CAREERS 360

PREPARATION Series

AIIMS B.Sc. Nursing Exam

Previous Year Questions With Solutions

AIIMS BSc Nursing PYQ ebook

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About this eBook

Welcome to the AIIMS B.Sc. Nursing PYQ eBook—Subject-Wise Solved Questions! This eBook has been meticulously designed to provide a complete, exam-focused resource featuring subject-wise previous year questions from the AIIMS B.Sc. Nursing entrance exam. With carefully categorised questions and detailed solutions, this book is your go-to companion for understanding the exam pattern, mastering core concepts, and building the confidence needed to crack the exam.

Features of This eBook

- **Subject-Wise Organization**
  All questions are neatly categorised under Biology, Physics, Chemistry, and General Knowledge, allowing for focused revision and efficient practice in each subject area.
- **Accurate & Explained Solutions**
  Each PYQ comes with a clear, well-structured solution to strengthen your understanding and problem-solving skills.
- **Authentic Exam Coverage**
  The questions are sourced directly from the official AIIMS B.Sc. Nursing entrance exams, providing true-to-pattern practice for serious aspirants.

AIIMS BSc Nursing Biology PYQ

The Biology section in the AIIMS BSc Nursing PYQ ebook is designed to help students prepare effectively for the entrance exam, which includes 30 marks dedicated to biology. Biology covers essential topics like Cell Biology, Human Anatomy and Physiology, Genetics, Microbiology, and Ecology. Each chapter provides a thorough description of key concepts like the structure of a cell, the systems of the human body, inheritance patterns, functions of microorganisms, and the health of the environment. This ebook has previous year practice questions, which will help the students to make themselves aware of the exam pattern and concentrate on weightage-high chapters like Human Anatomy (25%) and Cell Biology (20%). When these chapters are focused on by candidates along with regular practice, then a sound foundation in the exam becomes possible.

Some PYQs from Biology

1. Human blood group is an example of

(A) Dominance

(B) Multiple allelism

(C) Codominance

(D) All of these

Answer: Human blood groups, especially the ABO blood group system, are a classic example in genetics that show

- Dominance: The A and B alleles are dominant over the O allele.
- Multiple allelism: There are more than two alleles involved — IA, IB, and i — which is a case of multiple allelism.
- Codominance: The IA and IB alleles are codominant, meaning both are equally expressed in the AB blood group (i.e., both A and B antigens are present on red blood cells).

Hence, the correct answer is option D) All of these.

2. MOET is a method of

(A) Fish cultivation

(C) Cloning in sheep

(B) Birth control in humans

(D) Hybridization in cattle

Answer: MOET stands for Multiple Ovulation and Embryo Transfer. It's a reproductive technology used in cattle breeding to improve the quality of livestock by producing high-yielding hybrid animals

Hence, the correct answer is option D) Hybridisation in cattle.

3. If a heterozygous tall and yellow-seeded plant is crossed with a dwarf and green-seeded plant, the progeny will be obtained in the ratio of

(A) 3:1

(B) 9:3:3:1

(C) 1:1:1:1

(D) 12:3:1

Answer: If tall (T) is dominant over dwarf (t) and yellow seed (Y) is dominant over green seed, the heterozygous tall, yellow-seeded plant has the genotype TtYy, and the dwarf**,** green-seeded plant has the genotype ttyy. Hence, this is a dihybrid cross:
TtYy × ttyy. Using the Punnett square, this cross gives a 1:1:1:1 ratio for the phenotypes:

- Tall, yellow
- Tall, green
- Dwarf, yellow
- Dwarf, green

Hence, the correct answer is option C) 1:1:1:1.

4. GAATTC is the recognition site of which of the following restriction endonucleases?

(A) Hird III

(B) EcoRI

(C) BamI

(D) HaeIII

Answer: The recognition site GAATTC is specific to the restriction enzyme EcoRI. EcoRI cuts between G and A in the sequence:

G▼AATTC

CTTAA▲G

Hence, the correct answer is option B) EcoRI.

5. Which class of tissues seems to be the most primitive among all types of tissues?

(A) Fibers

(B) Vessels

(C) Parenchyma

(D) Sieve tubes

Answer: In the context of plant tissues, "primitive" refers to tissues that are least specialised, ancestral in evolution, and capable of giving rise to other tissues. Parenchyma is the least specialised and most basic type of plant tissue. It is involved in functions like photosynthesis, storage, and tissue repair. It is found in almost all parts of the plant. It's considered primitive because it's the first to evolve and gives rise to other more specialised tissues.

