

NEET 2023 Solutions Code F1

Physics Questions & Solutions

Question 1. The ratio of radius of gyration of a solid sphere of mass M and radius R about its own axis to the radius of gyration of the thin hollow sphere of same mass and radius about its axis is

- (1) 5 : 3
- (2) 2 : 5
- (3) 5 : 2
- (4) 3 : 5

Answer (4)

Question 2. The work functions of Caesium (Cs), Potassium (K) and Sodium (Na) are 2.14 eV, 2.30 eV and 2.75 eV respectively. If incident electromagnetic radiation has an incident energy of 2.20 eV, which of these photosensitive surfaces may emit photoelectrons?

- (1) Both Na and K
- (2) K only
- (3) Na only
- (4) Cs only

Answer (4)

Solution. Energy of incident radiation = 2.80 eV

Work function of Cs \rightarrow 2.14 eV

Work function of K \rightarrow 2.30 eV

Work function of Na \rightarrow 2.75 eV

Since the work function of potassium and sodium are more than energy of incident radiation hence photons may be emitted from caesium.

Question 4. Resistance of a carbon resistor determined from colour codes is $(22000 \pm 5\%) \Omega$. The colour of third band must be

- (1) Green
- (2) Orange
- (3) Yellow
- (4) Red

Answer (2)

Solution. Resistance = $(22 \times 10^3) \Omega \pm 5\%$ Third band corresponds to decimal multiplier. Decimal multiplier = 103
 \Rightarrow Colour \rightarrow Orange

Question 7. Given below are two statements:

Statement I: Photovoltaic devices can convert optical radiation into electricity.

Statement II: Zener diode is designed to operate under reverse bias in breakdown region.

In the light of the above statements, choose the most appropriate answer from the options given below.

- (1) Both Statement I and Statement II are incorrect
- (2) Statement I is correct but Statement II is incorrect
- (3) Statement I is incorrect but Statement II is correct
- (4) Both Statement I and Statement II are correct

Answer (4)

Solution. Both Statements are correct.

I: Photovoltaic devices convert optical radiation into electricity.

II: Zener diodes are designed to operate under reverse bias in breakdown regions. e.g., Zener diode as a voltage regulator.

Question 8. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are

- (1) Personal errors
- (2) Least count errors
- (3) Random errors
- (4) Instrumental errors

Answer (3)

Solution. The errors which cannot be associated with any systematic or constant cause are called random errors. These errors can arise due to unpredictable fluctuations in experimental conditions. e.g., random change in pressure, temperature, voltage supply etc.

Question 9. If $\oint E \cdot dS = 0$ over a surface, then

- (1) The magnitude of electric field on the surface is constant
- (2) All the charges must necessarily be inside the surface
- (3) The electric field inside the surface is necessarily uniform
- (4) The number of flux lines entering the surface must be equal to the number of flux lines leaving it

Answer (4)

Solution. $\oint E \cdot dS = 0$ Net flux through the surface is zero. Therefore, the number of flux lines entering the surface must be equal to the number of flux lines leaving it.

Question 11. An ac source is connected to a capacitor C. Due to decrease in its operating frequency

- (1) Displacement current increases
- (2) Displacement current decreases
- (3) Capacitive reactance remains constant
- (4) Capacitive reactance decreases

Answer (2)

Solution $X_C = \frac{1}{\omega C}$

Since ω decreasing X_C will increase hence current will decrease also
conduction current = displacement current Therefore displacement current will decrease.

Question 13. The venturi-meter works on

- (1) Bernoulli's principle
- (2) The principle of parallel axes
- (3) The principle of perpendicular axes
- (4) Huygens's principle

Answer (1)

Solution. Venturi-meter works on the Bernoulli's principle.

Question 14. A full wave rectifier circuit consists of two p-n junction diodes, a centre-tapped transformer, capacitor and a load resistance. Which of these components remove the ac ripple from the rectified output?

