

NEET 2023 Solutions Code H3

Physics Questions & Solutions

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

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

Answer (3) Zero

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

Answer (3) 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 8. The venturi-meter works on

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

Answer (4) Bernoulli's principle

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

Question 10 . An ac source is connected to a capacitor C. Due to decrease in its operating frequency

- (1) Displacement current decreases**
- (2) Capacitive reactance remains constant
- (3) Capacitive reactance decreases
- (4) Displacement current increases

Answer (1) Displacement current decreases

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

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

Answer (2) 8 uJ

$$\begin{aligned}\text{Solution. Energy} &= \frac{1}{2}Li^2 \\ &= \frac{1}{2} \times 4 \times 10^{-2} \times 2^2 \\ &= 8 \times 10^{-6} \text{ J} \\ &= 8 \mu\text{J}\end{aligned}$$

Question 14. A full wave rectifier circuit consists of two p-n junction diodes, a center-tapped transformer, capacitor and a load resistance. Which of these components remove the ac ripple from the rectified output?

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

Answer (1) Capacitor

Solution . Capacitor removes the ac ripple from rectified output.

Question 16. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are

- (1) Least count errors
- (2) **Random errors**
- (3) Instrumental errors
- (4) Personal errors

Answer (2) 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 19. 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) K only
- (2) Na only
- (3) Cs only
- (4) Both Na and K

Answer (3) Cs only

Solution. Energy of incident radiation = 2.20 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 20. 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) **Statement I is true but Statement II is false.**

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

Answer (1) Statement I is true but Statement II is false

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 $\propto \lambda$

If $\lambda \uparrow \rightarrow$ angular separation of fringes increases

So, statement I is true and statement II is false.

Question 28. $\oint E \cdot dS = 0$ over a surface, then

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

Answer (3) The number of flux lines entering the surface must be equal to the number of flux lines leaving it

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

Question 31. A Carnot engine has an efficiency of 50% when its source is at a temperature 327°C. The temperature of the sink is

- (1) 100°C
- (2) 200°C

(3) 27°C

(4) 15°C

Answer (3) 27°C

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

- (1) Along the tangent to its position
- (2) **Along the axis of rotation**
- (3) Along the radius, away from centre
- (4) Along the radius towards the centre

Answer (2) Along the axis of rotation

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

Chemistry Questions & Solutions

Question 54. 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) **D, E only**
- (2) A, B, C only
- (3) B, C, D, E only
- (4) B, D only

Answer (1) 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 57. 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) A is true but R is false
- (2) A is false but R is true
- (3) Both A and R are true and R correct explanation of A
- (4) **Both A and R are true and R is NOT the correct explanation of A**

Answer (4) 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.

- Gases diffuses easily with each other.

Question 58 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) A is true but R is false
- (2) A is false but R is true
- (3) Both A and R are true and R is the correct explanation of A
- (4) **Both A and R are true and R is NOT the correct explanation of A**

Answer (4) 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.

Question 64. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?

- (1) Valium
- (2) **Veronal**
- (3) Chlordiazepoxide
- (4) Meprobamate

Answer (2) Veronal

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

Question 67. Which one of the following statements is correct?

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

Answer (3)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 co-factor.

- Bone in human body is not an inert and unchanging substance but is continuously being solubilised and redeposited.
- Ca plays important role in neuromuscular function, interneuronal transmission, cell membrane integrity and blood coagulation.
- The daily requirement of Mg and Ca in the human body is estimated to be 200 - 300 mg (0.2 - 0.3 g).

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

Answer (2) 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. The element expected to form largest ion to achieve the nearest noble gas configuration is

- (1) N
- (2) Na
- (3) O
- (4) F

Answer (1) N

Solution . For isoelectronic species, as the charge on anion increases, ionic size increases So, N forms N^{3-} anion with largest ionic size

Question 85. 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, E are correct**
- (2) A, C, D, E are correct
- (3) B, C, D, E are correct

(4) A, B, C, D are correct

Answer (1) 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 88. Pumice stone is an example of

(1) **Solid sol**

(2) Foam

(3) Sol

(4) Gel

Answer (1) Solid sol

Solution . Pumice stone is a solid sol.

Dispersed phase : Gas

Dispersed medium : Solid

Botany Questions & Solutions

Question 101. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as

(1) Development

(2) Senescence

(3) Differentiation

(4) **Dedifferentiation**

Answer (4) 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 103. 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) Statement I is correct but Statement II is incorrect
- (2) Statement I is incorrect but Statement II is correct
- (3) **Both Statement I and Statement II are correct**
- (4) Both Statement I and Statement II are incorrect

Answer (3) Both Statement I and Statement II are correct

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 107. Spraying of which of the following phytohormone on juvenile conifers helps hastening the maturity period, that leads early seed production?

