

NEET 2023 Solutions Code E4

Physics Questions & Solutions

Question 1. The ratio of frequencies of fundamental harmonic produced by an open pipe to that of closed pipe having the same length is

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

Answer (2)

Question 3. An ac source is connected to a capacitor C. Due to decrease in its operating frequency

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

Answer (3)

Question 5. The venturi-meter works on

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

Answer (2)

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

Question 6. The angular acceleration of a body, moving along the circumference of a circle, is

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

Answer (4)

Solution. Angular acceleration of a body, moving along the circumference of a circle is along the axis of rotation. 7. The magnitude and direction of the current in the following circuit is

Question 8. 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 eastward
- (2) Along northward
- (3) Along north-east
- (4) Along south-west

Answer (3)

Question 9. The potential energy of a long spring when stretched by 2 cm is U . If the spring is stretched by 8 cm, potential energy stored in it will be

- (1) $2U$
- (2) $4U$
- (3) $8U$
- (4) $16U$

Answer (4)

Question 12. 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) A centre-tapped transformer
- (2) p-n junction diodes
- (3) Capacitor
- (4) Load resistance

Answer (3)

Solution. Capacitor removes the ac ripple from rectified output.

Question 15. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are

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

Answer (4)

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 17. A metal wire has mass (0.4 ± 0.002) g, radius (0.3 ± 0.001) mm and length (5 ± 0.02) cm. The maximum possible percentage error in the measurement of density will nearly be

- (1) 1.2%
- (2) 1.3%
- (3) 1.6%
- (4) 1.4%

Answer (3)

Question 18. 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) Cs only
- (2) Both Na and K
- (3) K only
- (4) Na only

Answer (1)

Solution. Energy of incident radiation = 2.20 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 24. 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 correct
- (2) Both Statement I and Statement II are incorrect
- (3) Statement I is correct but Statement II is incorrect
- (4) Statement I is incorrect but Statement II is correct

Answer (1)

Solution. Both Statements are correct. I: Photovoltaic devices convert optical radiation into electricity. II: Zener diode is designed to operate under reverse bias in breakdown region. e.g., Zener diode as a voltage regulator

Question 25. 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 true.
- (2) Both Statement I and Statement II are false.
- (3) Statement I is true but Statement II is false.
- (4) Statement I is false but Statement II is true.

Answer (3)

Solution. For YDSE, angular fringe width is given by $\alpha = \frac{\gamma}{D}$ It does not depend on the distance of screen from the slit, so statement I is correct. Angular fringe width $\alpha \propto \gamma$ If $\gamma \uparrow \rightarrow$ angular separation of fringes increases So, statement I is true and statement II is false

Question 27. Resistance of a carbon resistor determined from colour codes is $(22000 \pm 5\%)$. The colour of third band must be

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

Answer (3)

Question 49. 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) 10
- (2) 100
- (3) 1
- (4) 1000

Answer (2)

Chemistry Questions & Solutions

Question 53. 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, C, D, E only
- (2) B, D only
- (3) D, E only
- (4) A, B, C only

Answer (3)

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 54. Amongst the given options which of the following molecules/ion acts as a Lewis acid?

- (1) NH_3
- (2) H_2O
- (3) BF_3
- (4) OH^-

Answer (3)

Question 57. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is :

- (1) 16
- (2) 32
- (3) 30
- (4) 18

Answer (2)

Question 61. Given below are two statements : one is labelled as Assertion A and the other is labelled 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 the correct explanation of A
- (2) Both A and R are true and R is NOT the correct explanation of A
- (3) A is true but R is false
- (4) A is false but R is true

Answer (2)

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 62. Homoleptic complex from the following complexes is

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

Answer (1)

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 63. Which one is an example of heterogeneous catalysis?