- (1) p-n junction diodes
- (2) Capacitor
- (3) Load resistance
- (4) A centre-tapped transformer

Answer (2)

Solution. Capacitor removes the ac ripple from rectified output

Question 16. For Young's double slit experiment, two statements are given below:

Statement I : If screen is moved away from the plane of slits, angular separation of the fringes remains constant.

Statement II : If the monochromatic source is replaced by another monochromatic source of larger wavelength, the angular separation of fringes decreases.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.
- (2) Statement I is true but Statement II is false.
- (3) Statement I is false but Statement II is true.
- (4) Both Statement I and Statement II are true.

Answer (2)

Solution. For YDSE, angular fringe width is given by $\alpha = \frac{\lambda}{d}$

It does not depend on the distance of screen from the slit, so statement I is correct.

Angular fringe width $\propto \lambda$

If $\lambda \uparrow \rightarrow$ angular separation of fringes increases So, statement I is true and statement II is false

Question 20. A football player is moving southward and suddenly turns eastward with the same speed to avoid an opponent.

The force that acts on the player while turning is

- (1) Along northward
- (2) Along north-east
- (3) Along south-west
- (4) Along eastward

Answer (2)

Question 22. The angular acceleration of a body, moving along the circumference of a circle, is

- (1) Along the radius towards the centre
- (2) Along the tangent to its position
- (3) Along the axis of rotation

(4) Along the radius, away from center

Answer (3)

Solution. Angular acceleration of a body, moving along the circumference of a circle is along the axis of rotation.

Question 29. A Carnot engine has an efficiency of 50% when its source is at a temperature 327°C . The temperature of the sink is

- (1) 15°C
- (2) 100°C
- (3) 200°C
- (4) 27°C

Answer (4)

Question 36. A bullet from a gun is fired on a rectangular wooden block with velocity u . When bullet travels 24 cm through the block along its length horizontally, velocity of bullet becomes $3u$. Then it further penetrates into the block in the same direction before coming to rest exactly at the other end of the block. The total length of the block is

- (1) 24 cm
- (2) 28 cm
- (3) 30 cm
- (4) 27 cm

Answer (4)

Question 39. 10 resistors, each of resistance R are connected in series to a battery of emf E and negligible internal resistance. Then those are connected in parallel to the same battery, the current is increased n times. The value of n is

- (1) 100

- (2) 1
- (3) 1000
- (4) 10

Answer (1)

Chemistry Questions & Solutions

Question 54. Given below are two statements : one is labeled as Assertion A and the other is labeled as

Reason R :

Assertion A : A reaction can have zero activation energy.

Reasons R : The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both A and R are true and R is NOT the correct explanation of A
- (2) A is true but R is false
- (3) A is false but R is true
- (4) Both A and R are true and R is the correct explanation of A

Answer (1)

Solution. • Few reactions can have zero activation energy for example radical reactions.

• Activation energy is defined as the minimum amount of extra energy absorbed by reactants to achieve threshold energy.

Question 59. Which one of the following statements is correct?

- (1) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor
- (2) The bone in human body is an inert and unchanging substance
- (3) Mg plays roles in neuromuscular function and interneuronal transmission

(4) The daily requirement of Mg and Ca in the human body is estimated to be 0.2-0.3 g

Answer (4)

Solution. • All enzymes that utilize ATP in phosphate transfer require Mg as the co-factor.

- Bone in human body is not an inert and unchanging substance but is continuously being solubilised and redeposited.
- Ca plays important role in neuromuscular function, interneuronal transmission, cell membrane integrity and blood coagulation.
- The daily requirement of Mg and Ca in the human body is estimated to be 200 - 300 mg (0.2 - 0.3 g)

Question 61. Homoleptic complex from the following complexes is

- (1) Diamminechloridonitrito-N-platinum (II)
- (2) Pentaamminecarbonatocobalt (III) chloride
- (3) Triamminetriaquachromium (III) chloride
- (4) Potassium trioxalatoaluminate (III)

Answer (4)

Solution. • Complexes in which a metal is bound to only one kind of donor groups are called as homoleptic complexes

- Potassium trioxalatoaluminate (III) $K_3[Al(ox)_3]$ It is a homoleptic complex

Question 64. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Helium is used to dilute oxygen in diving apparatus.