Hence, the correct answer is option C) Parenchyma.

6. The sequence of DNA not translated is

(A) Introns

(B) Exons

(C) Cistrons

(D) Recons

Answer: Introns are non-coding sequences in a gene that are not translated into proteins. They are removed during RNA splicing.

Hence, the correct answer is option A) introns.

7. Consider the following four statements (a-d) and select the option that includes all the incorrect ones only.

(a) Cross-breeding allows the desirable qualities of two different species to be combined.

(b) Wax is a food of high nutritive value and is used in the preparation of cosmetics and polishes of various kinds.

(c) Pisciculture is an industry devoted to the catching, processing, or selling of fish, shellfish, or other aquatic animals.

(d) Controlled breeding experiments are carried out using artificial insemination.

Options:

(A) Statement (b), (c), and (d)

(B) Statements (a) and (d)

(C) Statement (c) and (d)

(D) Statement (a), (c), and (b)

Answer: Statement (a): Incorrect. "Cross-breeding allows the desirable qualities of two different species to be combined."
Reason: Cross-breeding refers to mating between different breeds of the same species, not different species. Mating between different species usually results in sterile offspring or no offspring at all.

Statement (b): Incorrect. "Wax is a food of high nutritive value and is used in the preparation of cosmetics and polishes of various kinds."
Reason: Wax (e.g., beeswax) is not of high nutritive value and is not commonly consumed as food. It is used in cosmetics and polishes, but the first part makes the statement incorrect.

Statement (c): Incorrect. "Pisciculture is an industry devoted to the catching, processing, or selling of fish, shellfish, or other aquatic animals."
Reason: This definition fits fisheries, not pisciculture. Pisciculture is the breeding and rearing of fish, typically in controlled environments like fish farms.

Statement (d): Correct. "Controlled breeding experiments are carried out using artificial insemination."
Reason: This is true. Artificial insemination is commonly used in controlled breeding.

Hence, the correct answer is option D) Statement (a), (c), and (b).

8. The gene that encodes for the BT protein specific to the cotton bollworm is

(A) CryIAC

(B) CryIIABC

(C) CryIIAC

(D) CryIIAB

Answer: The CryIAC gene specifically produces a protein toxic to Lepidopteran larvae, such as the cotton bollworm.

Hence, the correct answer is option A) CryIAC.

9. Read the following statements (I-IV):

(I) The first movement of the foetus and appearance of hair on the head are usually observed during the fourth month

(II) SAHELI, a new oral contraceptive for females

(III) MTPs are considered relatively safe during the second trimester

(IV) The corpus luteum secretes large amounts of estrogen, which is essential for the maintenance of the endometrium

How many statements are incorrect?

(A) Four

(B) Three

(C) Two

(D) One

Answer: Statement (a): Correct: "The first movement of the fetus and appearance of hair on the head are usually observed during the fourth month."

Reason—The first movement of the fetus (quickening) and development of features like hair on the head usually occur in the second trimester, around the 4th to 5th month.
Statement (b): Correct "SAHELI, a new oral contraceptive for females."

Reason— Saheli is a non-steroidal oral contraceptive developed in India, containing centchroman. It's indeed a female contraceptive.
Statement (c): Incorrect: "MTPs are considered relatively safe during the second trimester."

Reason— Medical Termination of Pregnancy (MTP) is considered relatively safe during the first trimester (up to 12 weeks). Risks increase during the second trimester.
Statement (d): Incorrect: "The corpus luteum secretes large amounts of estrogen, which is essential for the maintenance of the endometrium."

Reason—The corpus luteum primarily secretes progesterone, not estrogen. Progesterone is the hormone responsible for maintaining the endometrium.

Hence, the correct answer is option C) two.

10. The growth of a population is determined by

(A) Natality rate

(B) Mortality rate

(C) Vitalindex

(D) Population density

Answer: The vital index gives a balanced measure of population growth by considering both natality and mortality, so it reflects the growth trend.

