NEET 2023 Solutions Code F4

Physics Questions & Solutions

Question 2. 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 3. 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)

Solution. The efficiency of Carnot engine, $\%\eta = \left(1 - \frac{Tsink}{Tsource} X\ 100\right)$

$T_{source} = 327$ ° C$=600K$

$50=\left(1-\frac{Tsink}{600}\right)$

$\frac{1}{2} = 1 - \frac{T_{sink}}{600}$

$T_{sink} = 300K$

So the temperature of the sink is= 327-300= 27° C

Question 5. 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 centre

Answer (3)

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

Question 6. The venturi-meter works on
(1) Bernoulli's principle
(2) The principle of parallel axes
(3) The principle of perpendicular axes
(4) Huygen's principle

Answer (1)

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

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 14. 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 → 2.14 eV Work function of K → 2.30 eV Work function of Na → 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 20. The temperature of a gas is –50°C. To what temperature the gas should be heated so that the rms speed is
increased by 3 times?
(1) 3295°C
(2) 3097 K
(3) 223 K
(4) 669°C

Answer (1)

Question 21. 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 diode is designed to operate under reverse bias in breakdown region.
e.g., Zener diode as a voltage regulator.

Question 22. If $\oint E.dS = 0$ 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 $\oint E.dS = 0$ 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 24. 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 Xc = $\frac{1}{\omega c}$ Since ω decreasing XC will increases hence current will decreases also
conduction current = displacement current
Therefore displacement current will decrease.

Question 27. Resistance of a carbon resistor determined from colour codes is (22000 ± 5%) Ω. The colour of third band must be
(1) Green
(2) Orange
(3) Yellow
(4) Red

Answer (2)

Solution . Resistance = (22 × 103) Ω ± 5% Third band corresponds to decimal multiplier.
Decimal multiplier = 10^{-3}
Colour → Orange

Question 30. The magnetic energy stored in an inductor of inductance 4 H carrying a current of 2 A is
(1) 4 mJ
(2) 8 mJ
(3) 8 uJ

(4) 4 uJ

Answer (3)

Solution Energy = $\frac{1}{2}Li^2$

= $\frac{1}{2}$X 4 X $10^{-2}X\ 2^2$

= 8 x 10-6 J

= 8 μJ

Question 31. 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 = d
It does not depend on the distance of screen from the slit, so statement I is correct.
Angular fringe width
If → angular separation of fringes increases So, statement I is true and statement II is false

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, 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 54. 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 55. 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) K3[Al(ox)3] It is a homoleptic complex

Question 65. Match List-I with List-II.

List-I	List-II
A. Coke	I. Carbon atoms are sp3 hybridised
B. Diamond	II. Used as a dry lubricant
C. Fullerene	III. Used as a reducing agent
D. Graphite	IV. Cage like molecules

Choose the correct answer from the options given below :
(1) A-IV, B-I, C-II, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-III, B-IV, C-I, D-II
(4) A-II, B-IV, C-I, D-III

Answer (2)

Solution . • Coke is largely used as a reducing agent in metallurgy.
• In diamond, each carbon atom undergoes sp3 hybridisation and linked to four other carbon atoms by using hybridized orbitals in tetrahedral fashion.
• Buckminsterfullerene contains six membered and five membered rings and hence is a cage like molecule.
• Graphite is very soft and slippery. Hence, it is used as a dry lubricant in machines running at hightemperature.

Question 66. 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 N3– anion with largest ionic size

Question72. 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.

Question73. 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 O2.
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 a diluent for oxygen in modern diving apparatus because of its very low solubility in blood.
• Gases diffuses easily with each other

Question76. 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 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.

Question79. 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

Question81. 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 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 89. 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

Question 99. 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 eutrophication.

Botany Questions & Solutions

Question 101. Among eukaryotes, replication of DNA takes place in :
(1) S phase
(2) G1 phase
(3) G2 phase
(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 102. Cellulose does not form blue colour with Iodine because
(1) It is a helical molecule
(2) It does not contain complex helices and hence cannot hold iodine molecules
(3) It breaks down when iodine reacts with it
(4) It is a disaccharide

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

Question 103. 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 104. 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 com cob represent stigma and style which wave in the wind to trap pollen grains.

