# NEET 2023 Solutions Code E5

## Physics Questions & Solutions

**Question 2.** Given below are two statements: Statement I: Photovoltaic devices can convert optical radiation into electricity. Statement II: Zener diode is designed to operate under reverse bias in breakdown region. In the light of the above statements, choose the most appropriate answer from the options given below.

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

**Answer (1)**

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

**Question 3.** A full wave rectifier circuit consists of two p-n junction diodes, a centre-tapped transformer, capacitor and a load resistance. Which of these components remove the ac ripple from the rectified output?

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

**Answer (3)**

**Solution** Correct, the component that removes the AC ripple from the rectified output in a full-wave rectifier circuit is the capacitor. The capacitor acts as a filter, smoothing out the pulsating DC voltage by charging during the peaks of the rectified waveform and discharging during the troughs, thus reducing the ripple voltage across the load resistor.

**Question 4**. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are
(1) Instrumental errors
(2) Personal errors
(3) Least count errors
(4) Random errors

**Answer (4)**

**Solution** Correct, the errors in measurement that arise due to unpredictable fluctuations in temperature and voltage supply are referred to as random errors. These errors do not have any systematic or constant cause and can occur due to various uncontrollable factors such as fluctuations in experimental conditions like temperature, voltage supply, pressure, etc.

**Question 6**. 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) 669°C
(2) 3295°C
(3) 3097 K
(4) 223 K

**Answer (2)**

**Question 9.** The venturi-meter works on

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

**Answer (2)**

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

**Question 12.** If $\oint E \cdot \overline{dS} = 0$ over a surface, then

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

**Answer (1)**

**Solution.** net $\oint E \cdot \overline{dS} = 0$ 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 17**. The work functions of Caesium (Cs), Potassium (K) and Sodium (Na) are 2.14 eV, 2.30 eV and 2.75 eV respectively. If incident electromagnetic radiation has an incident energy of 2.20 eV, which of these photosensitive surfaces may emit photoelectrons?
(1) Cs only
(2) Both Na and K
(3) K only
(4) Na only

**Answer (1)**

**Solution**. Energy of incident radiation = 2.80 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 18**. The net magnetic flux through any closed surface is
(1) Zero
(2) Positive
(3) Infinity
(4) Negative

**Answer (1)**

**Solution**. $\oint B.ds = 0$ Magnetic monopole doesn't exist. Hence net magnetic flux through any closed surface is zero.

**Question 22**. For Young's double slit experiment, two statements are given below:
Statement I : If screen is moved away from the plane of slits, angular separation of the fringes remains
constant.
Statement II : If the monochromatic source is replaced by another monochromatic source of larger
wavelength, the angular separation of fringes decreases.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is true but Statement II is false.
(4) Statement I is false but Statement II is true.

**Answer (3)**

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

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

Angular fringe width $\alpha\ \lambda$

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

**Question 25.** An ac source is connected to a capacitor C. Due to decrease in its operating frequency

(1) Capacitive reactance decreases

(2) Displacement current increases

(3) Displacement current decreases

(4) Capacitive reactance remains constant

**Answer (3)**

**Solution**. $X_c = \frac{1}{\omega c}$ Since $\omega$ decreasing XC will increases hence current will decreases also conduction current = displacement current Therefore displacement current will decrease.

**Question 26**. Resistance of a carbon resistor determined from colour codes is (22000 ± 5%) . The colour of third band must be

(1) Red

(2) Green

(3) Orange

(4) Yellow

**Answer (3)**

**Question 27.** A Carnot engine has an efficiency of 50% when its source is at a temperature 327°C. The temperature of the sink is

(1) 27°C
(2) 15°C
(3) 100°C
(4) 200°C

**Answer (1)**

**Question 28.** The angular acceleration of a body, moving along the circumference of a circle, is
(1) Along the radius, away from center
(2) Along the radius towards the center
(3) Along the tangent to its position
(4) Along the axis of rotation