Hence, the correct answer is option C) Vital Index

11. The treatment of snakebite by antivenom is an example of

(A) Specific natural immunity

(B) Naturally acquired passive immunity

(C) Artificially acquired passive immunity

(D) Artificially acquired active immunity

Answer: Snakebite treatment with antivenom involves injecting preformed antibodies (antivenom) into a person. These antibodies neutralize the venom quickly but are not produced by the person's immune system. Since the antibodies are introduced from an external source and provide immediate but short-term protection, this is a classic case of passive immunity. Because the antibodies are administered through medical intervention, they are artificially acquired.

Hence, the correct answer is option C) Artificially Acquired Passive Immunity.

12. The polyembryony was first observed in

(A) Coconut

(B) Cycas

(C) Citrus

(D) Tomato

Answer: In Citrus, polyembryony occurs naturally due to the formation of multiple embryos from nucellar cells (a type of apomixis), in addition to the zygotic embryo.

Hence, the correct answer is option C) Citrus.

13. Which of the following is properly matched

(A) Membrane Attack Complex—Natural killer cells

(B) Phagolysosomes—Hydrolytic enzymes

(C) Active immunity—Immediately effective

(D) MHC-I Antigen presenting cells—Only on antigen

Answer: Phagolysosomes are formed when a phagosome (engulfed particle) fuses with a lysosome. They contain hydrolytic enzymes that digest pathogens.

Hence, the correct answer is option B) phagolysosomes—hydrolytic enzymes.

14. Ranikhet disease is caused by

(A) Bacteria

(B) Virus

(C) Fungus

(D) Parasite

Answer: Ranikhet disease, also known as Newcastle disease, is a viral disease that affects poultry (like chickens). It is caused by the Newcastle disease virus (NDV), which belongs to the Paramyxoviridae family. The disease is highly contagious and causes respiratory distress and nervous symptoms. This can lead to high mortality in birds.

Hence, the correct answer is option B) Virus.

15. Mendel's work remained unrecognized till 1900 due to all except

(A) His work could not be widely publicised

(B) His work was not supported with the required data

(C) He could not provide any proof for the existence of factors

(D) His concept of genes was not accepted by his contemporaries

Answer: Mendel's work remained unrecognized till 1900 for several reasons, but lack of data was not one of them. Mendel provided very strong data from controlled experiments on pea plants.

Hence, the correct answer is option B) His work was not supported with the required data.

AIIMS BSc Nursing Chemistry PYQ

The Chemistry part of the AIIMS BSc Nursing PYQ book is a necessary part of the entrance test, carrying 30 marks. It deals with important topics like Atomic Structure, Chemical Bonding, Thermodynamics, Organic Chemistry, and Biomolecules. Each chapter gives detailed explanations of concepts like electron configuration, molecular structures, reaction mechanisms, and organic compound properties. The ebook contains the previous year's practice questions, which help in understanding the trend of the exam and practising high-weightage chapters such as Chemical Bonding (20%) and Organic Chemistry (25%). Constant practice and strategic revision of these topics help the candidates build a strong foundation for scoring well in the Chemistry section.

Some PYQs from Chemistry

1. Bell metal is an alloy of

(A) Cu, Zn, and Sn

(B) Cu and Sn

(C) Cu and Zn

(D) Sn and Zn

Answer: Bell metal is a type of bronze, which is primarily an alloy of copper (Cu) and tin (Sn). The typical composition is about 78% copper and 22% tin. It is used for making bells, musical instruments, and statues because of its hardness and resonant sound.

Hence, the correct answer is option B) Cu and Sn.

2. Which of these has the highest packing efficiency

(A) SCC

(B) BCC

(C) FCC

(D) ECC (Edge-centered)

Answer: FCC has atoms at the corners and at the centers of each face. It is the most efficient among the common crystal structures. Metals like gold, silver, aluminum, and copper crystallize in the FCC structure.

Hence, the correct answer is option C) FCC.

3. Which of these is the correct IUPAC name?

(A) Prop-2-ene

(B) Pentan-3-al

(C) Pentan-1-one

(D) Pentan-2-one

Answer: A 5-carbon chain (pentan-) with a ketone group at position 2. This is a valid and correct IUPAC name.

Hence, the correct answer is option D) Pentan-2-one.

4. Faraday's first law of electricity states :

(A) For the same electrolyte, the mass of a substance produced or consumed at an electrode is directly proportional to the quantity of electricity passed through the electrolye cells

(B) For the same electrolyte, the mass of a substance produced or consumed at an electrode is inversely proportional to the quantity of electricity passed through the electrolytic cell

(C) When the same quantity of electricity is passed through different electrolytes, the amounts of products obtained are proportional to their equivalent weights.