Question 105. Given below are two statements : One is labelled as Assertion A and the other is labeled 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 106. 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 utilization of its benefits.

Question 107. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?
(1) Transcription of tRNA, 5S rRNA and snRNA
(2) Transcription of precursor of mRNA
(3) Transcription of only snRNAs
(4) Transcription of rRNAs (28S, 18S and 5.8S)

Answer (1)

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 (precurssor of mRNA)
RNA polymerase III transcribes : tRNAs, ScRNA, 5S rRNA and snRNA
108. 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 produces two different kind of spores. Psilotum, Lycopodium and Equisetum are homosporous pteridophytes

Question 109. 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 110. The reaction center in PS II has an absorption maxima at
(1) 700 nm
(2) 660 nm
(3) 780 nm
(4) 680 nm
Answer (4)

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 111. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?
(1) Over exploitation for economic gain
(2) Alien species invasions
(3) Co-extinctions
(4) Habitat loss and fragmentation
Answer (4)

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

Question 112. Which of the following stages of meiosis involves division of centromere?
(1) Metaphase II
(2) Anaphase II
(3) Telophase
(4) Metaphase I

Answer (2)

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 113. Spraying of which of the following phytohormone on juvenile conifers helps hastening the maturity period,
that leads early seed production?
(1) Gibberellic Acid
(2) Zeatin
(3) Abscisic 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 114. Identify the correct statements:
A. Detrivores 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) B, C, D only
(2) C, D, E only
(3) D, E, A only
(4) A, B, C only
Answer (4)

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 115. Which micronutrient is required for splitting of water molecule during photosynthesis?
(1) Molybdenum
(2) Magnesium
(3) Copper
(4) Manganese
Answer (4)

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 116. 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 117. 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 118. 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 119. Upon exposure to UV radiation, DNA stained with ethidium bromide will show
(1) Bright blue color
(2) Bright yellow color
(3) Bright orange color
(4) Bright red color

Answer (3)

Solution . Option (3) is the correct answer because in recombinant DNA technology the separated DNA fragments can be visualized 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 120. 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)

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 121. 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 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.

Question122. 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 inconversion 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 utilization of ATP is for phosphorylation the substrates

Question 125. 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 expression, the gene is called pleiotropic gene and the phenomenon is called pleiotropism.

Question 126. 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 127. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are :
(1) Antipodals, synergids, and primary endosperm nucleus
(2) Synergids, Zygote and Primary endosperm nucleus
(3) Synergids, antipodals and Polar nuclei
(4) Synergids, Primary endosperm nucleus and zygote
Answer (2)

Solution. Synergids are the cells of gametophyte and hence these are haploid Zygote is formed by fusion of twogametes and thus it is diploid. Primary endosperm nucleus is formed by the fusion of diploid secondary nucleus with a male gamete. Therefore, it is triploid.

Question 128. 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 131. 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 132. 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) Monoadelphous and Monothecous anthers
(3) Epiphyllous and Dithecous anthers
(4) Diadelphous and Dithecous anthers

Answer (4)

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

Question134. 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 135. Given below are two statements :
Statement I : Endarch and exarch are the terms often used for describing the position of secondary xylem
in the plant body.
Statement II : Exarch condition is the most common feature of the root system.
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 . Endarch and exarch are the terms often used for describing the position of primary xylem in the plant body. Primary xylem is of two types protoxylem and metaxylem. On the basis of relative position of protoxylem and metaxylem in the organ the arrangement of primary xylem can be endarch or exarch. Exarch type of primary xylem is seen in roots. Therefore, Statement I is false and Statement II is true.

Zoology Questions & Solutions

Question 151. 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) Ileo-caecal valve

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 152. 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 153. 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 154. 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 diseasesmentioned are viral diseases.

Question 155. Match List I with List II.