**Answer (4)**

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

**Question 39**. A bullet from a gun is fired on a rectangular wooden block with velocity u. When bullet travels 24 cm through the block along its length horizontally, velocity of bullet becomes u/3. Then it further penetrates into the block in the same direction before coming to rest exactly at the other end of the block. The total length of the block is
(1) 27 cm
(2) 24 cm
(3) 28 cm
(4) 30 cm

**Answer (1)**

**Question 44. 1**0 resistors, each of resistance R are connected in series to a battery of emf E and negligible internal

resistance. Then those are connected in parallel to the same battery, the current is increased n times. The
value of n is
(1) 10
(2) 100
(3) 1
(4) 1000

**Answer (2)**

**Question 48.** A horizontal bridge is built across a river. A student standing on the bridge throws a small ball vertically upwards with a velocity 4 m s–1. The ball strikes the water surface after 4 s. The height of bridge above water surface is (Take g = 10 m s–2 )
(1) 56 m
(2) 60 m
(3) 64 m
(4) 68 m

**Answer (3)**

**Question 49.** Two thin lenses are of same focal lengths (f), but one is convex and the other one is concave. When they are placed in contact with each other, the equivalent focal length of the combination will be

(1) Zero
(2) 4 f
(3) 2 f
(4) Infinite

**Answer (4)**

## Chemistry Questions & Solutions

**Question 51.** Which of the following statements are NOT correct?
A. Hydrogen is used to reduce heavy metal oxides to metals.
B. Heavy water is used to study reaction mechanism.
C. Hydrogen is used to make saturated fats from oils.
D. The H–H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any elements.
E. Hydrogen reduces oxides of metals that are more active than iron.
Choose the most appropriate answer from the options given below:

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

**Answer (3)**

**Solution.** Statement A, B, C are correct (D) H – H bond dissociation energy is maximum as compared to single bond between two atom of any element. (E) Hydrogen reduces oxides of metal that are less active than iron.

**Question 55.** Given below are two statements : one is labelled as Assertion A and the other is labelled as
Reason R :
Assertion A : A reaction can have zero activation energy.
Reasons R : The minimum extra amount of energy absorbed by reactant molecules so that their energy
becomes equal to threshold value, is called activation energy.
In the light of the above statements, choose the correct answer from the options given below :
(1) Both A and R are true and R is the correct explanation of A

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

**Answer (2)**

**Solution.** • Few reactions can have zero activation energy for example radical reactions.
• Activation energy is defined as the minimum amount of extra energy absorbed by reactants to achieve threshold energy

**Question 62.** Amongst the given options which of the following molecules/ ion acts as a Lewis acid?
(1) NH3
(2) H2O
(3) BF3
(4) OH–

**Answer (3)**

**Solution** Correct, among the given options, BF3 (boron trifluoride) acts as a Lewis acid.

A Lewis acid is a substance that can accept an electron pair. In the case of BF3, it has an incomplete octet of electrons around boron, so it can accept a pair of electrons from a Lewis base, making it a Lewis acid.

**Question 63.** Homoleptic complex from the following complexes is
(1) Potassium trioxalatoaluminate (III)
(2) Diamminechloridonitrito-N-platinum (II)
(3) Pentaamminecarbonatocobalt (III) chloride
(4) Triamminetriaquachromium (III) chloride

**Answer (1)**

**Solution.** • Complexes in which a metal is bound to only one kind of donor groups are called as homolepticComplexes
• Potassium trioxalatoaluminate (III) K3[Al(ox)3] It is a homoleptic complex

**Question 65.** Intermolecular forces are forces of attraction and repulsion between interacting particles that will include : A. dipole - dipole forces B. dipole - induced dipole forces C. hydrogen bonding D. covalent bonding E. dispersion forces Choose the most appropriate answer from the options given below :
(1) B, C, D, E are correct
(2) A, B, C, D are correct
(3) A, B, C, E are correct
(4) A, C, D, E are correct

**Answer (3)**

**Solution .** The most appropriate answer is (3) A, B, C, E are correct.

Explanation:

Dipole-dipole forces (option A): These occur between polar molecules with permanent dipoles.
Dipole-induced dipole forces (option B): These occur between a polar molecule and a nonpolar molecule, where the polar molecule induces a temporary dipole in the nonpolar molecule.
Hydrogen bonding (option C): This is a specific type of dipole-dipole interaction that occurs when hydrogen is bonded to highly electronegative atoms such as nitrogen, oxygen, or fluorine.
Dispersion forces (option E): Also known as London dispersion forces, these are the weakest intermolecular forces and occur between all molecules, regardless of polarity, due to temporary fluctuations in electron distribution.
Covalent bonding (option D) is not considered an intermolecular force because it involves the sharing of electrons between atoms within a molecule, rather than interactions between separate molecules.

