

**Science & Technology**  
**IT, Communication Networks and Space Technology**

1. What is the difference between a CFL and an LED lamp? (2011)
1. To produce light, a CFL uses mercury vapour and phosphor while an LED lamp uses semiconductor material
  2. The average life span of a CFL is much longer than that of an LED lamp
  3. A CFL is less energy-efficient as compared to an LED lamp

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

2. A new optical disc format known as the Blu-ray Disc (BD) is becoming popular. In what way is it different from the traditional DVD? (2011)

1. DVD supports Standard Definition video while BD supports High Definition video
2. Compared to a DVD, the BD format has several times more storage capacity
3. Thickness of BD is 2.4 mm while that of DVD is 1.2 mm

Which of the statements given above is/are correct?

- A. 1 only
- B. 1 and 2 only
- C. 2 and 3 only
- D. 1, 2 and 3

3. Satellites used for telecommunication relay are kept in a geostationary orbit. A satellite is said to be in such an orbit when: (2011)

1. The orbit is geosynchronous
2. The orbit is circular
3. The orbit lies in the plane of the Earth's equator
4. The orbit is at an altitude of 22,236 km

Select the correct answer using the codes given

- A. 1, 2 and 3 only
- B. 1, 3 and 4 only
- C. 2 and 4 only
- D. 1, 2, 3 and 4

4. What is the difference between Bluetooth and Wi-Fi devices? (2011)

- A. Bluetooth uses 2.4 GHz radio frequency band, whereas Wi-Fi can use 2.4 GHz or 5 GHz frequency band
- B. Bluetooth is used for Wireless Local Area Networks (WLAN) only, whereas Wi-Fi is used for Wireless Wide Area Networks (WWAN) only
- C. When information is transmitted between two devices using Bluetooth technology, the devices have to be in the line of sight of each other, but when Wi-Fi technology is used the devices need not be in the line of sight of each other
- D. The statements (a) and (b) given above are correct in this context

5. What is "Virtual Private Network"? (2011)

- A. It is a private computer network of an organization where the remote users can transmit encrypted information through the server of the organization
- B. It is a computer network across a public internet that provides users access to their organization's network while maintaining the security of the information transmitted
- C. It is a computer network in which users can access a shared pool of computing resources through a service provider.

- D. None of the statements (a), (b) and (c) given above is a correct description of Virtual Private Network

6. Which of the following pair is/are correctly matched? (2014)

**Spacecraft: Purpose**

1. Cassini-Huygens :Orbiting the Venus and transmitting data to the Earth
2. Messenger : Mapping and investigating the Mercury
3. Voyager 1 and 2 :Exploring the outer solar system

Select the correct answer using the code given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

7. Which reference to Agni-IV Missile, which of the following statements is/are correct? (2014)

1. It is a surface-to-surface missile
2. It is fuelled by liquid propellant only
3. It can deliver one-tonne nuclear warheads about 7500 km away

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

8. For the measurement/estimation of which of the following are satellite images/remote sensing data used?

1. Chlorophyll content in the vegetation of a specific location
2. Greenhouse gas emissions from rice paddies of a specific location
3. Land surface temperatures of a specific location

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

9. Consider the following statements:

1. According to the Indian Patents Act, a biological process to create a seed can be patented in India.
2. In India, there is no Intellectual Property Appellate Board.
3. Plant varieties are not eligible to be patented in India.

Which of the statements given above is/are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 3 only
- D. 1, 2 and 3

10. In the context of which one of the following are the terms "pyrolysis and plasma gasification" mentioned?

- A. Extraction of rare earth elements
- B. Natural gas extraction technologies
- C. Hydrogen fuel-based automobiles
- D. Waste-to-energy technologies

11. 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 a 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 smartphone or PC.
4. VR closes the world, and transposes an individual, providing 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

**12.** Consider the following statements: A digital signature is

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 or server on 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

**13.** 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

- A. 1 only
- B. 2 and 3 only
- C. 3 only
- D. 1, 2 and 3

**14.** 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 inter-galactic space travel through 'wormhole' was confirmed.
- D. It enabled the scientists to understand 'singularity'.