List I (Interacting species)	List II (Name of interaction)
A. A Leopard and a Lion in a forest/grassland	I. Competition
B. A Cuckoo laying egg in a Crow's nest	II. Brood parasitism
C. Fungi and root of a higher plant in Mycorrhizae	III. Mutualism
D. A cattle egret and a Cattle in a field	IV. Commensalism

Choose the correct answer from the options given below.
(1) A-I, B-II, C-IV, D-III
(2) A-III, B-IV, C-I, D-II
(3) A-II, B-III, C-I, D-IV
(4) A-I, B-II, C-III, D-IV

Answer (4)

Solution . A leopard and a lion in a forest/grassland exemplify competition where both the species are competing for the same resources. A cuckoo laying egg in a crow's nest is brood parasitism where cuckoo is the parasitic bird that lays its egg in the nest of crow (host bird). Fungi and root of a higher plant in mycorrhizae exemplify mutualism where both the species are
benefitted. The fungi help the plant in the absorption of essential nutrients from the soil while the plant in turn provides the fungi with energy yielding carbohydrates. A cattle egret and a cattle in a field exemplify commensalism where one species benefits and the other remains unaffected. The egrets always forage close to where cattle are grazing because the cattle, as they move, stir up and flush out insects from the vegetation that otherwise might be difficult for the egrets to find and catch.

Question 158. 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 159. Match List I with List II.

List I	List II
A. Vasectomy	I. Oral method
B. Coitus interruptus	II. Barrier method
C. Cervical caps	III. Surgical method
D. Saheli	IV. Natural method

Choose the correct answer from the options given below:
(1) A-III, B-IV, C-II, D-I
(2) A-II, B-III, C-I, D-IV
(3) A-IV, B-II, C-I, D-III
(4) A-III, B-I, C-IV, D-II

Answer (1)

Solution . Option (1) the correct answer because
(i) Vasectomy is a surgical method of contraception
(ii) Coitus interruptus is a natural method of contraception

(iii) Cervical cap is a barrier method of contraception
(iv) Saheli is an oral method of contraception which is a non-steroidal pill

Question 162. 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 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 163. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatment?
(1) Serum and Urine analysis
(2) Polymerase Chain Reaction (PCR) technique
(3) Enzyme Linked Immuno-Sorbent Assay (ELISA) technique
(4) Recombinant DNA Technology

Answer (1)

Solution . The correct answer is option (1) 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 164. 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 166. 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 167. Which of the following functions is carried out by cytoskeleton in a cell?
(1) Protein synthesis
(2) Motility
(3) Transportation
(4) Nuclear division

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 168. 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 169. Match List I with List II.

List I (Type of Joint)	List II (Found between)
A. Cartilaginous Joint	I. Between flat skull bones
B. Ball and Socket Joint	II. Between adjacent vertebrae in vertebral column
C. Fibrous Joint	III. Between carpal and metacarpal of thumb
D. Saddle Joint	IV. Between Humerus and Pectoral girdle

Choose the correct answer from the options given below:
(1) A-II, B-IV, C-I, D-III (2) A-I, B-IV, C-III, D-II
(3) A-II, B-IV, C-III, D-I (4) A-III, B-I, C-II, D-IV
Answer (1)

Solution. Option (1) is the correct answer because cartilaginous joint is present in between the adjacent vertebrae in the vertebral column.
Option (2) is not the answer because cartilaginous joint is not present between flat skull bones.
Option (3) is not the answer because fibrous joint is not present in between the carpal and metacarpal of thumb.
Option (4) is not the answer because saddle joint is not present in between humerus and pectoral girdle.

Question 173. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.
Assertion A: Nephrons are of two types: Cortical & Juxta medullary, based on their relative position in cortex and medulla.
Reason R: Juxta medullary nephrons have short loop of Henle whereas, cortical nephrons have longer loop of Henle.

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 (2)

Solution . The correct answer is option (2) because Assertion is true as there are two types of nephrons, i.e.,
cortical nephrons and juxtamedullary nephrons based on their relative position in the cortex and medulla. Reason is not correct as loop of Henle in juxtamedullary nephrons is very long and runs deep into the medulla. Therefore, Assertion is true but Reason is false.

Question 174. 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 hemichrodates 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 176. Which of the follwoing 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 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 water

Question 177. 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 178. 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)

Sol. 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.

Question 179. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.
(1) Numbat, Spotted cuscus, Flying phalanger
(2) Mole, Flying squirrel, Tasmanian tiger cat
(3) Lemur, Anteater, Wolf
(4) Tasmanian wolf, Bobcat, Marsupial mole

Answer (1)

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