

NEET 2023 Solutions Code F2

Physics Questions & Solutions

Question 1. 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 2. 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 5. The net magnetic flux through any closed surface is

- (1) Positive
- (2) Infinity
- (3) Negative
- (4) Zero

Answer (4)

Solution. $\oint \mathbf{B} \cdot d\mathbf{s} = 0$ Magnetic monopole doesn't exist. Hence net magnetic flux through any closed surface is zero.

Question 9. 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 μ J
- (4) 4 μ J

Answer (3)

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

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

$$= 8 \times 10^{-6} \text{ J} = 8 \mu\text{J}$$

Question 10. 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 Bernoulli's principle.

Question 19. The angular acceleration of a body, moving along the circumference of a circle, is

- (1) Along the radius towards the center
- (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 21. 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 23. 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, $\% \eta = (1 - \frac{T_{\text{sink}}}{T_{\text{source}}} \times 100)$

$$T_{\text{source}} = 327^\circ \text{C} = 600\text{K}$$

$$50 = (1 - \frac{T_{\text{sink}}}{600})$$

$$12 = 1 - \frac{T_{\text{sink}}}{600}$$

$$T_{\text{sink}} = 300\text{K}$$

So the temperature of the sink is $= 327 - 300 = 27^\circ \text{C}$

Question 26. 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 $\theta = \frac{\lambda}{d}$

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

Angular fringe width

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

Question 27. 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 29. Resistance of a carbon resistor determined from colour codes is $(22000 \pm 5\%) \Omega$. The color 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

Colour $\rightarrow$ Orange

Question 30. 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 31. 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 33. 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) 4 U
- (2) 8 U
- (3) 16 U
- (4) 2 U

Answer (3)

Question 39. The radius of inner most orbit of hydrogen atom is 5.3×10^{-11} m. What is the radius of third allowed orbit of hydrogen atom?

- (1) $1.06 \text{ \AA}$
- (2) $1.59 \text{ \AA}$
- (3) $4.77 \text{ \AA}$
- (4) $0.53 \text{ \AA}$

Answer (3)

Question 34 . Light travels a distance x in time t_1 in air and $10x$ in time t_2 in another denser medium. What is the critical angle for this medium?

- (1) $\sin^{-1}\left(\frac{10 t_2}{t_1}\right)$
- (2) $\sin^{-1}\left(\frac{t_1}{10 t_2}\right)$
- (3) $\sin^{-1}\left(\frac{10 t_1}{t_2}\right)$
- (4) $\sin^{-1}\left(\frac{t_2}{t_1}\right)$

Answer . (3)

Solution . speed of light in air $V_1 = \frac{x}{t_1}$

Speed of light in a medium $V_2 = \frac{10x}{t_2}$

$$\sin \theta_c = \frac{v_2}{v_1} = \frac{10x}{t_2} \cdot \frac{t_1}{x}$$

$$\theta_c = \sin^{-1} \left(\frac{10 t_1}{t_2} \right)$$

Question 37 . A satellite is orbiting just above the surface of the earth with period T. If d is the density of the earth and G is the universal constant of gravitation, the quantity $3 Gd$ represents

(1) T^2

(2) T^3

(3) $\sqrt{T}$

(4) T

Answer . (1) T^2

Solution

Chemistry Questions & Solutions

Question 52. 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 53. 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 cofactor. Bone in the human body is not an inert and unchanging substance but is continuously being solubilised and redeposited.

Ca plays an 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 59. 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 61. 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 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 is the 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 diffuse easily with each other

Question 72. 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 75. 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 the same chemical properties.
- D. Protons and electrons are collectively known as nucleons.
- E. Dalton's atomic theory, regarded the atom as an ultimate particle 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 76. Which one is an example of heterogeneous catalysis?

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

Answer (3)

Question 81. 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 92. 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

Question 95. 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 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 102. 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.

Question 103. 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 104. 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.

105. 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 106. 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 107. 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 108. 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 109. 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 110. 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.

111. 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 represents stigma and style which wave in the wind to trap pollen grains.

Question 112. 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 113. 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) 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 114. The reaction centre 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 115. 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 116. 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.

Question 117. 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 118. 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 119. 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) Abscissic 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 120. 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 121. The process of appearance of recombination nodules occurs at which sub stage of prophase I in meiosis?

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

Answer (1)

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

Question 123. 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 127. 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 128. 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 130. 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 Ditheous anthers

Answer (4)

Solution . Fabaceae → Diadelphous and ditheous anther.

Solanaceae → Polyandrous, epipetalous and ditheous anther.