- (1) Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen
- (2) Hydrolysis of sugar catalysed by H^+ ions
- (3) Decomposition of ozone in presence of nitrogen monoxide
- (4) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron

Answer (4)

Question 64. Given below are two statements : one is labelled as

Assertion A and the other is labelled as Reason R :

Assertion A : Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

Reason R : The deep blue solution is due to the formation of amide. 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 the correct explanation of A
- (2) Both A and R are true but R is NOT the correct explanation of A

- (3) A is true but R is false
- (4) A is false but R is true

Answer (3)

Question 65. 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) B, C, D, E are correct
- (2) A, B, C, D are correct
- (3) A, B, C, E are correct
- (4) A, C, D, E are correct

Answer (3)

Solution. Intermolecular forces are the forces of attraction and repulsion between interacting molecules. This 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 67. A compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy $\frac{1}{3}$ of tetrahedral voids. If the formula of the compound is A_xB_y , then the value of $x + y$ is in option

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

Answer (1)

Question 71. Which one of the following statements is correct?

- (1) The daily requirement of Mg and Ca in the human body is estimated to be 0.2-0.3 g
- (2) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor
- (3) The bone in human body is an inert and unchanging substance
- (4) Mg plays roles in neuromuscular function and interneuronal transmission

Answer (1)

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 75. Amongst the following the total number of species NOT having eight electrons around central atom in its outermost shell, is NH_3 , AlCl_3 , BeCl_2 , CCl_4 , PCl_5 :

- (1) 3
- (2) 2
- (3) 4
- (4) 1

Answer (1)

Question 76. 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) A, B and C only

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

Answer (4)

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

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

Answer (3)

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

Question 83. 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 correct explanation of A
- (2) Both A and R are true and R is NOT the correct explanation of A
- (3) A is true but R is false
- (4) A is false but R is true

Answer (2)

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

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

Answer (4)

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

Answer (4)

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 98. Pumice stone is an example of

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

Answer (3)

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

Answer (3)

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

Question 102. 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 and R is the correct explanation of A.
- (2) Both A and R are true but R is NOT the correct explanation of A.
- (3) A is true but R is false.
- (4) A is false but R is true.

Answer (1)

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

Answer (1)

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 104. The reaction centre in PS II has an absorption maxima at
(1) 680 nm

- (2) 700 nm
- (3) 660 nm
- (4) 780 nm

Answer (1)

Solution. In PS-I, the reaction centre chlorophyll a has an absorption peak at 700 nm, while in PS-II, reaction centre has an absorption maxima at 680 nm.

Question 105. 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) Diadelphous and Ditheous anthers
- (2) Polyadelphous and epipetalous stamens
- (3) Monadelphous and Monotheous anthers
- (4) Epiphyllous and Ditheous anthers

Answer (1)

Solution. Fabaceae → Diadelphous and ditheous anther. Solanaceae → Polyandrous, epipetalous and ditheous anther. Liliaceae → Polyandrous, epiphyllous and ditheous anther.

Question 106. 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 and R is the correct explanation of A
- (2) Both A and R are correct but R is NOT the correct explanation of A (3) A is correct but R is not correct
- (4) A is not correct but R is correct

Answer (1)

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 107. Axile placentation is observed in

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

Answer (4)

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

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

Answer (2)

Solution. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as 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 109. 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) Thomas Hunt Morgan
- (2) Sutton and Boveri
- (3) Alfred Sturtevant
- (4) Henking

Answer (3)

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

Question 110. Spraying of which of the following phytohormone on juvenile conifers helps in hastening the maturity period, that leads to early seed production?

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

Answer (2)

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

Question 111. Large, colourful, fragrant flowers with nectar are seen in

- (1) Insect pollinated plants

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

Answer (1)

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

Question 113. Which of the following stages of meiosis involves division of centromere?

- (1) Metaphase I
- (2) Metaphase II
- (3) Anaphase II
- (4) Telophase

Answer (3)

Solution. Splitting of centromere occurs during anaphase of mitosis or anaphase II of meiosis. During Metaphase I and II, chromosomes align at the equator. During telophase, chromosomes reach the respective poles.

Question 114. Which micronutrient is required for splitting of water molecule during photosynthesis?

- (1) Manganese
- (2) Molybdenum
- (3) Magnesium
- (4) Copper

Answer (1)

Solution. Manganese plays a major role in the splitting of water to liberate oxygen during photosynthesis. Copper is essential for the overall metabolism in plants. Molybdenum is included in nitrogen metabolism. Magnesium activates several enzymes involved in photosynthesis and respiration.