**15.** 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

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

**16.** Which of the following adopted a law on data protection and privacy for its citizens known as 'General Data Protection Regulation' in April 2016 and started implementation of it from 25th May, 2018?

- A. Australia
- B. Canada

- C. The European Union
- D. The United States of America

17. Recently, India signed a deal known as 'Action Plan for Prioritization and Implementation of Cooperation Areas in the Nuclear Field' with which of the following countries?
- A. Japan
  - B. Russia
  - C. The United Kingdom
  - D. The United States of America

**2020**

1. 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

2. 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

3. 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

4. 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

5. 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

6. 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

### 2022

1. Consider the following:

1. Aarogya Setu
2. COWIN
3. DigiLocker
4. DIKSHA

Which of the above are built on top of open-source digital platforms?

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

2. With reference to Web 3.0, consider the following statements:

1. Web 3.0 technology enables people to control their own data.
2. In Web 3.0 world, there can be blockchain based social networks.
3. Web 3.0 is operated by users collectively rather than a corporation

Which of the following given above are correct?

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

3. With reference to “Software as a Service (SaaS)”, consider the following statements:

1. SaaS buyers can customise the user interface and can change data fields.
2. SaaS users can access their data through their mobile devices.
3. Outlook, Hotmail and Yahoo! Mail are forms of SaaS.

Which of the statements given above are correct?

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

4. Which one of the following statements best reflects the idea behind the “Fractional Orbital Bombardment System” often talked about in media?

- (a) A hypersonic missile is launched into space to counter the asteroid approaching the Earth and explode it in space.
- (b) A spacecraft lands on another planet after making several orbital motions.
- (c) A missile is put into a stable orbit around the Earth and deorbits over a target on the Earth.
- (d) A spacecraft moves along a comet with the same surface. speed and places a probe on its

5. Which one of the following is the context in which the term “qubit” is mentioned?

- (a) Cloud Services
- (b) Quantum Computing
- (c) Visible Light Communication Technologies
- (d) Wireless Communication Technologies

6. Consider the following communication technologies:

1. Closed-circuit Television
2. Radio Frequency Identification
3. Wireless Local Area Network

Which of the above are considered of the Short-Range devices/technologies?

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

### BIO-TECHNOLOGY

**18.** A genetically engineered form of brinjal, known as the Bt-brinjal, has been developed. The objective of this is (2011)

- A. To make it pest-resistant
- B. To improve its taste and nutritive qualities
- C. To make it drought-resistant
- D. To make its shelf-life longer

**19.** Other than resistance to pests, what are the prospects for which genetically engineered plants have been created? (2012)

1. To enable them to withstand drought
2. To increase the nutritive value of the produce
3. To enable them to grow and do photosynthesis in spaceships and space stations
4. To increase their shelf life

Select the correct answer using the codes given

- A. 1 and 2 only
- B. 3 and 4 only
- C. 1, 2 and 4 only
- D. 1, 2, 3 and 4

**20.** Recombinant DNA technology (Genetic Engineering) allows genes to be transferred (2013)

1. Across different species of plants
2. From animals to plants
3. From microorganisms to higher organisms

Select the correct Solution using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**21.** Mycorrhizal biotechnology has been used in rehabilitating degraded sites because mycorrhiza enables the plants to (2013)

1. Resist drought and increase absorptive area
2. Tolerate extremes of PH
3. Resist disease infestation

Select the correct Solution using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**22.** In addition to fingerprint scanning, which of the following can be used in the biometric identification of a person? (2014)

1. Iris scanning
2. Retinal scanning
3. Voice recognition

Select the correct answer using the code given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**2019**

**23.** Consider the following statements :

1. According to the Indian Patents Act, a biological process to create a seed can be patented in India.
2. In India, there is no Intellectual Property Appellate Board.
3. Plant varieties are not eligible to be patented in India.

