NEET 2023 Solutions Code F5

Physics Questions & Solutions

Question 1. 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) Capacitor

Solution. Capacitor removes the ac ripple from rectified output

Question 6. 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) Random errors

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 7. 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) Cs only

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

Question 18 . 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) Bernoulli's principle

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

Question 21. Given below are two statements:

Statement I: Photovoltaic devices can convert optical radiation into electricity.

Statement II: Zener diode is designed to operate under reverse bias in breakdown region.

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

(1) Both Statement I and Statement II are incorrect

(2) Statement I is correct but Statement II is incorrect

(3) Statement I is incorrect but Statement II is correct

(4) **Both Statement I and Statement II are correct**

Answer (4) Both Statement I and Statement II are correct

Solution . Both Statements are correct.

I: Photovoltaic devices convert optical radiation into electricity.

II: Zener diode is designed to operate under reverse bias in breakdown region.

e.g., Zener diode as a voltage regulator

Question 22. 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) Statement I is true but Statement II is false.

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

Question 24. 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) 8 μJ

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

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

= 8 x 10-6 J

= 8 μJ

Question 27. The net magnetic flux through any closed surface is
(1) Positive
(2) Infinity
(3) Negative
(4) **Zero**

Answer (4) Zero

Solution

$\oint$ B. ds = 0

Magnetic monopoles don't exist.
Hence net magnetic flux through any closed surface is zero.

Question 28. 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) 27°C

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

$T_{source} = 327$ ° C$=600K$

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

$\frac{1}{2} = 1-\frac{Tsink}{600}$

$T_{sink}=300K$, So the temperature of the sink is= 327-300= 27° C

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) Displacement current decreases

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

Question 35. If $\oint E.dS = 0$ over a surface, then

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

Answer (4) The number of flux lines entering the surface must be equal to the number of flux lines leaving it

Solution $\oint E.dS = 0$ Net flux through the surface is zero. Therefore, the number of flux lines entering the surface must be equal to the number of flux lines leaving it.

Chemistry Questions & Solutions

Question 54. 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) A, B, C, E are correct

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 65. 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) Both A and R are true and R is NOT the correct explanation of A

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

Question 72. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?

(1) Meprobamate

(2) Valium

(3) **Veronal**

(4) Chlordiazepoxide

Answer (3) Veronal

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

Question 74. 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) D, E only

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 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) The daily requirement of Mg and Ca in the human body is estimated to be 0.2-0.3 g

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

NH_3, $AlCl_3$, $BeCl_2$, CCl_4, PCl_5 :
(1) 2
(2) 4
(3) 1
(4) **3**

Answer (4) 3

Question 79. 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) B, C and E only

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 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) Both A and R are true and R is NOT the correct explanation of A

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.

Question100 . Pumice stone is an example of
(1) Gel
(2) **Solid sol**
(3) Foam
(4) Sol

Answer (2) Solid sol

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

Botany Questions & Solutions

Question 101. 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) 1992

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

Question 102. 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) A single gene affecting multiple phenotypic expression

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

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) Active Transport

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

Answer (2) Anaphase II

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 106. 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) Statement I is incorrect but Statement II is true

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 107. 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) Alfred Sturtevant

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 109. 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) Dedifferentiation

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 110. 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) Synergids, Zygote and Primary endosperm nucleus

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

Answer (4) Manganese

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 112. 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) China rose, Petunia and Lemon

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 113. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :
Assertion A : Late wood has fewer xylary elements with narrow vessels.
Reason R : Cambium is less active in winters.
In the light of the above statements, choose the correct answer from the options given below :
(1) Both A and R are true 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) Both A and R are true and R is the correct explanation of A

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

Answer (1) Gibberellic Acid

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

Question 115. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out
(1) **DNA**
(2) Histones
(3) Polysaccharides
(4) RNA

Answer (1)DNA

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 116. 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)Both A and R are correct and R is the correct explanation of A

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 119. 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)Tungsten or gold

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 120. 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)Insect pollinated plants

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

Question 122. 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) Selaginella and Salvinia

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

Question 123. 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)Habitat loss and fragmentation

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

Question 124. 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)Bright orange colour

Solution . Option (3) is the correct answer because in recombinant DNA technology the separated DNA fragments can be visualized only after staining the DNA with a substance known as ethidium bromide followed by exposure to U.V. radiation. You can see bright orange coloured bands of DNA in an ethidium bromide stained gel exposed to U.V. light.