**Question 66.** Select the correct statements from the following A. Atoms of all elements are composed of two fundamental particles. B. The mass of the electron is 9.10939 × 10–31 kg. C. All the isotopes of a given element show same chemical properties: D. Protons and electrons are collectively known as nucleons. E. Dalton's atomic theory, regarded the atom as an ultimate particles of matter Choose the correct answer from the options given below
(1) A, B and C only
(2) C, D and E only
(3) A and E only
(4) B, C and E only

**Answer (4)**

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

**Question 67**. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?
(1) Chlordiazepoxide
(2) Meprobamate
(3) Valium
(4) Veronal

**Answer (4)**

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

**Question 68**. 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 the correct explanation of A
(2) Both A and R are true and R is NOT the correct explanation of A
(3) A is true but R is false
(4) A is false but R is true

**Answer (2)**

**Solution**. • Helium is used as diluent for oxygen in modern diving apparatus because of its very low solubility
in blood.
• Gases diffuses easily with each other.

**Question 74**. Which one of the following statements is correct?
(1) The daily requirement of Mg and Ca in the human body is estimated to be 0.2-0.3 g
(2) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor
(3) The bone in human body is an inert and unchanging substance
(4) Mg plays roles in neuromuscular function and interneuronal transmission
**Answer (1)**

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

• Bone in the human body is not an inert and unchanging substance but is continuously beingsolubilised 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 84**. The element expected to form largest ion to achieve the nearest noble gas configuration is
(1) O
(2) F
(3) N
(4) Na

**Answer (3)**

**Solution**. For isoelectronic species, as the charge on anion increases, ionic size increases So, N forms N3– anion with largest ionic size

**Question 98**. Given below are two statements :
Statement I : The nutrient deficient water bodies lead to eutrophication
Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is correct but Statement II is false.
(4) Statement I is incorrect but Statement II is true.

**Answer (4)**

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

**Question 100**. Pumice stone is an example of
(1) Sol
(2) Gel
(3) Solid sol
(4) Foam

**Answer (3)**

**Solution**. Pumice stone is a solid sol.
Dispersed phase : Gas
Dispersed medium : Solid

## Botany Questions & Solutions

**Question 102**. Large, colourful, fragrant flowers with nectar are seen in
(1) Insect pollinated plants
(2) Bird pollinated plants
(3) Bat pollinated plants
(4) Wind pollinated plants

**Answer (1)**

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

**Question 103**. The phenomenon of pleiotropism refers to
(1) Presence of several alleles of a single gene controlling a single crossover
(2) Presence of two alleles, each of the two genes controlling a single trait
(3) A single gene affecting multiple phenotypic expression
(4) More than two genes affecting a single character

**Answer (3)**

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

**Question 104**. Frequency of recombination between gene pairs on same chromosome as a measure of the distance
between genes to map their position on chromosome, was used for the first time by

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

**Answer (3)**

**Solution**. Alfred Sturtevant used the frequency of recombination between gene pairs on the same chromosome
as a measure of the distance between genes and 'mapped' their position on the chromosome.Sutton and Boveri proposed chromosomal theory of inheritance. Henking discovered X-chromosome. Thomas Hunt Morgan proved chromosomal theory of inheritance and proposed the concept of linkage.

