



# Science and Technology

## Previous Years Questions Compilation

### UPSC CSE PRELIMS 2020

Q 1. Which of the following statements are correct regarding the general difference between plant and animal cells?

1. Plant cells have cellulose cell walls whilst animal cells do not.
2. Plant cells do not have plasma membranes unlike animal cells which do.
3. Mature plant cell has one large vacuole whilst an animal cell has many small vacuoles.

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) 1, 2 and 3

Q 2. In the context of recent advances in human reproductive technology, 'Pronuclear Transfer' is used for

- (a) Fertilization of egg in vitro by the donor sperm
- (b) Genetic modification of sperm producing cells
- (c) Development of stem cells into functional embryos
- (d) Prevention of mitochondrial diseases in offspring

Q 3. What is the importance of using Pneumococcal Conjugate Vaccines in India?

1. These vaccines are effective against pneumonia as well as meningitis and sepsis.
2. Dependence on antibiotics that are not effective against drug-resistant bacteria can be reduced.
3. These vaccines have no side effects and cause no allergic reactions.

Select the correct answer using the code given below :

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

Q 4. With reference to the carbon nanotubes, consider the following statement :

1. They can be used as the carriers of drugs and antigens in the human body.
2. They can be made into artificial blood capillaries for an injured part of the human body.
3. They can be used in biochemical sensors.
4. Carbon nanotubes are biodegradable.

Which of the statements given above are correct ?

- (a) 1 and 2 only
- (b) 2, 3 and 4 only
- (c) 1, 3 and 4 only
- (d) 1, 2, 3 and 4



Q 5. Consider the following statements :

1. Genetic changes can be introduced in the cells that produce eggs or sperms of a prospective parent.
2. A person's genome can be edited before birth at the early embryonic stage.
3. Human induced pluripotent stem cells can be injected into the embryo of a pig.

Which of the statements given above is/are correct ?

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

Q 6. With the present state of development, Artificial Intelligence can effectively do which of the following?

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-speech conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

- (a) 1, 2, 3 and 5 only
- (b) 1, 3, and 4 only {?}
- (c) 2, 4, and 5 only
- (d) 1, 2, 3, 4 and 5

Q 7. With reference to visible light communication (VLC) technology, which of the following statements are correct?

1. VLC uses electromagnetic spectrum wavelengths 375 to 780nm
2. VLC is known as long-range optical wireless communication
3. VLC can transmit large amounts of data faster than Bluetooth
4. VLC has no electromagnetic interference

Select the correct answer using the code given below

- (a) 1, 2 and 3 only
- (b) 1, 2 and 4 only
- (c) 1, 3 and 4 only
- (d) 2, 3 and 4 only

Q 8. In India, the term "Public Key Infrastructure" is used in the context of

- (a) Digital security infrastructure
- (b) Food security infrastructure
- (c) Health care and education infrastructure
- (d) Telecommunication and transportation infrastructure

Q 9. Consider the following activities :

1. Spraying pesticides on a crop field
2. Inspecting the craters of active volcanoes
3. Collecting breath samples from spouting whales for DNA analysis

At the present level of technology, which of the above activities can be successfully carried out by using drones ?

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



Q 10. The experiment will employ a trio of spacecraft flying in formation in the shape of an equilateral triangle that has sides one million kilometres long, with lasers shining between the craft.” The experiment in question refers to

- (a) Voyager-2
- (b) New Horizons
- (c) LISA Pathfinder
- (d) Evolved LISA

Q 11. With reference to solar water pumps, consider the following statements:

- 1. Solar power can be used for running surface pumps and not for submersible pumps,
- 2. Solar power can be used for running centrifugal pumps and not the ones with piston.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answers:

1. C 2. D 3. B 4. C 5. D 6. D 7. C 8. A 9. D 10. D 11. D



## UPSC CSE PRELIMS 2019

Q 1. The word 'Denisovan' is sometimes mentioned in media in reference to

- (a) fossil of a kind of dinosaurs
- (b) an early human species
- (c) a cave system found in North-East India
- (d) a geological period in the history of Indian subcontinent

Q 2. With reference to the recent developments in science, which one of the following statements is not correct?

- (a) Functional chromosomes can be created by joining segments of DNA taken from cells of different species.
- (b) Pieces of artificial functional DNA can be created in laboratories.
- (c) A piece of DNA taken out from an animal cell can be made to replicate outside a living cell in a laboratory.
- (d) Cells taken out from plants and animals can be made to undergo cell division in laboratory petri dishes.