Reason R : Helium has high solubility in O_2 .

In the light of the above statements, choose the correct answer from the options given below

- (1) Both A and R are true and R is NOT the correct explanation of A
- (2) A is true but R is false
- (3) A is false but R is true

(4) Both A and R are true and R correct explanation of A

Answer (1)

Solution. • Helium is used as diluent for oxygen in modern diving apparatus because of its very low solubility in blood.

- Gases diffuses easily with each other.

Question 65. Select the correct statements from the following

A. Atoms of all elements are composed of two fundamental particles.

B. The mass of the electron is 9.10939×10^{-31} kg.

C. All the isotopes of a given element show same chemical properties:

D. Protons and electrons are collectively known as nucleons.

E. Dalton's atomic theory, regarded the atom as an ultimate particles of matter

Choose the correct answer from the options given below

(1) C, D and E only

(2) A and E only

(3) B, C and E only

(4) A, B and C only

Answer (3)

Solution. • Atoms consist of three fundamental particles :

Electrons, protons and neutrons

- The mass of the electron is 9.10939×10^{-31} kg

- All the isotopes of a given element show same chemical properties.

- Protons and neutrons present in the nucleus are collectively called as nucleons.

- Dalton's atomic theory, regarded the atom as the ultimate particle of matter So, the correct statements are B, C, E only

Question 66. Which of the following statements are NOT correct?

A. Hydrogen is used to reduce heavy metal oxides to metals.

- B. Heavy water is used to study reaction mechanism.
- C. Hydrogen is used to make saturated fats from oils.
- D. The H–H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any elements.
- E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below:

- (1) B, D only
- (2) D, E only
- (3) A, B, C only
- (4) B, C, D, E only

Answer (2)

Solution . Statement A, B, C are correct

(D) H – H bond dissociation energy is maximum as compared to single bond between two atom of any element.

(E) Hydrogen reduces oxides of metal that are less active than iron.

Question 74. Intermolecular forces are forces of attraction and repulsion between interacting particles that will include :

- A. dipole - dipole forces
- B. dipole - induced dipole forces
- C. hydrogen bonding
- D. covalent bonding
- E. dispersion forces

Choose the most appropriate answer from the options given below :

- (1) A, B, C, D are correct
- (2) A, B, C, E are correct
- (3) A, C, D, E are correct
- (4) B, C, D, E are correct

Answer (2)

Solution . Intermolecular forces are the forces of attraction and repulsion between interacting molecules. This

the term does not include covalent bonds as covalent bond holds atoms of a molecule together. Hence, dipole - dipole forces, dipole - induced dipole forces, hydrogen bonding and dispersion forces are intermolecular forces.

Question 76. The element expected to form largest ion to achieve the nearest noble gas configuration is

- (1) F
- (2) N
- (3) Na
- (4) O

Answer (2)

Solution. For isoelectronic species, as the charge on anion increases, ionic size increases So, N forms N^{3-} anion with largest ionic size

Question 77. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?

- (1) Meprobamate
- (2) Valium
- (3) Veronal
- (4) Chlordiazepoxide

Answer (3)

Solution . Veronal is the derivative of Barbituric acid and considered as barbiturate. Meprobamate, valium and chlordiazepoxide are other tranquilizers

Question 97. Given below are two statements :

Statement I : The nutrient deficient water bodies lead to eutrophication

Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.

- (2) Statement I is correct but Statement II is false.
- (3) Statement I is incorrect but Statement II is true.
- (4) Both Statement I and Statement II are true.

Answer (3)

Solution. Nutrient enriched water bodies support a dense plant population, which kills animal life by depriving it of oxygen and results in subsequent loss of biodiversity. This process is called as eutrophication.

Question 99. Pumice stone is an example of

- (1) Gel
- (2) Solid sol
- (3) Foam
- (4) Sol

Answer (2)

Solution. Pumice stone is a solid sol.

