.
- The primary payload of XPoSat is POLIX (Polarimeter Instrument in X-rays) that is designed to measure polarimetry parameters.
- The POLIX payload was developed by the Raman Research Institute (RRI), Bengaluru, with support from various ISRO centres.
- The secondary payload is the XSPECT (X-ray Spectroscopy and Timing) payload, which will provide spectroscopic information within the energy range of 0.8-15 keV.
- The XSPECT payload was developed by the U.R. Rao Satellite Centre (URSC), ISRO.

3) Orbital Resonance, sometimes seen in the news, is related to which of the following statement(s)?

a. A phenomenon that occurs when an object or system is subjected to an external force or vibration that matches its natural frequency.
b. It is any system of two or more satellites orbiting the same primary and whose orbital mean motions are in a ratio of small whole numbers.
c. A way of describing the bonding in certain molecules and polyatomic ions.
d. It is the time it takes for an object to return to the same point in its orbit.

Answer : b

Orbital Resonance

Recently the Scientists have discovered rare 6-planet system that is in orbital resonance.

- Orbital Resonance is any system of two or more satellites (including planets) orbiting the same primary and whose orbital mean motions are in a ratio of small whole numbers.

- Astronomers have discovered an exceptionally rare phenomenon in a nearby star system where 6 planets that orbit their central star in sync with a rhythm.
- The six planets orbit a star called HD110067, which is about 100 light-years away from the Earth in the northern constellation of Coma Berenices.
- In this particular case, the planet closest to the star makes three orbits for every two of the next planet. This is called a 3/2 resonance and is repeated among the four closest planets.
- Multi-planet systems may be common in our galaxy, but ones in a tight gravitational formation known as “resonance” are rarely observed.
- Among the two outermost ones, a 4/3 resonance pattern was identified, meaning that one takes four orbits for every three of the outermost one.

4) Consider the following statements with respect to Provisional State of the Global Climate Report, 2023

1. The report is released by the World Meteorological Organization (WMO).
2. According to the report, world has already crossed the long-term warming threshold of 1.5C.

Which of the above statement(s) is/are correct?

a. 1 only

b. 2 only

c. Both 1 and 2

d. Neither 1 nor 2

Answer : a

Provisional State of the Global Climate Report, 2023

This Report was recently released by the World Meteorological Organization (WMO) which confirms that, 2023 will be the warmest year on record by a large margin.

- Provisional State of the Global Climate Report, 2023 was released by the World Meteorological Organization (WMO).
- **Key highlights of the report** – 2023 is the warmest year in the 174-year observational record, surpassing the previous joint warmest years.
- ***The world is about to cross the long-term warming threshold of 1.5C***.
- Greenhouse gas levels, Global temperatures and Sea level rise are at a record high and are at a record high.
- Antarctic sea ice is at a record low.
- Greenhouse gas levels continue to increase and extreme weather causes death and devastation.
- The warming is clearly occurring because of the excess carbon dioxide and other greenhouse gases in the atmosphere which are at record levels.

5) Consider the following statements regarding Exit Polls

1. It is conducted after the completion of the voting process.
2. Only State run media is permitted to conduct Exit Polls.
3. The Election Commission has no powers with respect to Exit Polls.

How many of the above statement(s) is/are **incorrect**?

a. Only one

b. Only two

c. All Three

d. None of the above

Answer : b

Exit Poll and Opinion Poll

Recently the exit polls was conducted in the 5 states such as Telangana, Madhya Pradesh, Rajasthan, Mizoram, and Chhattisgarh for the state assembly elections.

- An opinion poll is a pre-election survey to gather voters' views on a range of election-related issues.
- An exit poll is a post-election survey that is conducted immediately after people have voted and assesses the support for political parties and their candidates.
- ***It is conducted by various survey agencies***.
- The first exit polls in India was conducted in 1957 during the second Lok Sabha elections by the Indian Institute of Public Opinion.
- Exit poll results are very useful to the media to fill a bit of airtime before the announcement of the results.
- A well-run exit poll can be extremely accurate.
- In February 2010, restrictions were imposed only on exit polls through the introduction of Section 126(A) in the RPA.
- ***Election Commission has powers to regulate Exit Polls***.