**Question 105**. 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 correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct

**Answer (1)**

**Solution**. 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 106**. Which micronutrient is required for splitting of water molecule during photosynthesis?
(1) Manganese
(2) Molybdenum
(3) Magnesium
(4) Copper

**Answer (1)**

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

**Question 107**. The reaction centre in PS II has an absorption maxima at
(1) 680 nm
(2) 700 nm
(3) 660 nm
(4) 780 nm

**Answer (1)**

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

**Question 108**. 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) A, B, C only
(2) B, C, D only
(3) C, D, E only
(4) D, E, A only

**Answer (1)**

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

**Question 109**. The thickness of ozone in a column of air in the atmosphere is measured in terms of :
(1) Dobson units
(2) Decibels
(3) Decameter
(4) Kilobase

**Answer (1)**

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

**Question 110**. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as
(1) Differentiation
(2) Dedifferentiation
(3) Development
(4) Senescence

**Answer (2)**

**Solution**. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as dedifferentiation.
Dedifferentiation is a phenomenon by which the living differentiated plant cells, that by now have lost the capacity to divide can regain the capacity of division under certain conditions.

**Question 111**. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :
Assertion A : ATP is used at two steps in glycolysis.
Reason R : First ATP is used in converting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1, 6-diphosphate.
In the light of the above statements, choose the correct answer from the options given below :
(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true but R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

**Answer (1)**

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

**Question 113**. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?
(1) Habitat loss and fragmentation
(2) Over exploitation for economic gain
(3) Alien species invasions
(4) Co-extinctions

**Answer (1)**

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

**Question 114**. Spraying of which of the following phytohormone on juvenile conifers helps hastening the maturity period, that leads early seed production?
(1) Indole-3-butyric Acid
(2) Gibberellic Acid
(3) Zeatin
(4) Abscisic Acid

**Answer (2)**

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

**Question 115**. Unequivocal proof that DNA is the genetic material was first proposed by
(1) Frederick Griffith

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

Answer (2)

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

**Question 116**. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?
(1) Transcription of rRNAs (28S, 18S and 5.8S)
(2) Transcription of tRNA, 5S rRNA and snRNA
(3) Transcription of precursor of mRNA
(4) Transcription of only snRNAs

**Answer (2)**

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

**Question 117**. Among eukaryotes, replication of DNA takes place in :
(1) M phase
(2) S phase
(3) G1phase
(4) G2phase

**Answer (2)**

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

**Question 118**. Which of the following stages of meiosis involves division of centromere?
(1) Metaphase I
(2) Metaphase II
(3) Anaphase II
(4) Telophase

**Answer (3)**

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

**Question 119**. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year
(1) 1985
(2) 1992
(3) 1986
(4) 2002

**Answer (2)**

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

**Question 120**. Given below are two statements : One labelled as Assertion A and the other labelled as Reason R:

Assertion A : The first stage of gametophyte in the life cycle of moss is protonema stage.
Reason R : Protonema develops directly from spores produced in capsule.
In the light of the above statements, choose the most appropriate answer from options given below:
(1) Both A and R are correct and R is the correct explanation of A
(2) Both A and R are correct but R is NOT the correct explanation of A
(3) A is correct but R is not correct
(4) A is not correct but R is correct

**Answer (1)**

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

**Question 121**. In gene gun method used to introduce alien DNA into host cells, microparticles of _____ metal are used.
(1) Copper
(2) Zinc
(3) Tungsten or gold
(4) Silver

**Answer (3)**
**Solution**. Option (3) 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 122**. Cellulose does not form blue colour with Iodine because
(1) It is a disaccharide
(2) It is a helical molecule

(3) It does not contain complex helices and hence cannot hold iodine molecules
(4) It breaks down when iodine reacts with it

**Answer (3)**

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

**Question 123**. What is the function of tassels in the corn cob?
(1) To attract insects
(2) To trap pollen grains
(3) To disperse pollen grains
(4) To protect seeds

**Answer (2)**

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

**Question 124**. Axile placentation is observed in
(1) Mustard, Cucumber and Primrose
(2) China rose, Beans and Lupin
(3) Tomato, Dianthus and Pea
(4) China rose, Petunia and Lemon

**Answer (4)**

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

**Question 125**. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are :
(1) Synergids, Primary endosperm nucleus and zygote
(2) Antipodals, synergids, and primary endosperm nucleus
(3) Synergids, Zygote and Primary endosperm nucleus
(4) Synergids, antipodals and Polar nuclei

**Answer (3)**

**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 nuclei with a male gamete.Therefore, it is triploid.

**Question 126**. Expressed Sequence Tags (ESTs) refers to
(1) All genes that are expressed as RNA.
(2) All genes that are expressed as proteins.
(3) All genes whether expressed or unexpressed.
(4) Certain important expressed genes.