Dispersed phase : Gas

Dispersed medium : Solid

Botany Questions & Solutions

Question 101. Which hormone promotes internode/petiole elongation in deep water rice?

- (1) Kinetin
- (2) Ethylene
- (3) 2, 4-D
- (4) GA3

Answer (2)

Solution . Ethylene promotes rapid internode/petiole elongation in deep water rice plants.

Question 102. Movement and accumulation of ions across a membrane against their concentration gradient can be explained by

- (1) Facilitated Diffusion
- (2) Passive Transport
- (3) Active Transport
- (4) Osmosis

Answer (3)

Solution. Movement and accumulation of ions across a membrane against their concentration gradient can be explained by active transport. It uses energy to transport molecules from lower concentration to a higher concentration.

Question 103. Large, colourful, fragrant flowers with nectar are seen in

- (1) Bird pollinated plants
- (2) Bat pollinated plants
- (3) Wind pollinated plants
- (4) Insect pollinated plants

Answer (4)

Solution. Large, colourful, fragrant flowers with nectar attract biotic pollinators (insects), thus, they are seen in insect pollinated plants.

Question 104. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as

- (1) Dedifferentiation
- (2) Development
- (3) Senescence
- (4) Differentiation

Answer (1)

Solution. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called

dedifferentiation. Dedifferentiation is a phenomenon by which the living differentiated plant cells, that by now have lost the capacity to divide can regain the capacity of division under certain conditions

Question 105. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year

- (1) 1992
- (2) 1986
- (3) 2002
- (4) 1985

Answer (1)

Solution. The historic convention on Biological Diversity, "The Earth Summit" was held in Rio de Janeiro in the year 1992. It called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits.

Question 106. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out

- (1) DNA
- (2) Histones
- (3) Polysaccharides
- (4) RNA

Answer (1)

Solution. Option (1) is the correct answer as, during isolation of the genetic material, purified DNA ultimately precipitates out after the addition of chilled ethanol. Option (2) is not the answer as, proteins can be removed by treatment with proteases. Option (4) is not the answer as RNA can be removed by treatment with ribonuclease.

Question 109. In gene gun method used to introduce alien DNA into host cells, microparticles of _____ metal are used.

- (1) Zinc

- (2) Tungsten or gold
- (3) Silver
- (4) Copper

Answer (2)

Solution. Option (2) is the correct answer because in gene gun method, microparticles of tungsten or gold are used. Gold or tungsten are inert in nature so they do not alter the chemical composition of cells.

Question 110. The phenomenon of pleiotropism refers to

- (1) Presence of two alleles, each of the two genes controlling a single trait
- (2) A single gene affecting multiple phenotypic expression
- (3) More than two genes affecting a single character
- (4) Presence of several alleles of a single gene controlling a single crossover

Answer (2)

Solution. When a single gene affects multiple phenotypic expressions, the gene is called pleiotropic gene and the phenomenon is called pleiotropism.

Question 111. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : Late wood has fewer xylary elements with narrow vessels.

Reason R : Cambium is less active in winters.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both A and R are true but R is NOT the correct explanation of A
- (2) A is true but R is false
- (3) A is false but R is true
- (4) Both A and R are true and R is the correct explanation of A

Answer (4)

Solution. In winter, the cambium is less active and forms fewer xylary elements that have narrow vessels, and this wood is called autumn wood or late wood.

Question 112. Among eukaryotes, replication of DNA takes place in :

- (1) S phase
- (2) G1phase
- (3) G2phase
- (4) M phase

Answer (1)

Solution. Replication of DNA takes place in S-phase of cell cycle in eukaryotes. Most of the cell organelles duplicate in G1 phase.

Question 113. Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabaceae but not found in Solanaceae or Liliaceae.

- (1) Polyadelphous and epipetalous stamens
- (2) Monadelphous and Monothealous anthers
- (3) Epiphyllous and Dithealous anthers
- (4) Diadelphous and Dithealous anthers

Answer (4)

Solution. Fabaceae → Diadelphous and dithealous anther.

Solanaceae → Polyandrous, epipetalous and dithealous anther.