Question 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) All genes that are expressed as RNA

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

Zoology Questions & Solutions

Question 154. 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) A, C and D only

Solution. The correct answer is option (3) as first menstrual cycle that begins at puberty is called menarche. Cyclic menstruation is an indicator of normal reproductive phase and extends between menarche and menopause. In primates, cyclical changes during reproduction are called menstrual cycle.

Question 155. 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)Numbat, Spotted cuscus, Flying phalanger

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 156. 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)Motility

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

Answer (3) IRV + ERV + TV
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 158. Match List I with List II.

List I	List II
A. Gene ‘a’	I. -galactosidase
B. Gene ‘y’	II. Transacetylase
C. Gene ‘i’	III. Permease
D. Gene ‘z’	IV. Repressor protein

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

Answer (1)A-II, B-III, C-IV, D-I
Solution. In a lac operon,
Gene a codes for enzyme transacetylase.
Gene y codes for enzyme permease.
Gene i codes for repressor protein

Gene z codes for enzyme -galactosidase.

Question 159. 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)Serum and Urine analysis

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.

Question160. 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) **Down's syndrome**

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 161. 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)Both Statement I and Statement II are true.

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

Question 162. 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 163. Given below are two statements: one is labelled as Assertion A and other is labelled as Reason R.
Assertion A : Amniocentesis for sex determination is one of the strategies of Reproductive and Child Health Care Programme.

Reason R : Ban on amniocentesis checks increasing menace of female foeticide.
In the light of the above statements, choose the correct answer from the options given below.
(1) Both A and R are true and R is 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 (3)

Solution . The correct answer is option (3) 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 foetus. Amniocentesis is not a sex determination technique in India and is not a strategy of RCH.

Question 165. Given below are two statements :
Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.
Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.
In the light of the above statements, choose the correct answer from the options given below :
(1) Both Statement I and Statement II are false.
(2) Statement I is true but Statement II is false.
(3) Statement I is false but Statement II is true.
(4) Both Statement I and Statement II are true.
Answer (4)

Solution. The correct answer is option (4) as low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.
•Competitive inhibitor due to its close structural similarity with the substrate, competes with the substrate for the substrate-binding site of the enzyme.

Question 166. Given below are two statements: one is labelled as Assertion A and the other is labelled 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) Both A and R are true but R is NOT the correct explanation of A.

Solution. Option (1) is the correct answer because both Assertion and Reason are true. Implantation is embedding of the blastocyst into 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 167. Given below are two statements:
Statement I: A protein is imagined as a line, the left end represented by first amino acid (Cterminal) and the right end represented by last amino acid (N-terminal).
Statement II: Adult human haemoglobin, consists of 4 subunits (two subunits of 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 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) Statement I is false but Statement II is true.

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 168. 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 169. 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) A is true but R is false.

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 170. Given below are two statements:
Statement I: In prokaryotes, the positively charged DNA is held with some negatively charged proteins in a region called nucleoid.
Statement II: In eukaryotes, the negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are false.
(2) Statement I is correct but Statement II is false.
(3) **Statement I is incorrect but Statement II is true**.
(4) Both Statement I and Statement II are true.

Answer (3) Statement I is incorrect but Statement II is true

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 171. Match List I with List II.

List I	List II
A. P-wave	I. Beginning of systole
B. Q-wave	II. Repolarisation of ventricles
C. QRS complex	III. Depolarisation of atria
D. T-wave	IV. Depolarisation of ventricles

Choose the correct answer from the options given below :

(1) A-IV, B-III, C-II, D-I

(2) A-II, B-IV, C-I, D-III

(3) A-I, B-II, C-III, D-IV

(4) A-III, B-I, C-IV, D-II

Answer (4)

Solution. The correct answer is option (4) as in a standard ECG, P-wave represents the electrical excitation (or depolarisation) of the atria which leads to the contraction of both the atria.

• QRS complex represents the depolarisation of ventricles which initiates the ventricular contraction.

• T-wave represents the return of the ventricles from excited to normal state.