**Answer (1)**

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

**Question 133.** During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out
(1) RNA
(2) DNA
(3) Histones
(4) Polysaccharides

**Answer (2)**

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

**Question 134**. Identify the pair of heterosporous pteridophytes among the following :
(1) Lycopodium and Selaginella
(2) Selaginella and Salvinia
(3) Psilotum and Salvinia
(4) Equisetum and Salvinia

**Answer (2)**

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

**Question 141**. Which one of the following statements is NOT correct?
(1) The micro-organisms involved in biodegradation of organic matter in a sewage polluted water body
consume a lot of oxygen causing the death of aquatic organisms
(2) Algal blooms caused by excess of organic matter in water improve water quality and promote fisheries
(3) Water hyacinth grows abundantly in eutrophic water bodies and leads to an imbalance in the ecosystem
dynamics of the water body
(4) The amount of some toxic substances of industrial waste water increases in the organisms at
successive trophic levels

**Answer (2)**

**Solution**. Algal bloom imparts a distinct colour to the water bodies. It causes deterioration of the water quantity and fish mortality.

**Question 142**. Given below are two statements : One labeled as Assertion A and the other labeled as Reason R :
Assertion A : In gymnosperms the pollen grains are released from the microsporangium and carried by air
currents.
Reason R : Air currents carry the pollen grains to the mouth of the archegonia where the male gametes are
discharged and the pollen tube is not formed.
In the light of the above statements, choose the correct answer from the options given below :
(1) Both A and R are true and R is the correct explanation of A
(2) Both A and R are true but R is NOT the current explanation of A
(3) A is true but R is false
(4) A is false but R is true

**Answer (3)**

**Solution**. Assertion is correct but reason is false as in gymnosperms the pollen grains are released from the microsporangium and they are carried in air currents. They come in contact with the opening of the ovules borne on megasporophylls. The pollen tube carrying the male gametes grows towards archegonia in the ovules and discharges their contents near the mouth of the archegonia.

## Zoology Questions & Solutions

**Question 152.** Which of the following statements are correct regarding female reproductive cycle?
A. In non-primate mammals cyclical changes during reproduction are called oestrus cycle**.**

B. First menstrual cycle begins at puberty and is called menopause.
C. Lack of menstruation may be indicative of pregnancy.
D. Cyclic menstruation extends between menarche and menopause.
Choose the most appropriate answer from the options given below.
(1) A and D only
(2) A and B only
(3) A, B and C only
(4) A, C and D only

Answer (4)

**Solution.** The correct answer is option (4) as first menstrual cycle that begins at puberty is called menarche. Cyclic menstruation is an indicator of normal reproductive phase and extends between menarche and menopause. In primates, cyclical changes during reproduction are called menstrual cycle

**Question 154**. Given below are two statements: one is labeled as Assertion A and other is labeled as Reason R.
Assertion A : Amniocentesis for sex determination is one of the strategies of Reproductive and Child Health
Care Programme.
Reason R : Ban on amniocentesis checks increasing menace of female foeticide.
In the light of the above statements, choose the correct answer from the options given below.
(1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true and R is NOT the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

**Answer (4)**

**Solution**. The correct answer is option (4) as 'Reproductive and Child Health Care (RCH) programme' deals with creating awareness among people about various reproduction related aspects and providing facilities and support for building up a reproductively healthy society.
Amniocentesis is basically used to test for the presence of certain genetic disorders such as Down's syndrome, hemophilia, etc., to determine the survivability of the fetus. Amniocentesis is not a sex determination technique in India and is not a strategy of RCH.