Liliaceae → Polyandrous, epiphyllous and dithealous anther.

Question 114. Axile placentation is observed in

- (1) China rose, Beans and Lupin
- (2) Tomato, Dianthus and Pea
- (3) China rose, Petunia and Lemon
- (4) Mustard, Cucumber and Primrose

Answer (3)

solution. China rose, Tomato, Petunia and Lemon show axile placentation.
Dianthus and Primrose show free central placentation.
Pea, Lupin and Beans show marginal placentation.
Cucumber and mustard show parietal placentation.

Question 115. Identify the pair of heterosporous pteridophytes among the following :

- (1) Selaginella and Salvinia
- (2) Psilotum and Salvinia
- (3) Equisetum and Salvinia
- (4) Lycopodium and Selaginella

Answer (1)

Solution. Selaginella and Salvinia are heterosporous pteridophytes. They produce two different kinds of spores. Psilotum, Lycopodium and Equisetum are homosporous pteridophytes.

Question 116. The thickness of ozone in a column of air in the atmosphere is measured in terms of :

- (1) Decibels
- (2) Decameter
- (3) Kilobase
- (4) Dobson units

Answer (4)

Solution. The thickness of the ozone in a column of air from the ground to the top of the atmosphere is measured in terms of Dobson units (DU). Noise is measured in decibels.

Question 117. What is the function of tassels in the corn cob?

- (1) To trap pollen grains
- (2) To disperse pollen grains
- (3) To protect seeds

(4) To attract insects

Answer (1)

Solution. Tassels in the corn cob represent stigma and style which wave in the wind to trap pollen grains.

Question 118. Given below are two statements : One labelled as Assertion A and the other labelled as Reason R:

Assertion A : The first stage of gametophyte in the life cycle of moss is protonema stage.

Reason R : Protonema develops directly from spores produced in capsule.

In the light of the above statements, choose the most appropriate answer from options given below:

- (1) Both A and R are correct but R is not the correct explanation of A
- (2) A is correct but R is not correct
- (3) A is not correct but R is correct
- (4) Both A and R are correct and R is correct explanation of A

Answer (4)

Solution. The predominant stage of the life cycle of a moss is the gametophyte which consists of two stages. The first stage is the protonema stage, which develops directly from a spore. Capsule of the sporophyte contains spore which gives rise to protonema. Thus, reason correctly explains the assertion.

Question 119. Given below are two statements :

Statement I : The forces generated transpiration can lift a xylem-sized column of water over 130 meters height.

Statement II : Transpiration cools leaf surfaces sometimes 10 to 15 degrees evaporative cooling.

In the light of the above statements, choose the most appropriate answer from the options given below :

- (1) Both Statement I and Statement II are incorrect

- (2) Statement I is correct but Statement II is incorrect
- (3) Statement I is incorrect but Statement II is correct
- (4) Both Statement I and Statement II are correct

Answer (4)

Solution. Statement I is correct as measurements reveal that the forces generated by transpiration can create pressures sufficient to lift a xylem sized column of water up to 130 meters high. Statement II is also correct as transpiration cools leaf surfaces, sometimes 10 to 15 degrees, by evaporative cooling.

Question 120. Spraying of which of the following phytohormone on juvenile conifers helps hastening the maturity period, That leads to early seed production?

- (1) Gibberellic Acid
- (2) Zeatin
- (3) Absciscic Acid
- (4) Indole-3-butyric Acid

Answer (1)

Solution. Spraying juvenile conifers with gibberellins (GAs) hastens the maturity period, thus leading to early seed production.

Question 121. Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on chromosome, was used for the first time by

- (1) Sutton and Boveri
- (2) Alfred Sturtevant
- (3) Henking
- (4) Thomas Hunt Morgan

Answer (2)

Solution . Alfred Sturtevant used the frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes and 'mapped' their position on the chromosome.

Sutton and Boveri proposed chromosomal theory of inheritance.

Henking discovered the X-chromosome.

Thomas Hunt Morgan proved chromosomal theory of inheritance and proposed the concept of linkage.