Which of the statements given above is/are correct?

- A. 1 and 3 only
- B. 2 and 3 only
- C. 3 only
- D. 1, 2 and 3

**24.** 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.

**25.** '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 viral pathogens.

Select the correct answer using the code given

- A. 1, 2 and 4
- B. 2 and 3
- C. 1 and 3
- D. 1 and 4 only

**26.** 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

- A. 1 and 2
- B. 2 and 3 only
- C. 1, 3 and 4
- D. 2, 3 and 4

**27.** What is Cas9 protein that is often mentioned in 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 pestresistant
- D. A herbicidal substance synthesized in genetically modified crops

**28.** Which one 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

**2020**

1. 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

2. 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

7. Consider the following statements:

- 1. Biofilms can form on medical implants within human tissues.
- 2. Biofilms can form on food and food processing surfaces.
- 3. Biofilms can exhibit antibiotic resistance.

Which of the statements given above are correct? (2022)

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

### **PHYSICS**

**29.** Graphene is frequently in news recently. What is its importance? (2012)

- 1. It is a two-dimensional material and has good electrical conductivity
- 2. It is one of the thinnest but strongest materials tested so far
- 3. It is entirely made of silicon and has high optical transparency
- 4. It can be used as 'conducting electrodes' required for touch screens, LCDs and organic LEDs

Which of the statements given above are correct?

- A. 1 and 2 only
- B. 3 and 4 only
- C. 1, 2 and 4 only
- D. 1, 2, 3 and 4

**30.** Consider the following: (2013)

1. Electromagnetic radiation
2. Geothermal energy
3. Gravitational force
4. Plate movements
5. Rotation of the earth
6. Revolution of the earth

Which of the above are responsible for bringing dynamic changes on the surface of the earth?

- A. 1, 2, 3 and 4 only
- B. 1, 3, 5 and 6 only
- C. 2, 4, 5 and 6 only
- D. 1, 2, 3, 4, 5 and 6

**31.** During a thunderstorm, the thunder in the skies is produced by the (2013)

1. Meeting of cumulonimbus clouds in the sky
2. Lightning that separates the nimbus clouds
3. Violent upward movement of air and water particles

Select the correct answer using the codes given

- A. 1 only
- B. 2 and 3
- C. 1 and 3
- D. None of the above

**32.** Consider the following phenomena: (2013)

1. Size of the sun at dusk
2. Colour of the sun at dawn
3. Moon being visible at dawn
4. Twinkle of stars in the sky
5. Polestar being visible in the sky

Which of the above are optical illusions?

- A. 1, 2 and 3
- B. 3, 4 and 5
- C. 1, 2 and 4
- D. 2, 3 and 5

**33.** Rainbow is produced when sunlight falls on drops of rain. Which of the following physical phenomena are responsible for this? (2013)

1. Dispersion
2. Refraction
3. Internal reflection

Select the correct Solution using the codes given

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

### Physics: Current Affairs

**34.** A team of scientists at Brookhaven National Laboratory including those from India created the heaviest anti-matter (anti-helium nucleus). What is/are the implication/ implications of the creation of anti-matter? (2012)

1. It will make mineral prospecting and oil exploration easier and cheaper
2. It will help probe the possibility of the existence of stars and galaxies made of anti-matter
3. It will help understand the evolution of the universe

Select the correct answer using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 3 only

D. 1, 2 and 3

**35.** The efforts to detect the existence of Higgs boson particle have become frequent news in the recent past. What is /are the importance/importance of discovering this particle? (2013)

1. It will enable us to understand as to why elementary particles have mass
2. It will enable us in the near future to develop the technology to transferring matter from one point to another without traversing the physical space between them
3. It will enable us to create better fuels for nuclear fission

Select the correct answer using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**36.** Which of the following is /are cited by the scientists as evidence/ evidences for the continued expansion of universe? (2012)