Question 115. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out

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

Answer (2)

Solution. Option (2) is the correct answer as, during isolation of the genetic material, purified DNA ultimately precipitates out after the addition of chilled ethanol. Option (3) is not the answer as, proteins can be removed by treatment with proteases. Option (1) is not the answer as RNA can be removed by treatment with ribonuclease.

Question 116. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?

- (1) Transcription of rRNAs (28S, 18S and 5.8S)
- (2) Transcription of tRNA, 5S rRNA and snRNA
- (3) Transcription of precursor of mRNA
- (4) Transcription of only snRNAs

Answer (2)

Solution. In eukaryotes there are three major types of RNA polymerases. RNA polymerase I transcribes : 5.8S, 18S, 28S rRNAs RNA polymerase II transcribes : hnRNAs (precursor of mRNA) RNA polymerase III transcribes : tRNAs, 5S rRNA and snRNA

Question 117. Cellulose does not form blue colour with Iodine because

- (1) It is a disaccharide
- (2) It is a helical molecule
- (3) It does not contain complex helices and hence cannot hold iodine molecules

(4) It breaks down when iodine reacts with it

Answer (3)

Solution. Option (3) is the correct answer because cellulose does not contain complex helices and hence cannot hold iodine molecules. Option (1), (2) and (4) are not correct as cellulose is a polysaccharide.

Question 118. Identify the pair of heterosporous pteridophytes among the following :

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

Answer (2)

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

Question 119. Expressed Sequence Tags (ESTs) refers to

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

Answer (1)

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

Question 120. Identify the correct statements: A. Detritivores perform fragmentation. B. The humus is further degraded by some microbes during

mineralization. C. Water soluble inorganic nutrients go down into the soil and get precipitated by a process called leaching. D. The detritus food chain begins with living organisms. E. Earthworms break down detritus into smaller particles by a process called catabolism. Choose the correct answer from the options given below:

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

Answer (1)

Solution. The detritus food chain begins with detritus that is dead organic matter. The saprotrophic bacteria and fungi breakdown detritus into simpler inorganic substances by a process called catabolism.

Question 121. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?

- (1) Habitat loss and fragmentation
- (2) Over exploitation for economic gain
- (3) Alien species invasions
- (4) Co-extinctions

Answer (1)

Solution. Habitat loss and fragmentation is the most important cause driving animals and plants to extinction.

Question 122. The phenomenon of pleiotropism refers to

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

Answer (3)

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

Question 124. The process of appearance of recombination nodules occurs at which sub stage of prophase I in meiosis?

- (1) Zygotene
- (2) Pachytene
- (3) Diplotene
- (4) Diakinesis

Answer (2)

Solution. The process of recombination occurs at Pachytene stage of prophase I. This stage is characterised by the appearance of recombination nodules.

Question 125. Upon exposure to UV radiation, DNA stained with ethidium bromide will show

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

Answer (4)

Solution. Option (4) 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 126. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year

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

Answer (2)

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

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

Answer (2)

Solution. The unequivocal proof that DNA is the genetic material came from the experiment of Alfred Hershey and Martha Chase. Avery, Macleoid and McCarty gave the biochemical characterisation of Transforming Principle. The transformation experiments by using *Pneumococcus* was conducted by Frederick Griffith. Wilkins and Franklin produced X-ray diffraction data of DNA.

Question 129. The thickness of ozone in a column of air in the atmosphere is measured in terms of :

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

(4) Kilobase

Answer (1)

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.

Zoology Questions & Solutions

Question 151. 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 true
- (2) Both Statement I and Statement II are false
- (3) Statement I is true but Statement II is false
- (4) Statement I is false but Statement II is true

Answer (2)

Solution. Option (2) 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 157. Which of the following statements is correct?

- (1) Eutrophication refers to increase in domestic sewage and waste water in lakes.
- (2) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels.

- (3) Presence of large amount of nutrients in water restricts 'Algal Bloom'
- (4) Algal Bloom decreases fish mortality

Answer (2)

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

Question 158. 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 the correct explanation of A.
- (2) Both A and R are true and R is NOT the correct explanation of A.
- (3) A is true but R is false.
- (4) A is false but R is true.