(D) When the same quantity of electricity is passed through different electrolytes, the amounts of products obtained are proportional to their molecular masses

Answer: The mass (m) of a substance deposited or liberated at an electrode is directly proportional to the quantity of electricity (Q) passed through the electrolyte.

Hence, the correct answer is option A) For the same electrolyte, the mass of a substance produced or consumed at an electrode is directly proportional to the quantity of electricity passed through the electrolyte cells.

5. Boiling point _____ as a result of Intramolecular H-bonding

(A) Increases

(B) Decreases

(C) Remains the same

(D) None

Answer: Intramolecular hydrogen bonding occurs within the same molecule, forming a bond between two functional groups inside the molecule. This reduces the ability of the molecule to form intermolecular hydrogen bonds with neighboring molecules. Since intermolecular H-bonding increases the boiling point (due to stronger forces between molecules); the lack of it due to intramolecular bonding leads to a lower boiling point.

Hence, the correct answer is option B) Decreases.

6. The impurities associated with minerals used in metallurgy are called collectively

(A) Slag

(B) Gangue

(C) Flux

(D) Froth

Answer: In metallurgy, minerals contain the desired metal along with unwanted impurities like sand, clay, and other earthy materials. These impurities are collectively known as gangue.

Hence, the correct answer is option B) Gangue.

7. Calcination is used in metallurgy for the removal of

(A) water and sulphide

(B) water and H_2S

(C) water and CO_2

(D) water and CO

Answer: Calcination is a process in metallurgy where ore is heated in the absence or limited supply of air to bring about thermal decomposition. It is primarily used to remove moisture (water) from hydrated ores and expel volatile impurities like CO_2 from carbonate ores.

Hence, the correct answer is option C) water and CO_2.

8. If gas expands at constant temperature, then

(A) The number of molecules of the gas increases

(B) K.E. of the molecules increases

(C) K.E. of the molecules decreases

(D) K.E. of the molecules remains the same

Answer: The kinetic energy (K.E.) of gas molecules is directly proportional to temperature. So, if a gas expands at constant temperature (isothermal expansion), the kinetic energy of the molecules remains unchanged. So, if a gas expands at constant temperature (isothermal expansion), the kinetic energy of the molecules remains unchanged.

Hence, the correct answer is option D) K.E. of the molecules remains the same.

9. Which of the following statements is false?

(A) Catalysts are selective

(B) Catalysts affect the equilibrium

(C) Catalysts affect the activation energy

(D) Catalysts affect the mechanism

Answer: Catalysts do not affect the position of equilibrium. They only speed up the rate at which equilibrium is reached, but the equilibrium composition (ratio of products to reactants) remains the same.

Hence, the correct answer is option B) Catalysts affect the equilibrium.

10. If $KMnO_4$ is reduced to oxalic acid in an acidic medium, then the oxidation no. of Mn changes from

(A) 4 to 2

(B) 6 to 4

(C) 7 to 2

(D) 7 to 4

Answer: In an acidic medium, potassium permanganate ($KMnO_4$) acts as a strong oxidizing agent, and the Mn in it undergoes reduction. In $KMnO_4$, manganese (Mn) has an oxidation number of +7. When reduced in an acidic medium, it becomes Mn^{2+}, where the oxidation number is +2.

Hence, the correct answer is option C) 7 to 2.

11. The temperature of a system decreases in

(A) Adiabatic compression

(B) Adiabatic expansion

(C) Isothermal compression

(D) Isothermal expansion

Answer: In adiabatic expansion, the gas expands without any heat exchange with the surroundings ($Q = 0$). Since the system is doing work on the surroundings and no heat is coming in, the internal energy (and thus temperature) of the gas decreases.

Hence, the correct answer is option B) adiabatic expansion.

12. Which of the following species has zero standard molar enthalpy of formation at 25°C

(A) $H_2O(g)$

(B) Cl_2 (g)

(C) $Br_2(g)$

(D) $CH_4(g)$

Answer: The standard molar enthalpy of formation (ΔHf°) of a compound is defined as the enthalpy change when 1 mole of a substance is formed from its elements in their standard states at 25°C (298 K) and 1 atm. For any element in its standard state, $\Delta Hf^\circ = 0$.