1. Detection of microwaves in space
2. Observation of redshift phenomenon in space
3. Movement of asteroids in space
4. Occurrence of supernova explosions in space

Select the correct answer using the codes given

- A. 1 and 2
- B. 2 only
- C. 1, 3 and 4
- D. None of the above can be cited as evidence

**37.** Electrically charged particles from space travelling at speeds of several hundred km/sec can severely harm living beings if they reach the surface of the Earth. What prevents them from reaching the surface of the Earth? (2012)

- A. The Earth's magnetic field diverts them towards its poles
- B. Ozone layer around the Earth reflects them back to outer space
- C. Moisture in the upper layers of atmosphere prevents them from reaching the surface of the Earth
- D. None of the statements (a), (b) and (c) given above is correct

**38.** Ball bearings are used in bicycles, cars, etc., because (2013)

- A. The actual between the is increased area of contact wheel and axle
- B. The effective between the is increased area of contact wheel and axle
- C. The effective between the is reduced area of contact wheel and axle
- D. None of the above statements is correct

**39.** The known forces of nature can be divided into four classes, viz, gravity electromagnetism, weak nuclear force and strong nuclear force. With reference to them, which one of the following statements is not correct? (2013)

- A. Gravity is the strongest of the four
- B. Electromagnetism act only on particles with an electric charge
- C. Weak nuclear force causes radioactivity
- D. Strong nuclear force holds protons and neutrons inside the nuclear of an atom.

### **BIOLOGY**

**40.** A married couple adopted a male child, A few years later; twin boys were born to them. The blood group of the couple is AB positive and O negative. The blood group of the three sons is A positive, B positive, and O positive. The blood group of the adopted son is (2011)

- A. O positive
- B. A positive
- C. B positive

D. Cannot be determined on the basis of the given data

**41.** At present, scientists can determine the arrangement or relative positions of genes or DNA sequences on a chromosome. How does this knowledge benefit us? (2011)

1. It is possible to know the pedigree of livestock
2. It is possible to understand the causes of all human diseases
3. It is possible to develop disease-resistant animal breeds

Which of the statements given above is/are correct?

- A. 1 and 2 only
- B. 2 only
- C. 1 and 3 only
- D. 1, 2 and 3

**42.** With reference to 'stem cells', frequently in the news, which of the following statements is/are correct? (2012)

1. Stem cells can be derived from mammals only
2. Stem cells can be used for screening new drugs
3. Stem cells can be used for medical therapies

Select the correct answer using the codes given

- A. 1 and 2 only
- B. 2 and 3 only
- C. 3 only
- D. 1, 2 and 3

**43.** Which of the following diseases can be transmitted from one person to another through tattooing?(2013)

1. Chikungunya
2. Hepatitis B
3. HIV-AIDS

Select the correct answer using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**44.** Consider the following minerals (2013)

1. Calcium
2. Iron
3. Sodium

Which of the minerals given above is/are required by human body for the contraction of muscles?

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**45.** Which of the following statements is/are correct? (2013)

1. Viruses lack enzymes necessary for the generation of energy
2. Viruses can be cultured in any synthetic medium
3. Viruses are transmitted from one organism to another by biological vectors only

Select the correct answer using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

46. Consider the following diseases (2014)

1. Diphtheria
2. Chickenpox
3. Smallpox

Which of the above diseases has/have been eradicated in India?

- A. 1 and 2 only
- B. 3 only
- C. 1, 2 and 3
- D. None

47. Consider the following pairs: (2014)

**Vitamin : Deficiency disease**

1. Vitamin C : Scurvy
2. Vitamin D : Rickets
3. Vitamin E : Night blindness

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

- A. 1 and 2 only
- B. 3 only
- C. 1, 2 and 3
- D. None

### 2020

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

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

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

### 2021

1. Water can dissolve more substances than any other liquid because.

- (a) It is dipolar in nature.
- (b) It is a good conductor of heat
- (c) It has high value of specific heat
- (d) It is an oxide of hydrogen

2. With reference to street lighting, how do sodium lamps differ from LED lamps?

1. Sodium lamps produce light at 360 degrees but it is not so in the case of LED lamps.

2. As street lights, sodium lamps have a longer life span than LED lamps.
3. The spectrum of visible light from sodium lamps is almost monochromatic while LED lamps offer significant colour advantages in street lighting.