Q 3. 'RNA interference (RNAi)' technology has gained popularity in the last few years.why?

- 1. It is used in developing gene silencing therapies.
- 2. It can be used in developing therapies for the treatment of cancer.
- 3. It can be used to develop hormone replacement therapies.
- 4. It can be used to produce crop plants that are resistant to virtual pathogens.

Select the correct answer using the code given below.

- (a) 1, 2 and 4
- (b) 2 and 3
- (c) 1 and 3
- (d) 1 and 4 only

Q 4. Which of the following are the reasons for the occurrence of multi-drug resistance in microbial pathogens in India?

- 1. Genetic predisposition of some people.
- 2. Taking incorrect doses of antibiotics to cure diseases.
- 3. Using antibiotics in livestock farming.
- 4. Multiple chronic diseases in some people.

Select the correct answer using the code given below.

- (a) 1 and 2
- (b) 2 and 3 only
- (c) 1,3 and 4
- (d) 2,3 and 4

Q 5. What is cas9 protein that is often mentioned in the news ?

- (a) A molecular scissors used in targeted gene editing.
- (b) A biosensor used in the accurate detection of pathogens in patients.
- (c) A gene that makes plants pest-resistant
- (d) A herbicidal substance synthesized in generally modified crops



Q 6. Which of the following statements is not correct?

- (a) Hepatitis B virus is transmitted much like HIV.
- (b) Hepatitis B, unlike Hepatitis C, does not have a vaccine.
- (c) Globally, the number of people infected with Hepatitis B and C viruses are several times more than those infected with HIV.
- (d) Some of those infected with Hepatitis B and C viruses do not show the symptoms for many years.

Q 7. With reference to communication technologies, what is/are the difference/differences between LTE (Long-Term Evolution) and VoLTE (Voice over Long-Term Evolution)?

- 1. LTE is commonly marketed as 3G and VoLTE is commonly marketed as advanced 3G.
- 2. LTE is data-only technology and VoLTE is voice-only technology.

Select the correct answer using the code given below

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q 8. In The context of digital technologies for entertainment, consider the following statements :

- 1. In Augmented Reality (AR), a simulated environment is created and the physical world is completely shut out.
- 2. In Virtual Reality (VR), images generated from the computer are projected onto real life objects or surroundings.
- 3. AR allows individuals to be present in the world and improves the experience using the camera of a smart-phone or PC.
- 4. VR closes the world, and transposes an individual, providing a complete immersion experience.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 and 4
- (c) 1, 2 and 3
- (d) 4 only

Q 9. Consider the following statements about a digital signature:

- 1. An electronic record that identifies the certifying authority issuing it.
- 2. Used to serve as a proof of identity of an individual to access information of server on the Internet.
- 3. an electronic method of signing an electronic document and ensuring that the original content is unchanged.

Which of the statements given above is/are correct?

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

Q 10. In the context of wearable technology, which of the following tasks is/are accomplished by wearable devices?

- 1. Location identification of a person
- 2. Sleep monitoring of a person
- 3. Assisting the hearing impaired person

Select the correct answer using the code given below.

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



Q 11. Recently, scientists observed the merger of giant 'blackholes' billions of light-years away from the earth. What is the significance of this observation?

- (a) 'Higgs boson particles' were detected.
- (b) 'Gravitational waves' were detected.
- (c) Possibility of intergalactic space travel through 'wormhole' was confirmed.
- (d) It enabled the scientists to understand 'singularity'.

Answers:

1. B 2. A 3. A 4. D 5. A 6. B 7. D 8. B 9. D 10. D 11. B



## UPSC CSE PRELIMS 2018

Q 1. Consider the following phenomena

1. Light is affected by gravity.
2. The Universe is constantly expanding.
3. Matter warps its surrounding space-time.

Which of the above is/are the prediction/predictions of Albert Einstein's General Theory of Relativity, often discussed in media ?

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

Q 2. Consider the following pairs of Terms sometimes seen in news vs Context /Topic: (Pre18 Set-D)

1. Belle II experiment: Artificial Intelligence
2. Blockchain technology: Digital/ Cryptocurrency
3. CRISPR — Cas9: Particle Physics

Which of the pairs given above is/are correctly matched ?

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

Q 3. Consider the following statements:

1. The Earth's magnetic field has reversed every few hundred thousand years.
2. When the Earth was created more than 4000 million years ago, there was 54% oxygen and no carbon dioxide.
3. When living organisms originated, they modified the early atmosphere of the Earth.

Which of the statements given above is/are correct?