Answer (4)

Solution. The correct answer is option (4) 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, haemophilia, 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 160. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.

- (1) Tasmanian wolf, Bobcat, Marsupial mole
- (2) Numbat, Spotted cuscus, Flying phalanger
- (3) Mole, Flying squirrel, Tasmanian tiger cat
- (4) Lemur, Anteater, Wolf

Answer (2)

Solution. Option (2) is the correct answer because numbat, spotted cuscus and flying phalanger are Australian marsupials exhibiting adaptive radiation. Option (3) is incorrect because mole and flying squirrel are placental mammals. Option (4) is incorrect because lemur and wolf are placental mammals. Option (1) is incorrect because bobcat is a placental mammal.

Question 162. 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 true.
- (2) Both Statement I and Statement II are false.
- (3) Statement I is true but Statement II is false.
- (4) Statement I is false but Statement II is true.

Answer (1)

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

Question 163. Which of the following functions is carried out by cytoskeleton in a cell?

- (1) Nuclear division

- (2) Protein synthesis
- (3) Motility
- (4) Transportation

Answer (3)

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 164. Vital capacity of lung is _____.

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

Answer (4)

Solution. Option (4) 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 165. 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 D only
- (2) A and B only
- (3) A, B and C only

(4) A, C and D only

Answer (4)

Solution. The correct answer is option (4) 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 166. 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 true.

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

Answer (1)

Solution. Option (1) is the correct answer to this question because statement I and statement II both are correct. Vas deferens receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct. The cavity of cervix is called cervical canal which along with vagina forms the birth canal.

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 ionising 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 correct.

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

Answer (3)

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

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

Answer (2)

Solution. The correct answer is option (2) 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 173. 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 true.
- (2) Both Statement I and Statement II are false.

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

Answer (1)

Solution. The correct answer is option (1) 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 174. Given below are two statements:

Statement I: A protein is imagined as a line, the left end represented by first amino acid (Cterminal) and the right end represented by last amino acid (N-terminal).

Statement II: Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits of β type.) In the light of the above statements, choose the correct answer from the options given below:

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

Answer (4)

Solution. The correct answer is option (4) as a protein is imagined as a line, the left end represented by the first amino acid and the right end is represented by the last amino acid. The first amino acid is also called N-terminal amino acid. The last amino acid is called the C-terminal amino acid.

Question 175. Radial symmetry is NOT found in adults of phylum _____.

- (1) Ctenophora
(2) Hemichordata

- (3) Coelenterata
- (4) Echinodermata

Answer (2)

Solution. Option (2) is the correct answer because hemichordates are bilaterally symmetrical animals. Option (3) is not the answer because coelenterates are radially symmetrical organisms. Option (4) is not the answer because adult echinoderms are radially symmetrical in adult stage. Option (1) is not the answer because ctenophores are radially symmetrical organisms.

Question 176. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatment?

- (1) Recombinant DNA Technology
- (2) Serum and Urine analysis
- (3) Polymerase Chain Reaction (PCR) technique
- (4) Enzyme Linked Immuno-Sorbent Assay (ELISA) technique

Answer (2)

Solution. The correct answer is option (2) because using conventional methods of diagnosis like serum and urine analysis, etc, do not help in early diagnosis. Recombinant DNA technology, Polymerase Chain Reaction [PCR] and Enzyme Linked Immuno-Sorbent Assay (ELISA) are some of the techniques that serve the purpose of early diagnosis.

Question 177. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by

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

Answer (2)

Solution. Option (2) is the correct answer because the undigested food (feces) enters into the caecum of the large intestine through ileo-caecal valve, which prevents the backflow of the fecal matter. Option (3) is not the answer because a muscular sphincter i.e., the gastro-oesophageal sphincter regulates the opening of esophagus into the stomach. Option (4) is not the answer because pyloric sphincter regulates the opening in between stomach and duodenum. Option (1) is not the answer because the opening of the common hepato-pancreatic duct is guarded by a sphincter of Oddi.