Select the correct answer using the code given below.

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

3. The term “ACE2” is talked about in the context of

- (a) genes introduced in the genetically modified plants
- (b) development of India’s own satellite navigation system
- (c) radio collars for wildlife tracking
- (d) spread of viral diseases

4. Bisphenol A (BPA), a cause of concern, is a structural/key component in the manufacture of which of the following kinds of plastics?

- (a) Low-density polyethylene
- (b) Polycarbonate
- (c) Polyethylene terephthalate
- (d) Polyvinyl Chloride

5. “Triclosan” considered harmful when exposed to high levels for a long time, is most likely present in which of the following?

- (a) Food preservatives
- (b) Fruit ripening substances
- (c) reused plastic containers
- (d) Toiletries

6. Which one of the following is a reason why astronomical distances are measured in light-years?

- (a) Distance among stellar bodies do not change
- (b) Gravity of stellar bodies does not change
- (c) Light always travels in straight line
- (d) Speed of light is always same

7. With reference to recent developments regarding ‘Recombinant vector Vaccines’, consider the following statements:

1. Genetic engineering is applied in the development of these vaccines.
2. Bacteria and viruses are used as vectors.

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

8. In the context of hereditary diseases, consider the following statements:

1. Passing on mitochondrial diseases from parent to child can be prevented by mitochondrial replacement therapy either before or after in vitro fertilization of the egg.
2. A child inherits mitochondrial diseases entirely from the mother and not from the father.

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

9. Bollgard I and Bollgard II technologies are mentioned in the context of

- (a) Clonal propagation of crop plants
- (b) Developing genetically modified crop plants
- (c) Production of plant growth substances
- (d) Production of biofertilizers

10. In a pressure cooker, the temperature at which the food is cooked depends mainly upon which of the following?

1. Area of the hole in the lid
2. Temperature of the flame

### 3. Weight of the lid

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

11. Consider the following:

- 1. Bacteria
- 2. Fungi
- 3. Virus

Which of the above can be cultured in an artificial/ synthetic medium?

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

12. Consider the following statements:

- 1. Adenoviruses have single-stranded DNA genomes whereas retroviruses have double-stranded DNA genomes.
- 2. Common cold is sometimes caused by an adenovirus whereas AIDS is caused by a retrovirus.

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

13. Which one of the following is used in preparing a natural mosquito repellent?

- a) Congress grass
- b) Elephant grass
- c) Lemon grass
- d) Nut grass

**2022**

1. Consider the following statements in respect of probiotics :

- 1. Probiotics are made of both bacteria and yeast.
- 2. The organisms in probiotics are found in foods we ingest but they do not naturally occur in our gut.
- 3. Probiotics help in the digestion of milk sugars.

Which of the statements given above is/are correct?

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

2. In the context of vaccines manufactured to prevent COVID-19 pandemic, consider the following statements:

- 1. The Serum Institute of India produced COVID-19 vaccine named Covishield using mRNA platform.
- 2. Sputnik V vaccine is manufactured using vector based platform.
- 3. COVAXIN is an inactivated pathogen based vaccine.

Which of the statements given above are correct?

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

3. If a major solar storm (solar flare) reaches the Earth, which of the following are the possible effects on the Earth?

- 1. GPS and navigation systems could fail.
- 2. Tsunamis could occur at equatorial regions.
- 3. Power grids could be damaged.
- 4. Intense auroras could occur over much of the Earth.
- 5. Forest fires could take place over much of the planet.
- 6. Orbits of the satellites could be disturbed.
- 7. Shortwave radio communication of the aircraft flying over polar regions could be interrupted.