Hence, the correct answer is option B) Cl_2 (g).

13. For a reversible reaction at temperature T, ΔH and ΔS are both positive. If Te is the equilibrium temperature, then the reaction would be spontaneous at

(A) Te = T

(B) Te < T

(C) Te > T

(D) None

Answer: For a reaction to be spontaneous, the Gibbs free energy change (ΔG) must be negative. The formula is $\Delta G = \Delta H - T\Delta S$. Given that

- $\Delta H > 0$ (positive)
- $\Delta S > 0$ (positive)

For ΔG to be negative, $\Delta H - T\Delta S < 0$, which simplifies to $T > \Delta H / \Delta S$. Thus, the reaction is spontaneous when the temperature (T) is greater than the equilibrium temperature (Te).

Hence, the correct answer is Option C) Te > T.

14. The primary and secondary valencies of platinum in the complex $[Pt(en)_2Cl_2]$ are

(A) 4, 6

(B) 2, 6

(C) 4, 4

(D) 6, 4

Answer: In the complex $[Pt(en)_2Cl_2]$:

- Primary valency refers to the number of bonds formed between the metal and the ligands, corresponding to the oxidation state of platinum. In this case, platinum is in the +2 oxidation state, so the primary valency is 2.
- Secondary valency refers to the coordination number, which is the number of ligands directly bonded to the platinum ion. Since there are two ethylenediamine (en) ligands

and two chloride (Cl) ligands, the secondary valency is 6.

Hence, the correct answer is Option B) 2, 6.

15. What is the distance between the two nearest atoms in a BCC arrangement if the side length of the unit cell is ‘a’ ?

(A) a

(B) √3a

(C) 3√3a

(D) √3a/2

Answer: In a body-centered cubic (BCC) structure, the two nearest atoms are along the body diagonal of the unit cell. The body diagonal of the cube is √3a (where "a" is the side length of the unit cell). Since the two nearest atoms are located at the two ends of the body diagonal, the distance between them is half of the body diagonal. Therefore, the distance between the two nearest atoms is (√3a) / 2 = √3a / 2.

Hence, the correct answer is option D) √3a/2

AIIMS BSc Nursing Physics PYQ

The Physics subject of the AIIMS BSc Nursing PYQ book is most critical for maximum marks in the entrance exam, as it also contributes to 30 marks for the subject. The topics, such as Electromagnetic Induction, Optics, Current Electricity, and Electronic Devices, are of great importance. All the chapters talk about fundamental concepts such as the magnetic effect of current, the behavior of light through lenses, and principles of electric circuits. The ebook contains practice questions from past years that train students with the exam trend and bring out high-weightage chapters like Optics (20%) and Current Electricity (25%). By practicing these topics and numerical problems from time to time, students can improve their concepts and marks in the Physics section.

Some PYQs from Physics

1. A thin rod of length f/3 lies along the axis of a concave mirror of focal length f. One end of its magnified image touches the end of the rod. The length of the image is

(A) f

(B) 1/2 f

(C) 2f

(D) 1/4 f

Solution: A rod of length $\frac{f}{3}$ lies along the axis of a concave mirror (focal length f). One end of the image coincides with one end of the rod.

Let the object end be at $u = 2f$. Then from the mirror formula:

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \Rightarrow v = 2f$$

Other end at $u' = 2f + \frac{f}{3} = \frac{7f}{3}$

$$\frac{1}{v'} + \frac{1}{u'} = \frac{1}{f} \Rightarrow \frac{1}{v'} = \frac{1}{f} - \frac{3}{7f} = \frac{4}{7f} \Rightarrow v' = \frac{7f}{4}$$

Image length:

$$|v' - v| = \left| \frac{7f}{4} - 2f \right| = \frac{f}{4}$$

Hence, the correct answer is Option D. 1/4 f

2. The refractive index of diamond is 2.41. What is the minimum angle of incidence of a ray to get internally reflected in a diamond?

