

NEET 2023 Solutions Code F3

Physics Questions & Solutions

Question 2. 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 4. 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 monopoles don't exist.

Hence net magnetic flux through any closed surface is zero.

Question 10. The magnetic energy stored in an inductor of inductance 4 μH carrying a current of 2 A is

- (1) 4 mJ
- (2) 8 mJ
- (3) 8 μJ
- (4) 4 μJ

Answer (3)

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

$$= \frac{1}{2} \times 4 \times 10^{-6} \times 2^2$$

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

$$= 8 \mu\text{J}$$

Question 12. 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 20. If $\oint \mathbf{E} \cdot d\mathbf{S} = 0$ 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 $\oint \mathbf{E} \cdot d\mathbf{S} = 0$ Net flux through surface is zero. Therefore, the number of flux lines entering the surface must be equal to the number of flux lines leaving it.

Question 21. 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 26. 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 28. 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 30. 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, $\% \eta = \left(1 - \frac{T_{\text{sink}}}{T_{\text{source}}} \times 100 \right)$

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

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

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

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

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

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

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 32. 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 33. 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

Chemistry Questions & Solutions

Question 58. 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 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 63. 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 66. Which of the following statements are NOT correct?

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

B. Heavy water is used to study reaction mechanism.

C. Hydrogen is used to make saturated fats from oils.

D. The H–H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any elements.

E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below:

(1) B, D only

(2) D, E only

(3) A, B, C only

(4) B, C, D, E only

Answer (2)

Solution . Statement A, B, C are correct

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

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

Question 70. Amongst the following the total number of species NOT having eight electrons around central atom in its outermost shell, is

NH₃, AlCl₃, BeCl₂, CCl₄, PCl₅ :

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

Answer (4)

Question 76. 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 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 82. 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 84. 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.

85. Select the correct statements from the following

- A. Atoms of all elements are composed of two fundamental particles.
- B. The mass of the electron is 9.10939×10^{-31} kg.
- C. All the isotopes of a given element show same chemical properties:
- D. Protons and electrons are collectively known as nucleons.
- E. Dalton's atomic theory, regarded the atom as an ultimate particles of matter

Choose the correct answer from the options given below

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

(4) A, B and C only

Answer (3)

Solution. Atoms consist of three fundamental particles : Electrons, protons and neutrons. The mass of the electron is 9.10939×10^{-31} kg. All the isotopes of a given element show same chemical properties. Protons and neutrons present in the nucleus are collectively called as nucleons. Dalton's atomic theory, regarded the atom as the ultimate particle of matter. So, the correct statements are B, C, E only.

Question 99. Pumice stone is an example of

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

Answer (2)

Solution. Pumice stone is a solid sol.

Dispersed phase : Gas

Dispersed medium : Solid

Botany Questions & Solutions

Question 101. 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 102. 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 103. 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 104. 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 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. Given below are two statements : One labelled as Assertion A and the other labelled as Reason R:

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

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

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

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

Answer (4)

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

Question 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 (precursor of mRNA)

RNA polymerase III transcribes : tRNAs, ScRNA, 5S rRNA and snRNA

Question 108. 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 109. 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 for the utilization of ATP is for phosphorylation of the substrates.

Question 110. 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 111. 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 112. 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 kind of spores. Psilotum, Lycopodium and Equisetum are homosporous pteridophytes.

Question 113. 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.

114. Axile placentation is observed in

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

Answer (3)

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

Question 115. Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabaceae but not found in Solanaceae or Liliaceae.

- (1) Polyadelphous and epipetalous stamens

- (2) Monadelphous and Monothealous anthers
- (3) Epiphyllous and Dithealous anthers
- (4) Diadelphous and Dithealous anthers

Answer (4)

Solution. Fabaceae → Diadelphous and dithealous anther.

Solanaceae → Polyandrous, epipetalous and dithealous anther.

Liliaceae → Polyandrous, epiphyllous and dithealous anther.

Question 116. 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 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. Among eukaryotes, replication of DNA takes place in :

- (1) S phase
- (2) G1 phase
- (3) G2phase
- (4) M phase

Answer (1)

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

Question 119. 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 characterised by the appearance of recombination nodules.

Question 122. 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, colorful, fragrant flowers with nectar attract biotic pollinators (insects), thus, they are seen in insect pollinated plants.

Question 123. 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) Absciscic Acid
- (4) Indole-3-butyric Acid

Answer (1)

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

Question 124. 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 125. 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 126. 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.

Zoology Questions & Solutions

Question 151. 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 a nucleosome.

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

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

Answer (3)

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

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. 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 155. 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 156. 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. Consequently, viruses having RNA genome and having shorter life span mutate and evolve faster.

Question 157. 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 158. 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 159. Which of the following is not a cloning vector?

- (1) YAC
- (2) pBR322
- (3) Probe
- (4) BAC

Answer (3)

Solution . Option (3) is correct answer because a single stranded DNA or RNA tagged with a radioactive molecule is called a probe and it helps in the detection of mutated gene. Option (1), (2) and (4) are not correct because YAC, BAC, pBR322 are vectors.

Question 160. Given below are two statements:

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

Statement II: Adult human hemoglobin, consists of 4 subunits (two subunits of type α and two subunits of type β .)

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 (3)

Solution . The correct answer is option (3) 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 161. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by

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

Answer (1)

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

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

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

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

Question 163. 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 164. 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. Gonorrhoea is a bacterial disease which can be treated and cured completely, other diseases mentioned are viral diseases.

Question 165. Vital capacity of lung is _____.

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

Answer (3)

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

Question 166. 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) A, C and E only

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 170. 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 171. Given below are two statements:

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

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

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

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

Answer (4)

Solution .Option (4) is the correct answer to this question because statement I and statement II both are correct. Vas deferens receives a duct from the seminal vesicle and opens into the urethra as the ejaculatory duct. The cavity of the cervix is called the cervical canal which along with vagina forms the birth canal.