Select the correct answer using the code given below:

- (a) 1, 2, 4 and 5 only
- (b) 2, 3, 5, 6 and 7 only
- (c) 1, 3, 4, 6 and 7 only
- (d) 1, 2, 3, 4, 5, 6 and 7

4. Which one of the following statements best describes the role of B cells and T cells in the human body?

- (a) They protect the environmental allergens. body
- (b) They alleviate the body's pain and inflammation.
- (c) They act as immunosuppressants in the body.
- (d) They protect the body from the diseases caused by pathogens.

5. Consider the following statements:

- 1. Other than those made by humans, nanoparticles do not exist in nature.
- 2. Nanoparticles of some metallic oxides are used in the manufacture of some cosmetics.
- 3. Nanoparticles of some commercial products which enter the environment are unsafe for humans.

Which of the statements given above is/are correct?

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

6. Consider the following statements: DNA Barcoding can be a tool to:

- 1. assess the age of a plant or animal.
- 2. distinguish among species that look alike.
- 3. identify undesirable animal or plant materials in processed foods.

Which of the statements given above is/are correct?

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

### CHEMISTRY

48. The surface of a lake is frozen in severe winter, but the water at its bottom is still liquid. What is the reason? (2011)

- A. Ice is a bad conductor of heat
- B. Since the surface of the lake is at the same temperature as the air, no heat is lost
- C. The density of water is maximum at 4°C
- D. None of the statements (a), (b) and (c) given above is correct

49. The function of heavy water in a nuclear reactor is to (2011)

- A. Slow down the speed of neutrons
- B. Increase the speed of neutrons
- C. Cool down the reactor
- D. Stop the nuclear reaction

50. To meet its rapidly growing energy demand, some opine that India should pursue research and development on thorium as the future fuel of nuclear energy. In this context, what advantage does thorium hold over uranium? (2012)

- 1. Thorium is far more abundant in nature than uranium
- 2. On the basis of per unit mass of mined mineral, thorium can generate more energy compared to natural uranium
- 3. Thorium produces less harmful waste compared to uranium

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

**51.** Lead, ingested or inhaled, is a health hazard. After the addition of lead to petrol has been banned, what still are the sources of lead poisoning? (2012)

1. Smelting units
2. Pens and pencils
3. Hair oils and cosmetics

Select the correct answer using the codes given

- A. 1, 2 and 3 only
- B. 1 and 3 only
- C. 2 and 4 only
- D. 1, 2, 3 and 4

**BIOCHEMISTRY: (only basics)**

**52.** Fruits stored in a cold chamber exhibit longer storage life because (2013)

- A. Exposure to sunlight is prevented
- B. Concentration dioxide in the is increased of carbon environment
- C. Rate of respiration is decreased
- D. There is an increase in humidity

**53.** Many transplanted seedlings do not grow because (2013)

- A. The new soil does not contain favorable minerals
- B. Most of the root hairs grip the new soil too hard
- C. Most of the root hairs are lost during trsolutionplantation
- D. Leaves get damaged during trsolutionplantation

**54.** Which of the following is/are the example/examples of chemical change? (2014)

1. Crystallization of sodium chloride
2. Melting of ice
3. Souring of milk

Select the correct answer using the code given

- A. 1 and 2 only
- B. 3 only
- C. 1, 2 and 3
- D. None

**55.** In the context of the developments in Bioinformatics, the term 'transcriptome', sometimes seen in the news, refers to (2016)

- 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

**56.** Which one of the following is the best description of 'INS Astradharini', that was in the news recently? (2016)

- A. Amphibious warfare ship
- B. Nuclear-powered submarine
- C. Torpedo launch and recovery vessel
- D. Nuclear-powered aircraft carrier

**57.** What is 'Greased Lightning-10 (GL-10)', recently in the news? (2016)

- A. Electric plane tested by NASA
- B. Solar-powered two-seater aircraft designed by Japan
- C. Space observatory launched by China
- D. Reusable rocket designed by ISRO