(A) 42°

(B) 35°

(C) 24.5°

(D) 48.4°

Soluion: Refractive index of diamond $n = 2.41$

For total internal reflection, the ray must go from a denser to a rarer medium.
Critical angle θ_c is given by:

$$\sin\theta_c = \frac{1}{n} = \frac{1}{2.41} \Rightarrow \theta_c = \sin^{-1}\left(\frac{1}{2.41}\right) \Rightarrow \theta_c \approx \sin^{-1}(0.415) \Rightarrow \theta_c \approx 24.5^\circ$$

Hence, the correct answer is Option C. 24.5°

3. A plano-convex lens has a focal length of f = 20 cm. If its plane surface is silvered, then the new focal length will be

(A) 20 cm

(B) 5 cm

(C) 10 cm

(D) 25 cm

Solution:

A plano-convex lens with focal length $f = 20\,\text{cm}$.
The plane surface is silvered, so it behaves like a lens-mirror combination.

When the plane side is silvered:
- Light refracts through the lens,
- reflects off the silvered plane,
- and refracts again.

Effective focal length F is given by:

$$\frac{1}{F} = \frac{2}{f} \Rightarrow F = \frac{f}{2} = \frac{20}{2} = 10\,\text{cm}$$

Hence, the correct answer is Option C. 10 cm

4. A ray of light is incident at an angle of incidence, i, on one face of the prism of angle A (assumed to be small) and emerges normally from the opposite face. If the refractive index of the prism is μ, the angle of incidence i is nearly equal to

(A) μA

(B) μA/2

(C) A/μ

(D A/2μ

Solution:

Light is incident at an angle i on a prism of small angle A, and emerges normally from the opposite face. Refractive index = μ

Since the emergent ray is normal, the angle of refraction at the second face is 0°.
So, the angle of incidence at the second face is the angle inside the prism = $r_2 = A$

From Snell's law at first glance:

$$\mu = \frac{\sin i}{\sin r_1} \Rightarrow \sin r_1 = \frac{\sin i}{\mu}$$

But for small angles, $\sin\theta \approx \theta$ in radians, and $r_1 + r_2 = A \Rightarrow r_1 = A - r_2 = A - A = 0$, which is not valid. So instead we directly write:

From geometry and small angle approximation:

$$r_1 + r_2 = A \Rightarrow r_1 = A - r_2 = A - 0 = A$$

Then from Snell's law:

$$\sin i = \mu \sin r_1 \approx \mu A \Rightarrow i \approx \mu A$$

Hence, the correct answer is Option A. μA

5. For an angle of minimum deviation of a prism to be equal to its refracting angle, the prism must be made of a material whose refractive index is

(A) Lies between √2 and 1

(B) lies between 2 and √2

(C) is less than 1

(D) is greater than 2

Solution:

Angle of minimum deviation $D_m = A$ (prism angle).
We use the formula for minimum deviation:

\[\mu = \frac{\sin\left(\frac{A + D_m}{2}\right)}{\sin\left(\frac{A}{2}\right)}
\]

Given $D_m = A$, so:

$$\mu = \frac{\sin\left(\frac{A+A}{2}\right)}{\sin\left(\frac{A}{2}\right)} = \frac{\sin A}{\sin\left(\frac{A}{2}\right)}$$

Now take $A = 60^\circ$ (for example):

$$\mu = \frac{\sin 60^\circ}{\sin 30^\circ} = \frac{\sqrt{3}/2}{1/2} = \sqrt{3} \approx 1.732$$

So, for $D_m = A$, $\mu \approx \sqrt{3}$, which lies between $\sqrt{2}$ and 2.

Hence, the correct answer is Option (B) lies between 2 and √2

6. In Young's double-slit experiment, the intensity is I at a point where the path difference is λ/6, where λ is the wavelength of light used. If I_0 denotes the maximum intensity, then I/I_0 is equal to

(A) 3/4

(B) 1/√2

(C) √3/2

(D) 2

Path difference $\Delta = \frac{\lambda}{6}$,
Maximum intensity $= I_0$, and intensity at that point = I

Phase difference:

$$\phi = \frac{2\pi}{\lambda} \cdot \frac{\lambda}{6} = \frac{\pi}{3}$$

Intensity at a point in interference pattern:

$$I = I_0 \cos^2\left(\frac{\phi}{2}\right) = I_0 \cos^2\left(\frac{\pi}{6}\right) = I_0\left(\frac{\sqrt{3}}{2}\right)^2 = I_0 \cdot \frac{3}{4}$$