**Question 155**. 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) B and D only
(2) A, C and E only
(3) A and D only
(4) A, D and E only

**Answer (2)**

**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 156**. Vital capacity of lung is _____.
(1) IRV + ERV
(2) IRV + ERV + TV + RV
(3) IRV + ERV + TV – RV

(4) IRV + ERV + TV

**Answer (4)**

**Solution**. Option (4) is the correct answer because vital capacity is the maximum volume of air a person can breathe in after forced expiration. This includes ERV, TV and IRV.

**Question 160**. Given below are two statements :
Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high
temperature destroys enzymatic activity because proteins are denatured by heat.
Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the
activity of the enzyme, it is known as 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 true.
(2) Both Statement I and Statement II are false.
(3) Statement I is true but Statement II is false.
(4) Statement I is false but Statement II is true.

**Answer (1)**

**Solution**. The correct answer is option (1) as low temperature preserves the enzyme in a temporarily inactive
state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.
• Competitive inhibitor due to its close structural similarity with the substrate, competes with the substrate for the substrate-binding site of the enzyme.

**Question 161**. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.

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

**Answer (2)**

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

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

**Answer (2)**

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

**Question 165**. Which of the following functions is carried out by cytoskeleton in a cell?
(1) Nuclear division

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

**Answer (3)**

**Solution**. An elaborate network of filamentous proteinaceous structures consisting of microtubules, microfilaments and intermediate filaments present in cytoplasm is collectively referred to as the cytoskeleton. It is involved in many functions such as mechanical support, motility, maintenance of the shape of the cell.

**Question 166**. Broad palm with single palm crease is visible in a person suffering from-
(1) Down's syndrome
(2) Turner's syndrome
(3) Klinefelter's syndrome
(4) Thalassemia

**Answer (1)**

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

**Answer (4)**

**Solution**. 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 169**. Given below are two statements:
Statement I: Ligaments are dense irregular tissue.
Statement II: Cartilage is dense regular tissue.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Statement I is false but Statement II is true

**Answer (2)**

**Solution**. Option (2) is the correct answer because ligament is an example of dense regular connective tissue so Statement I is incorrect and cartilage is an example of specialized connective tissue and not dense regular tissue. Therefore Statement II is also incorrect.

**Question 170**. In which blood corpuscles, the HIV undergoes replication and produces progeny viruses?
(1) TH cells
(2) B-lymphocytes
(3) Basophils

(4) Eosinophils

**Answer (1)**

**Solution**. The correct answer is option (1) because HIV enters into helper T-lymphocytes (TH), replicates and produces progeny viruses. The progeny viruses released into blood attack other helper lymphocytes.

**Question 171**. Given below are two statements:
Statement I: Electrostatic precipitator is most widely used in thermal power plant.
Statement II: Electrostatic precipitator in thermal power plant removes ionizing radiations.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both Statement I and Statement II are correct.
(2) Both Statement I and Statement II are incorrect.
(3) Statement I is correct but Statement II is incorrect.
(4) Statement I is incorrect but Statement II is correct.

**Answer (3)**

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

**Question 172**. Given below are two statements:
Statement I: Vas deferens receives a duct from the seminal vesicle and opens into urethra as the ejaculatory duct.
Statement II: The cavity of the cervix is called the cervical canal which along with vagina forms the birth canal. In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true.
(2) Both Statement I and Statement II are false.
(3) Statement I is correct but Statement II is false.

(4) Statement I is incorrect but Statement II is true.

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

**Question 176**. Given below are two statements:
Statement I: A protein is imagined as a line, the left end represented by first amino acid (Cterminal) and the right end represented by last amino acid (N-terminal).
Statement II: Adult human hemoglobin, consists of 4 subunits (two subunits of type and two subunits of type.) In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false.
(3) Statement I is true but Statement II is false.
(4) Statement I is false but Statement II is true.

**Answer (4)**

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

**Question 177**. Which of the following statements is correct?
(1) Eutrophication refers to increase in domestic sewage and waste water in lakes.
(2) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels.

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

**Answer (2)**

**Solution**. Increase in the concentration of the toxicant at successive trophic 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 178**. Radial symmetry is NOT found in adults of phylum _____.
(1) Ctenophora
(2) Hemichordata
(3) Coelenterata
(4) Echinodermata

**Answer (2)**

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