Question 122. Expressed Sequence Tags (ESTs) refers to

- (1) All genes that are expressed as proteins.
- (2) All genes whether expressed or unexpressed.
- (3) Certain important expressed genes.
- (4) All genes that are expressed as RNA.

Answer (4)

Solution. All the genes that are expressed as RNA are referred to as Expressed Sequence Tags (ESTs).

Question 123. Upon exposure to UV radiation, DNA stained with ethidium bromide will show

- (1) Bright blue colour
- (2) Bright yellow colour
- (3) Bright orange colour
- (4) Bright red colour

Answer (3)

Solution. Option (3) is the correct answer because in recombinant DNA technology the separated DNA fragments can be visualised only after staining the DNA with a substance known as ethidium bromide followed by exposure to U.V. radiation. You can see bright orange coloured bands of DNA in an ethidium bromide stained gel exposed to U.V. light.

Question 124. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : ATP is used at two steps in glycolysis.

Reason R : First ATP is used in converting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1, 6-diphosphate.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both A and R are true but R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

Answer (4)

Solution. ATP in glycolysis is used at two steps of conversion that are
Glucose → Glucose-6-phosphate Fructose-6-phosphate → Fructose-1, 6-bisphosphate
The reason of the utilisation of ATP is for phosphorylation the substrates.

Question 125. Unequivocal proof that DNA is the genetic material was first proposed by

- (1) Alfred Hershey and Martha Chase
- (2) Avery, Macleoid and McCarthy
- (3) Wilkins and Franklin
- (4) Frederick Griffith

Answer (1)

Question 149. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.

Reason R : Internode of the shoot gets condensed to produce different floral appendages laterally at successive node instead of leaves.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both A and R are true but R is NOT the correct explanation of A
- (2) A is true but R is false
- (3) A is false but R is true
- (4) Both A and R are true and R correct explanation of A

Answer (4)

Solution. A flower is a modified shoot wherein the shoot apical meristem changes to floral meristem. Internodes do not elongate and the axis gets condensed. The apex produces different kinds of floral appendages laterally at the successive nodes instead of leaves. Therefore, both A and R are true and R is correct explanation of A.

Question 150. Main steps in the formation of Recombinant DNA are given below. Arrange these steps in a correct sequence.

- A Insertion of recombinant DNA into the host cell
- B Cutting of DNA at specific location by restriction enzyme
- C Isolation of desired DNA fragment
- D Amplification of gene of interest using PCR

Choose the correct answer from the options given below :

- (1) C, A, B, D
- (2) C, B, D, A
- (3) B, D, A, C
- (4) B, C, D, A

Answer (4)

Solution. The correct answer is option (4) because recombinant DNA technology involves several steps in specific sequence such as isolation of DNA, fragmentation of DNA by restriction endonucleases, isolation of desired DNA fragment, ligation of the DNA fragment into a vector, transferring the recombinant DNA into the host, culturing the host cells in a medium at large scale and extraction of the desired product.

Zoology Questions & Solutions

Question 151. Which of the following statements are correct regarding female reproductive cycle?

- A. In non-primate mammals cyclical changes during reproduction are called oestrus cycle.
- B. First menstrual cycle begins at puberty and is called menopause.
- C. Lack of menstruation may be indicative of pregnancy.
- D. Cyclic menstruation extends between menarche and menopause.

Choose the most appropriate answer from the options given below.

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

Answer (3)

Solution. The correct answer is option (3) as first menstrual cycle that begins at puberty is called menarche. Cyclic menstruation is an indicator of normal reproductive phase and extends between menarche and menopause. In primates, cyclical changes during reproduction are called menstrual cycle.

Question 152. Given below are two statements: one is labelled as Assertion A and other is labelled as Reason R.

Assertion A : Amniocentesis for sex determination is one of the strategies of Reproductive and Child Health Care Programme.

Reason R : Ban on amniocentesis checks increasing menace of female foeticide.

In the light of the above statements, choose the correct answer from the options given below.