**58.** Which of the following statements is/are correct? (2016) Viruses can infect:

1. Bacteria
2. Fungi
3. Plants

Select the correct answer using the code given

- A. 1 and 2 only
- B. 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**59.** On which of the following can you find the Bureau of Energy Efficiency Star Label? (2016)

1. Ceiling fans
2. Electric geysers
3. Tubular fluorescent lamps

Select the correct answer using the code given

- A. 1 and 2 only
- B. 3 only
- C. 2 and 3 only
- D. 1, 2 and 3

**60.** India is an important member of the 'International Thermonuclear Experimental Reactor'. If this experiment succeeds, what is the immediate advantage for India? (2016)

- 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

**61.** With reference to 'Astrosat', the astronomical observatory launched by India, which of the following statements is/are correct? (2016)

1. Other than 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

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

**62.** 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

**63.** 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

**64.** 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

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

**65.** 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

**66.** 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

- A. 1 only
- B. 1 and 2 only
- C. 3 only
- D. 1, 2 and 3

**67.** What is the purpose of '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

### **2018**

**52.** With reference to India's satellite launchvehicles, consider the following statements:

- 1. PSLV is launch the satellites useful for Earthresources monitoring whereas GSLVs aredesigned mainly to launch communicationsatellites.
- 2. Satellites launched by PSLV appear toremain permanently fixed in the sameposition in the sky, as viewed from aparticular location on Earth.
- 3. GSLV Mk III is a four-staged launch vehiclewith the first and third stages using solidrocket motors; and the second and fourthstages using liquid rocket engines.

Which of the statements given above is/arecorrect?

- A. 1 only
- B. 2 and 3
- C. 1 and 2
- D. 3 only

- 53.** What is “Terminal High Altitude Area Defense (THAAD)”, sometimes seen in the news?
- An Israeli radar system
  - India’s indigenous anti-missile programme
  - An American anti-missile system
  - A defence collaboration between Japan and South Korea

- 54.** “3D printing” has applications in which of the following?

- Preparation of confectionery items
- Manufacture of bionic ears
- Automotive industry
- Reconstructive surgeries
- Data processing technologies

Select the correct answer using the code given

- 1, 3 and 4 only
- 2, 3 and 5 only
- 1 and 4 only
- 1, 2, 3, 4 and 5

- 55.** With reference to the Indian Regional Navigation Satellite System (IRNSS), consider the following statements:

- IRNSS has three satellites in geostationary and four satellites in geosynchronous orbits.
- IRNSS covers entire India and about 5500 sq.km beyond its borders.
- 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?

- 1 only
- 1 and 2 only
- 2 and 3 only
- None

- 56.** Consider the following phenomena:

- Light is affected by gravity.
- The Universe is constantly expanding.
- 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?

- 1 and 2 only
- 3 only
- 1 and 3 only
- 1, 2 and 3

- 57.** With reference to the Genetically Modified mustard (GM mustard) developed in India, consider the following statements:

- GM mustard has the genes of a soil bacterium that give the plant the property of pest-resistance to a wide variety of pests.
- GM mustard has the genes that allow the plant cross-pollination and hybridization.
- GM mustard has been developed jointly by the IARI and Punjab Agricultural University.

Which of the statements given above is/are correct?

- 1 and 3 only

- B. 2 only
- C. 2 and 3 only
- D. 1,2 and 3

**58.** Consider the following pairs:

Terms sometimes seen in news- Context/Topice

1. Belle II experiment - Artificial intelligence
2. Blockchain technology Digital/Cryptocurrency
3. CRISPR - 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

**59.** 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

**60.** With reference to solar power production in India, consider the following statements:

1. India is the third largest in the world in the manufacture of silicon wafers used in photovoltaic units.
2. The solar power tariffs are determined by the Solar Energy Corporation of India.

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

**61.** In which of the following areas can GPS technology is used?

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

Select the correct answer using the codes given

- A. 1 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1,2 and 3