

**Q: Consider the following statement regarding CRISPR Technology:**

1. It has been successfully used for gene function, agriculture and medicine.
2. Cas9 enzyme protect the bacteria from future attacks by similar bacteriophages.
3. These short DNA sequences is absent in the genome of prokaryotic organisms.

Choose the correct option from the codes given below:

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

Ans: a

Explanation:

- CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) are short DNA sequences found in the genome of prokaryotic organisms such as bacteria, which are reminders of previous bacteriophage (viruses) attacks that the bacteria successfully defended against.
- Cas9 enzyme (part of bacteria's defence mechanism uses these flags to precisely target and cut any foreign DNA, thus protecting the bacteria from future attacks by similar bacteriophages.
- The unprecedented precision of targeting the DNA sequences and then efficiently cutting them is the basis for CRISPR-Cas9 technology, which has been recently demonstrated in editing genes in cells and organisms.
- CRISPR-Cas9 technology has been successfully used for many purposes, including basic studies of gene function, agriculture, and medicine to increase our knowledge of disease processes and their potential future therapies. So far, most binding trials were typically performed at 37 °C.

**Q: Consider the following statement regarding Black Sea Grain Initiative:**

1. The deal is brokered by USA.
2. The central idea was to calm markets by ensuring an adequate supply of grains, thereby limiting food price inflation.
3. Ukraine is among the largest exporters of wheat, maize, rapeseed, sunflower seeds and sunflower oil.

Choose the correct option from the codes given below:

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

Ans: b

Explanation:

- Black Sea Grain Initiative deal, brokered by the United Nations (UN) and Turkey, was signed in Istanbul on July 27, 2022. Initially stipulated for a period of 120 days, with an option to extend or terminate thereafter in November, the deal was to provide for a safe maritime humanitarian corridor for Ukrainian exports (particularly for food grains) from three of its key ports, namely, Chornomorsk, Odesa and Yuzhny/Pivdennyi.
- The central idea was to calm markets by ensuring an adequate supply of grains, thereby limiting food price inflation.
- Ukraine is among the largest exporters of wheat, maize, rapeseed, sunflower seeds and sunflower oil, globally. Its access to the deep-sea ports in the Black Sea enables it to directly approach Russia and Europe along with grain importers from the Middle East and North Africa.
- Russia's action in the East European country has now disturbed this route, earlier used to ship 75% of its agricultural exports – precisely what the initiative sought to address.

**Q: Consider the following statement:**

1. India announced its ambition to become a net-zero emitter by 2070 at COP26.
2. The bulk of these emissions in India are driven by six sectors.

Choose the correct option from the codes given below:

- a) 1 Only
- b) 2 Only
- c) 1 and 2
- d) None of the above

Ans: c

Explanation:

- India announced its ambition to become a net-zero emitter by 2070 at COP26—an important milestone in the fight against climate change.

- The report highlights that, despite low per-capita emissions (1.8 tons CO<sub>2</sub>), India is the third-largest emitter globally, emitting a net 2.9 gigatons of carbon-dioxide equivalent (GtCO<sub>2</sub>e) every year as of 2019. The bulk of these emissions (about 70 per cent) are driven by six sectors: power, steel, automotive, aviation, cement, and agriculture.

**Q: Consider the following statement regarding Cordy gold nanoparticles:**

1. It has earned an international patent from Germany.
2. Cordyceps militaris is a high value parasitic fungus.
3. Gold salts are ionic chemical compounds of gold generally used in medicine.

Choose the correct option from the codes given below:

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

Ans: d

Explanation:

- Cordy gold nanoparticles (Cor-AuNPs), the outcome of a collaborative experiment by scientists from four Indian institutions, has earned an international patent from Germany.
- These nanoparticles, derived from the synthesis of the extracts of Cordyceps militaris and gold salts, could make drug delivery in the human body faster and surer.
- Cordyceps militaris is a high value parasitic fungus, lab-grown at the Department of Biotechnology's Technology Incubation Centre (TIC) in Bodoland University.
- Gold salts are ionic chemical compounds of gold generally used in medicine.

**Q: McKinsey recently released a report titled, 'Decarbonising India: Charting a pathway for sustainable growth'. Consider the following statement regarding ten actions India may consider to accelerate its decarbonisation effort:**

1. Enable banks to support the transition.
2. Accelerate renewable adoption in the power sector.
3. No requirement of resilient indigenous manufacturing capability.

Choose the correct option from the codes given below:

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

Ans: a

Explanation:

- Lay out a detailed medium-term decarbonisation plan with sector-specific priorities and policy frameworks that account for interdependencies across sectors and provide demand signals to guide corporates to invest.
- Accelerate implementation of a compliance carbon market (within three years). This would also require the creation of demand signals, especially in hard-to-abate sectors, and incentives linked to investments in newer technologies like CCUS.
- Enable banks to support the transition, catalyzed by a green-transition bank. Banks could be asked to come up with their investment glide paths within one to two years and build the necessary capability for assessing risks in these new spaces.
- Accelerate renewable adoption in the power sector to scale up capacity addition by four times and to deepen market reforms with a 30-year outlook in a manner that ensures a stable grid fed predominantly by infirm power.
- Empower a nodal authority to define a national land-use plan. Lay clear land-use guidelines for optimized use across urbanization, industrial needs, carbon sinks, agriculture, and renewables.
- Create a resilient indigenous manufacturing capability and increase investment in cleantech R&D. Efforts would be needed to develop local raw-material resources (such as rare earths), secure materials from elsewhere in the world, and produce equipment locally through mechanisms like production-linked incentive (PLI).