- (1) Both A and R are true and R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

Answer (3)

Solution. The correct answer is option (3) as 'Reproductive and Child Health Care (RCH) programme' deals with creating awareness among people about various reproduction related aspects and providing facilities and support for building up a reproductively healthy society.

Amniocentesis is basically used to test for the presence of certain genetic disorders such as Down's syndrome, hemophilia, etc., to determine the survivability of the fetus. Amniocentesis is not a sex determination technique in India and is not a strategy of RCH

Question 154. Vital capacity of lung is _____.

- (1) $IRV + ERV + TV + RV$
- (2) $IRV + ERV + TV - RV$
- (3) $IRV + ERV + TV$
- (4) $IRV + ERV$

Answer (3)

Solution. Option (3) is the correct answer because vital capacity is the maximum volume of air a person can breathe in after forced expiration. This includes ERV, TV and IRV.

Question 155. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly?

- (1) Gonorrhea
- (2) Hepatitis-B
- (3) HIV Infection
- (4) Genital herpes

Answer (1)

Solution. The correct answer is option (1) because except for hepatitis-B, genital herpes and HIV infection other STIs are completely curable if

detected early and treated properly. Gonorrhoea is a bacterial disease which can be treated and cured completely, other diseases mentioned are viral diseases

Question 159. In which blood corpuscles, the HIV undergoes replication and produces progeny viruses?

- (1) B-lymphocytes (2) Basophils
(3) Eosinophils (4) TH cells

Answer (4)

Solution. The correct answer is option (4) because HIV enters into helper T-lymphocytes (TH), replicates and produces progeny viruses. The progeny viruses released into blood attack other helper lymphocytes.

Question 160. Given below are two statements :

Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both Statement I and Statement II are false.
(2) Statement I is true but Statement II is false.
(3) Statement I is false but Statement II is true.
(4) Both Statement I and Statement II are true.

Answer (4)

Solution. The correct answer is option (4) as low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

- Competitive inhibitor due to its close structural similarity with the substrate, competes with the substrate for the substrate-binding site of the enzyme.

Question 161. Given below are two statements:

Statement I: Ligaments are dense irregular tissue.

Statement II: Cartilage is dense regular tissue.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false
- (2) Statement I is true but Statement II is false
- (3) Statement I is false but Statement II is true
- (4) Both Statement I and Statement II are true

Answer (1)

Solution. Option (1) is the correct answer because ligament is an example of dense regular connective tissue so Statement I is incorrect and cartilage is an example of specialised connective tissue and not dense regular tissue. Therefore Statement II is also incorrect.

Question 162. Which of the following are NOT considered as the part of endomembrane system?

- A. Mitochondria
- B. Endoplasmic reticulum
- C. Chloroplasts
- D. Golgi complex
- E. Peroxisomes

Choose the most appropriate answer from the options given below:

- (1) A, C and E only
- (2) A and D only
- (3) A, D and E only
- (4) B and D only

Answer (1)

Solution. The endomembrane system include endoplasmic reticulum (ER), golgi complex, lysosomes and vacuoles. Since the functions of the mitochondria, chloroplast and peroxisomes are not coordinated with the

above components, these are not considered as part of endomembrane system

Question 164. Broad palm with single palm crease is visible in a person suffering from-

- (1) Turner's syndrome
- (2) Klinefelter's syndrome
- (3) Thalassemia
- (4) Down's syndrome

Answer (4)

Solution. Down's syndrome is caused by an additional copy of chromosome number 21. Its symptoms include—

- a. Broad palm with characteristic palm crease
- b. Short statured with small round head
- c. Furrowed tongue and partially open mouth, etc.

Question 165. Which of the following statements is correct?

- (1) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels.
- (2) Presence of large amount of nutrients in water restricts 'Algal Bloom'
- (3) Algal Bloom decreases fish mortality
- (4) Eutrophication refers to the increase in domestic sewage and waste water in lakes.

Answer (1)

Solution. Increase in the concentration of the toxicant at successive trophic levels is called biomagnification. Large amount of nutrients in water promotes the growth of algal blooms. Algal bloom increases fish mortality. Eutrophication refers to the natural aging of a lake by nutrient enrichment of its waste.