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

Q 4. Consider the following:

1. Birds
2. Dust blowing
3. Rain
4. Wind blowing

Which of the above spread plant diseases?

- (a) 1 and 3 only
- (b) 3 and 4 only
- (c) 1, 2 and 4 only
- (d) 1, 2, 3 and 4

Q 5. With reference to the Genetically Modified mustard (GM mustard) developed in India, consider the following statements :

1. GM mustard has the genes of a soil bacterium that give the plant the property of pest-resistance to a wide variety of pests.
2. GM mustard has the genes that allow the plant cross-pollination and hybridization.



3. GM mustard has been developed jointly by the IARI and Punjab Agricultural University. Which of the statements given above is/are correct ?

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

Q 6. Which of the following leaf modifications occur(s) in the desert areas to inhibit water loss?

- 1. Hard and waxy leaves
- 2. Tiny leaves
- 3. Thorns instead of leaves

Select the correct answer using the code given below :

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

Q 7. When the alarm of your smartphone rings in the morning, you wake up and tap it to stop the alarm which causes your geyser to be switched on automatically. The smart mirror in your bathroom shows the day's weather and also indicates the level of water in your overhead tank. After you take some groceries from your refrigerator for making breakfast, it recognizes the shortage of stock in it and places an order for the supply of fresh grocery items. When you step out of your house and lock the door, all lights, fans, geysers and AC machines get switched off automatically. On your way to office, your car warns you about traffic congestion ahead and suggests an alternative route, and if you are late for a meeting, it sends a message to your office accordingly.

In the context of emerging communication technologies, which one of the following terms best applies to the above scenario?

- (a) Border Gateway Protocol
- (b) Internet of Things
- (c) Internet Protocol
- (d) Virtual Private Network

Q 8. In which of the following areas can GPS technology be used?

- 1. Mobile phone operations
- 2. Banking operations
- 3. Controlling the power grids

Select the correct answer using the code given below:

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

Q 9. The terms 'Wanna Cry, Petya and Eternal Blue' sometimes mentioned in the news recently are related to

- (a) Exo-planets
- (b) Crypto-currency
- (c) Cyber attacks
- (d) Mini satellites

Q 10. "3D printing" has applications in which of the following?

- 1. Preparation of confectionery items
- 2. Manufacture of bionic ears



3. Automotive industry
4. Reconstructive surgeries
5. Data processing technologies

Select the correct answer using the code given below :

- (a) 1, 3 and 4 only
- (b) 2, 3 and 5 only
- (c) 1 and 4 only
- (d) 1, 2, 3, 4 and 5

Q 11. The identity platform 'Aadhaar' provides open "Application Programming Interfaces (APIs)". What does it imply?

1. It can be integrated into any electronic device.
2. Online authentication using iris is possible.

Which of the statements given above is/are correct ?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q 12. With reference to the Indian Regional Navigation Satellite System (IRNSS), consider the following statements :

1. IRNSS has three satellites in geostationary and four satellites in geosynchronous orbits.
2. IRNSS covers entire India and about 5500 sq. km beyond its borders.
3. India will have its own satellite navigation system with full global coverage by the middle of 2019.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) None

Q 13. With reference to India's satellite launch vehicles, consider the following statements:

1. PSLVs launch satellites useful for Earth resources monitoring whereas GSLVs are designed mainly to launch communication satellites.
2. Satellites launched by PSLV appear to remain permanently fixed in the same position in the sky, as viewed from a particular location on Earth.
3. GSLV Mk III is a four-staged launch vehicle with the first and third stages using solid rocket motors; and the second and fourth stages using liquid rocket engines.

Which of the statements given above is/are correct.?

- (a) 1 only
- (b) 2 and 3
- (c) 1 and 2
- (d) 3 only

Answers:

1. D 2. B 3. C 4. D 5. B 6. D 7. B 8. D 9. C 10. D 11. C 12. A 13. A



## UPSC CSE PRELIMS 2017

Q 1. Consider the following pairs:

Commonly Used / Unwanted or controversial chemicals

1. Lipstick
2. Softdrinks
3. Chinese Fast Food

Consumed materials likely to be found in them

- Lead  
Brominated Vegetable Oils  
Monosodium Glutamate

Which of the pairs given above is/are correctly matched?

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

Q 2. Organic Light Emitting Diodes (OLEDs) are used to create digital displays in many devices. What are the advantages of OLED displays over Liquid Crystal displays?

1. OLED displays can be fabricated on flexible plastic substrates.
2. Roll-up displays embedded in clothing can be made using OLEDs.
3. Transparent displays are possible using OLEDs.