- (1) Zeatin
- (2) Abscisic Acid
- (3) Indole-3-butyric Acid
- (4) **Gibberellic Acid**

Answer (4) Gibberellic Acid

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

Question 112. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?

- (1) Alien species invasions
- (2) Co-extinctions
- (3) Habitat loss and fragmentation
- (4) Over exploitation for economic gain

Answer (3)

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

Question 114. The thickness of ozone in a column of air in the atmosphere is measured in terms of :

- (1) Decameter
- (2) Kilobase
- (3) **Dobson units**
- (4) Decibels

Answer (3) Dobson units

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 115. Which micronutrient is required for splitting of water molecule during photosynthesis?

- (1) Magnesium
- (2) Copper
- (3) **Manganese**

(4) Molybdenum

Answer (3) 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 116. 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) Monoadelphous and Monothealous anthers
- (2) Epiphyllous and Dithecous anthers
- (3) **Diadelphous and Dithecous anthers**
- (4) Polyadelphous and epipetalous stamens

Answer (3) Diadelphous and Dithecous anthers

Solution. Fabaceae → Diadelphous and dithecous anther.

Solanaceae → Polyandrous, epipetalous and dithecous anther.

Liliaceae → Polyandrous, epiphyllous and dithecous anther.

Question 117. 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) A is correct but R is not correct
- (2) A is not correct but R is correct
- (3) **Both A and R are correct and R is the correct explanation of A**
- (4) Both A and R are correct but R is NOT the correct explanation of A

Answer (3) 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 121. Movement and accumulation of ions across a membrane against their concentration gradient can be explained by

- (1) Passive Transport
- (2) **Active Transport**
- (3) Osmosis
- (4) Facilitated Diffusion

Answer (2) 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 122. Upon exposure to UV radiation, DNA stained with ethidium bromide will show

- (1) Bright yellow colour
- (2) **Bright orange colour**
- (3) Bright red colour
- (4) Bright blue colour

Answer (2) Bright orange colour

Solution . Option (2) 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 123. 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) A is true but R is false

(2) A is false but R is true

(3) **Both A and R are true and R is the correct explanation of A**

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

Answer (3) 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 124. Axile placentation is observed in

(1) Tomato, Dianthus and Pea

(2) **China rose, Petunia and Lemon**

(3) Mustard, Cucumber and Primrose

(4) China rose, Beans and Lupin

Answer (2) 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 125. The phenomenon of pleiotropism refers to

- (1) **A single gene affecting multiple phenotypic expression**
- (2) More than two genes affecting a single character
- (3) Presence of several alleles of a single gene controlling a single crossover
- (4) Presence of two alleles, each of the two genes controlling a single trait

Answer (1) 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 126. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out

- (1) Histones
- (2) Polysaccharides
- (3) RNA
- (4) **DNA**

Answer (4) DNA

Solution. Option (4) is the correct answer as, during isolation of the genetic material, purified DNA ultimately precipitates out after the addition of chilled ethanol.

Option (1) is not the answer as, proteins can be removed by treatment with proteases.

Option (3) is not the answer as RNA can be removed by treatment with ribonuclease.

Question 128. The process of appearance of recombination nodules occurs at which sub stage of prophase I in meiosis?

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

Answer (4) Pachytene

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

Question 129. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?

- (1) Transcription of precursor of mRNA
- (2) Transcription of only snRNAs
- (3) Transcription of rRNAs (28S, 18S and 5.8S)
- (4) **Transcription of tRNA, 5S rRNA and snRNA**

Answer (4) Transcription of tRNA, 5S rRNA and snRNA)

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 133. Which of the following stages of meiosis involves division of centromere?

- (1) Anaphase II
- (2) Telophase
- (3) Metaphase I
- (4) Metaphase II

Answer (1)

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

Question 134. The reaction centre in PS II has an absorption maxima at

- (1) 660 nm
- (2) 780 nm
- (3) **680 nm**

(4) 700 nm

Answer (3) 680 nm

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

Question 135. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year

- (1) 1986
- (2) 2002
- (3) 1985
- (4) **1992**

Answer (4) 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...

Zoology Questions & Solutions

Question 154. Which of the following functions is carried out by cytoskeleton in a cell?