Liliaceae → Polyandrous, epiphyllous and ditheous anther.

Question 131. 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 132. 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 133. 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 134. 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 two gametes 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 135. Given below are two statements : One is labeled 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 136. Malonate inhibits the growth of pathogenic bacteria by inhibiting the activity of

- (1) Amylase
- (2) Lipase
- (3) Dinitrogenase
- (4) Succinic dehydrogenase

Answer (4)

Solution . Option (4) is the correct answer of this question because malonate is a competitive inhibitor of enzyme succinate dehydrogenase. Inhibition of succinic dehydrogenase by malonate occurs due to close resemblance of malonate with substrate succinate in structure. Competitive inhibitors are often used in the control of bacterial pathogens

Question 140. Which of the following statements are correct about Klinefelter's Syndrome?

- A. This disorder was first described by Langdon Down (1866).
- B. Such an individual has overall masculine development. However, the feminine development is also expressed.
- C. The affected individual is short statured.
- D. Physical, psychomotor and mental development is retarded.
- E. Such individuals are sterile.

Choose the correct answer from the options given below:

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

Answer (2)

Solution . Klinefelter's syndrome is caused due to the presence of an additional copy of X-chromosome resulting into a karyotype of 47, XXY.

Such an individual has overall masculine development, however, the feminine development is also expressed. Such individuals are sterile. Thus, statements B and E are correct regarding Klinefelter's syndrome. Statement A, C and D are incorrect w.r.t. Klinefelter's syndrome as they are associated with Down's syndrome

Zoology Questions & Solutions

Question 151. 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 the endomembrane system.

Question 153. 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.

Question 154. 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 increase in domestic sewage and waste water in lakes.

Answer (1)

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 156. 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 158. 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 160. Which of the following statements are correct regarding female reproductive cycle?

- A. In non-primate mammals cyclical changes during reproduction are called the 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 the 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 cycles.

Question 161. 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 a 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 162. 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 (feces) enters into caecum of the large intestine through ileo-caecal valve, which prevents the backflow of the fecal matter. Option (2) is not the answer because a muscular sphincter i.e., the gastro-oesophageal sphincter regulates the opening of esophagus 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 165. 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, mutates at a faster rate.

Question 170. Given below are two statements: one is labeled as Assertion A and the other is labeled as Reason R.

Assertion A: Endometrium is necessary for implantation of blastocyst.

Reason R: In the absence of fertilization, the corpus luteum degenerates that causes disintegration of endometrium. 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 (1)

Solution. Option (1) is the correct answer because both Assertion and Reason are true. Implantation is embedding of the blastocyst into the endometrium of uterus. Correct explanation of reason is Corpus luteum secretes large amount of progesterone which is essential for maintenance of endometrium of uterus. In absence of fertilization, the corpus luteum degenerates hence the decrease in the level of progesterone hormone will cause disintegration of endometrium leading to menstruation.

Question 175. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly?

- (1) Gonorrhoea
- (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. Gonorrhea is a bacterial disease which can be treated and cured completely, other diseases mentioned are viral diseases.

Question 177. 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 179. 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 180. 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 181. 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 specialized connective tissue and not dense regular tissue. Therefore Statement II is also incorrect.

Question 186. Which of the following are NOT under the control of thyroid hormone?

- A. Maintenance of water and electrolyte balance
- B. Regulation of basal metabolic rate
- C. Normal rhythm of sleep-wake cycle
- D. Development of immune system
- E. Support the process of RBCs formation

Choose the correct answer from the options given below:

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

Answer (2)

Solution. Option (2) is the correct answer because thyroid hormones play an important role in the regulation of basal metabolic rate, maintenance of water and electrolyte balance and support the process of RBCs formation,

whereas this hormone is not involved in regulating normal rhythm of sleep-wake cycle and development of immune system.

Question 187. Which of the following statements are correct?

- A. An excessive loss of body fluid from the body switches off osmoreceptors.
- B. ADH facilitates water reabsorption to prevent diuresis.
- C. ANF causes vasodilation.
- D. ADH causes increase in blood pressure.
- E. ADH is responsible for decrease in GFR.

Choose the correct answer from the options given below:

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

Answer (1)

Solution . Option (1) is the correct answer because statements B, C and D are true statements. ADH facilitates water reabsorption from DCT of nephron to prevent diuresis, which causes increase in blood pressure. ANF which is secreted by the heart is a vasodilator. Options (2), (3) and (4) are not correct because statements A and E are false. Excessive loss of body fluid from the body switches on the osmoreceptors.