Select the correct answer using the code given below

- (a) 1 and 3 only
- (b) 2 only
- (c) 1, 2 and 3
- (d) None of the above statements is correct

Q 3. What is the application of Somatic Cell Nuclear Transfer Technology?

- (a) Production of biolarvicides
- (b) Manufacture of biodegradable plastics
- (c) Reproductive cloning of animals
- (d) Production of organisms free of diseases

Q 4. In India, it is legally mandatory for which of the following to report on cyber security incidents?

1. Service providers
2. Data centres
3. Body corporate

Select the correct answer using the code given below:

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

Q 5. What is the purpose of the 'evolved Laser Interferometer Space Antenna (eLISA)' project?

- (a) To detect neutrinos
- (b) To detect gravitational waves
- (c) To detect the effectiveness of missile defence system
- (d) To study the effect of solar flares on our communication systems

Q 6. The term 'Domestic Content Requirement' is sometimes seen in the news with reference to

- (a) Developing solar power production in our country



- (b) Granting licences to foreign T.V. channels in our country
- (c) Exporting our food products to other countries
- (d) Permitting foreign educational institutions to set up their campuses in our country

Q 7. The terms 'Event Horizon', 'Singularity', 'String Theory' and 'Standard Model' are sometimes seen in the news in the context of

- (a) Observation and understanding of the Universe
- (b) Study of the solar and the lunar eclipses
- (c) Placing satellites in the orbit of the Earth
- (d) Origin and evolution of living organisms on the Earth

Q 8. With reference to agriculture in India, how can the technique of 'genome sequencing', often seen in the news, be used in the immediate future?

1. Genome sequencing can be used to identify genetic markers for disease resistance and drought tolerance in various crop plants.
2. This technique helps in reducing the time required to develop new varieties of crop plants.
3. It can be used to decipher the host-pathogen relationships in crops.

Select the correct answer using the code given below:

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

Q 9. Which of the following statements is/are correct regarding Smart India Hackathon 2017?

1. It is a centrally sponsored scheme for developing every city of our country into Smart Cities in a decade.
2. It is an initiative to identify new digital technology innovations for solving the many problems faced by our country.
3. It is a programme aimed at making all the financial transactions in our country completely digital in a decade.

Select the correct answer using the code given below :

- (a) 1 and 3 only
- (b) 2 only
- (c) 3 only
- (d) 2 and 3 only

Answers:

1. D 2. C 3. C 4. D 5. B 6. A 7. A 8. D 9. B



## UPSC CSE PRELIMS 2016

Q 1. Project Loon', sometimes seen in the news, is related to

- (a) waste management technology
- (b) wireless communication technology
- (c) solar power production technology
- (d) water conservation technology

Q 2. With reference to 'Li-Fi', recently in the news, which of the following statements is/are correct?

- 1. It uses light as the medium for high-speed data transmission.
- 2. It is a wireless technology and is several times faster than 'WiFi'.

Select the correct answer using the code given below.

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q 3. With reference to 'Astrosat', the astronomical observatory launched by India, which of the following statements is/are correct?

- 1. Other than the USA and Russia, India is the only country to have launched a similar observatory into space.
- 2. Astrosat is a 2000 kg satellite placed in an orbit at 1650 km above the surface of the Earth.

Select the correct answer using the code given below.

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q 4. India is an important member of the 'International Thermonuclear Experimental Reactor'. If this experiment succeeds, what is the immediate advantage for India?

- (a) It can use thorium in place of uranium for power generation
- (b) It can attain a global role in satellite navigation
- (c) It can drastically improve the efficiency of its fission reactors in power generation
- (d) It can build fusion reactors for power generation

Q 5. Consider the following statements: The Mangalyaan launched by ISRO

- 1. is also called the Mars Orbiter Mission
- 2. made India the second country to have a spacecraft orbit the Mars after USA
- 3. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

Which of the statements given above is/are correct?

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

Q 6. In the context of the developments in Bioinformatics, the term 'transcriptome', sometimes seen in the news, refers to

- (a) a range of enzymes used in genome editing



- (b) the full range of mRNA molecules expressed by an organism
- (c) the description of the mechanism of gene expression
- (d) a mechanism of genetic mutations taking place in cells

Q 7. Which of the following statements is/are correct? Viruses can infect

- 1. bacteria
- 2. fungi
- 3. plants

Select the correct answer using the code given below.

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

Answers:

1. B 2. C 3. D 4. D 5. C 6. B 7. D