- (1) **Motility**
- (2) Transportation
- (3) Nuclear division
- (4) Protein synthesis

Answer (1) 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 155. 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, B and C only

(2) **A, C and D only**

(3) A and D only

(4) A and B only

Answer (2) A, C and D only

Solution. The correct answer is option (2) 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 156. Match List I with List II.

List I

List II

A. Vasectomy

I. Oral method

B. Coitus interruptus

II. Barrier method

C. Cervical caps

III. Surgical method

D. Saheli

IV. Natural method

Choose the correct answer from the options given below:

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

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

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

(4) **Gonorrhoea**

Answer (4)Gonorrhoea

Solution . Option (4) the correct answer because

- (i) Vasectomy is a surgical method of contraception
- (ii) Coitus interruptus is a natural method of contraception
- (iii) Cervical cap is a barrier method of contraception
- (iv) Saheli is an oral method of contraception which is a non-steroidal pill

Question 160. 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-II, B-IV, C-I, D-III

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

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

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

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

Solution . The correct answer is option (3) 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

Question 161. Match List I with List II.

List I

List II

A. CCK

I. Kidney

B. GIP

II. Heart

C. ANF

III. Gastric gland

D. ADH

IV. Pancreas

Choose the correct answer from the options given below :

- (1) A-II, B-IV, C-I, D-III
- (2) A-IV, B-II, C-III, D-I
- (3) **A-IV, B-III, C-II, D-I**
- (4) A-III, B-II, C-IV, D-I

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

Solution . The correct answer is option (3) as Cholecystinin (CCK) acts on both gall bladder and pancreas and stimulates the secretion of bile juice and pancreatic enzymes respectively. GIP inhibits gastric secretion and motility. Atrial Natriuretic Factor (ANF) is released from the atrial wall of our heart. Anti-diuretic hormone (ADH) acts mainly on the kidney and stimulates resorption of water and electrolytes by the distal tubules

Question 163. Vital capacity of lung is _____.

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

Answer (2)

Solution . Option (2) 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 164. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.

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

Answer (4) Numbat, Spotted cuscus, Flying phalanger

Solution. Option (4) is the correct answer because numbat, spotted cuscus and flying phalanger are Australian marsupials exhibiting adaptive radiation.

Option (1) is incorrect because mole and flying squirrel are placental mammals.

Option (2) is incorrect because lemur and wolf are placental mammals.

Option (3) is incorrect because bobcat is a placental mammal.

Question 166. Match List I with List II.

List I (Type of Joint)

List II (Found between)

A. Cartilaginous Joint

I. Between flat skull bones

B. Ball and Socket Joint
vertebral column

II. Between adjacent vertebrae in

C. Fibrous Joint
Thumb

III. Between carpal and metacarpal of

D. Saddle Joint

IV. Between Humerus and Pectoralgirdle

Choose the correct answer from the options given below:

“(1)A-I, B-IV, C-III, D-II

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

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

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

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

Solution . Option (4) is the correct answer because cartilaginous joint is present in between the adjacent vertebrae in the vertebral column.

Option (1) is not the answer because cartilaginous joint is not present between flat skull bones.

Option (2) is not the answer because fibrous joint is not present in between the carpal and metacarpal of thumb.

Option (3) is not the answer because saddle joint is not present in between humerus and pectoral girdle.

Question 167. 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) **A is true but R is false.**
- (2) A is false but R is true.
- (3) Both A and R are true and R is the correct explanation of A.
- (4) Both A and R are true but R is NOT the correct explanation of A.

Answer (1)A is true but R is false

Solution. The correct answer is option (1) 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 169. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly?

- (1) Hepatitis-B
- (2) HIV Infection
- (3) Genital herpes
- (4) **Gonorrhoea**

Answer (4)Gonorrhoea

Solution . The correct answer is option (4) 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 171. Which of the following is not a cloning vector?

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

Answer (2)Probe

Solution . Option (2) 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), (3) and (4) are not correct because YAC, BAC, pBR322 are vectors.

Question 174. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by

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

Answer (4)Ileo-caecal valve

Solution . Option (4) 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 (1) is not the answer because a muscular sphincter i.e., the gastro-oesophageal sphincter regulates the opening of oesophagus into the stomach.

Option (2) is not the answer because pyloric sphincter regulates the opening in between stomach and duodenum.

Option (3) is not the answer because the opening of the common hepato-pancreatic duct is guarded by a sphincter of Oddi.

Question 175. 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) Statement I is correct but Statement II is false.
- (2) **Statement I is incorrect but Statement II is true.**
- (3) Both Statement I and Statement II are true.
- (4) Both Statement I and Statement II are false.

Answer (2)

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..