Question 167. Given below are two statements:

Statement I: Electrostatic precipitator is most widely used in thermal power plant

Statement II : Electrostatic precipitator in thermal power plant removes ionizing radiations

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Both Statement I and Statement II are incorrect.
- (2) Statement I is correct but Statement II is incorrect.
- (3) Statement I is incorrect but Statement II is correct.
- (4) Both Statement I and Statement II are correct.

Answer (2)

Solution. Electrostatic precipitator is most widely used in thermal power plants. It can remove over 99 percent particulate matter present in the exhaust from a thermal power plant.

Question 168. Given below are two statements:

Statement I: Vas deferens receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct.

Statement II: The cavity of the cervix is called cervical canal which along with vagina forms birth canal.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.
- (2) Statement I is correct but Statement II is false.
- (3) Statement I is incorrect but Statement II is true.
- (4) Both Statement I and Statement II are true.

Answer (4)

Solution. Option (4) is the correct answer to this question because statement I and statement II both are correct.

Vas deferens receives a duct from the seminal vesicle and opens into the urethra as the ejaculatory duct. The cavity of the cervix is called the cervical canal which along with vagina forms the birth canal.

Question 169. Radial symmetry is NOT found in adults of phylum _____.

- (1) Hemichordata
- (2) Coelenterata

- (3) Echinodermata
- (4) Ctenophora

Answer (1)

Solution. Option (1) is the correct answer because hemichordates are bilaterally symmetrical animals.

Option (2) is not the answer because coelenterates are radially symmetrical organisms.

Option (3) is not the answer because adult echinoderms are radially symmetrical in adult stage

Option (4) is not the answer because ctenophores are radially symmetrical organisms.

Question 172. Which of the following functions is carried out by cytoskeleton in a cell?

- (1) Protein synthesis
- (2) Motility
- (3) Transportation
- (4) Nuclear division

Answer (2)

Solution. An elaborate network of filamentous proteinaceous structures consisting of microtubules, microfilaments and intermediate filaments present in cytoplasm is collectively referred to as the cytoskeleton.

It is involved in many functions such as mechanical support, motility, maintenance of the shape of the cell.

Question 173. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by

- (1) Ileo-caecal valve
- (2) Gastro-oesophageal sphincter
- (3) Pyloric sphincter
- (4) Sphincter of Oddi

Answer (1)

Solution. Option (1) is the correct answer because the undigested food (faeces) enters into caecum of the large intestine through ileo-caecal valve, which prevents the backflow of the faecal matter.

Option (2) is not the answer because a muscular sphincter i.e., the gastro-oesophageal sphincter regulates the opening of oesophagus into the stomach.

Option (3) is not the answer because pyloric sphincter regulates the opening in between stomach and duodenum.

Option (4) is not the answer because the opening of common hepato-pancreatic duct is guarded by sphincter of Oddi.

Question 176. Given below are two statements:

Statement I: RNA mutates at a faster rate.

Statement II: Viruses having RNA genome and shorter life span mutate and evolve faster.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are false.

(2) Statement I is true but Statement II is false.

(3) Statement I is false but Statement II is true.

(4) Both Statement I and Statement II are true.

Answer (4)

Solution. RNA being unstable, mutate at a faster rate. Consequently, viruses having RNA genome and having shorter life span mutate and evolve faster.

Question 177. Given below are two statements:

Statement I: In prokaryotes, the positively charged DNA is held with some negatively charged proteins in a region called nucleoid.

Statement II: In eukaryotes, the negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.
- (2) Statement I is correct but Statement II is false.
- (3) Statement I is incorrect but Statement II is true.
- (4) Both Statement I and Statement II are true.

Answer (3)

Solution. In prokaryotes, the negatively charged DNA is held with some positively charged proteins in a region termed as nucleoid. In eukaryotes, the negatively charged DNA is wrapped around the positively charged histone octamer to form a structure called nucleosome.

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