So,

$$\frac{I}{I_0} = \frac{3}{4}$$

Hence, the correct answer is Option (A) 3/4

7. At two points P and Q on screen in Young's double slit experiment, waves from slits S1 and S2 have a path difference of 0 and λ/4, respectively; the ratio of intensities at P and Q will be

(A) 3:2

(B) 2:1

(C) 1:2

(D) 4: 1

Solution:
- Path difference at point $P = 0 \Rightarrow \phi = 0$
- Path difference at point $Q = \frac{\lambda}{4} \Rightarrow \phi = \frac{\pi}{2}$
- Maximum intensity $= I_0$

Intensity at a point:

$$I = I_0 \cos^2\left(\frac{\phi}{2}\right)$$

At point P:

$$I_P = I_0 \cos^2(0) = I_0$$

At point Q:

$$I_Q = I_0 \cos^2\left(\frac{\pi}{4}\right) = I_0\left(\frac{1}{\sqrt{2}}\right)^2 = \frac{I_0}{2}$$

Ratio:

$$\frac{I_P}{I_Q} = \frac{I_0}{I_0/2} = \boxed{2:1}$$

Hence, the correct answer is Option (B) 2:1

8. Assuming a human pupil to have a radius of 0.25 cm and a comfortable viewing distance of 25 cm, the minimum separation between two objects that the human eye can resolve at a 500 nm wavelength is

(A) 1 μm

(B) 30 μm

(C) 100 μm

(D) 300 μm

Solution:
- Wavelength $\lambda = 500\,\text{nm} = 500 \times 10^{-9}\,\text{m}$
- Pupil radius $a = 0.25\,\text{cm} = 2.5 \times 10^{-3}\,\text{m}$
- Viewing distance $D = 25\,\text{cm} = 0.25\,\text{m}$

Using Rayleigh's criterion:

$$\theta = 1.22 \cdot \frac{\lambda}{d}, \text{ where } d = \text{diameter} = 2a = 5 \times 10^{-3}\,\text{m}$$

$$\theta = 1.22 \cdot \frac{500 \times 10^{-9}}{5 \times 10^{-3}} = 1.22 \cdot 10^{-4}\,\text{radians}$$

Linear separation $x = D \cdot \theta$:

$$x = 0.25 \cdot 1.22 \cdot 10^{-4} = 3.05 \times 10^{-5}\,\text{m} = 30.5\,\mu\text{m}$$

Hence, the correct answer is Option (B) 30 μm

9. According to Einstein's photoelectric equation, the plot of the kinetic energy of the emitted photoelectrons from a metal versus the frequency of the incident radiation gives a straight line whose slope.

(A) depends on the nature of the metal used

(B) depends on the intensity of the radiation

(C) depends both on the intensity of the radiation and the metal used

(D) is the same for all metals and independent of the intensity of the radiation

Solution:

Einstein's photoelectric equation:

$$K.E. = h\nu - \phi$$

Where:
- $K.E.$ is the kinetic energy of emitted electrons
- ν is the frequency of incident radiation
- h is Planck's constant (slope of the line)
- ϕ is the work function (depends on the metal)

The equation is linear in form:

$$y = mx + c \quad \text{where} \quad m = h$$

So, the slope of the $K.E.$ vs. ν graph is h,
which is a universal constant, independent of metal and intensity

Hence, the correct answer is Option (D) is the same for all metals and independent of the intensity of the radiation

10. The binding energy per nucleon in deuterium (1H2) and helium (2He4) atoms is 1.1 MeV and 7.0 MeV, respectively. If two deuterium atoms combine to form a single helium atom, then the energy released is

(A) 13.9 MeV

(B) 19.2 MeV

(C) 23.6 MeV

(D) 26.9 MeV

Solution:

Given:
- Binding energy per nucleon of deuterium ($^{2}_{1}\text{H}$) = 1.1 MeV
- Binding energy per nucleon of helium ($^{4}_{2}\text{He}$) = 7.0 MeV

Step 1: Total binding energy of 2 deuterium nuclei:

$$\text{Each has 2 nucleons} \Rightarrow 2 \times 1.1 = 2.2\,\text{MeV per nucleus}$$

$$\text{Total for two nuclei} = 2 \times 2.2 = 4.4\,\text{MeV}$$

Step 2: Binding energy of one helium nucleus:

$$4\ \text{nucleons} \Rightarrow 4 \times 7.0 = 28.0\,\text{MeV}$$

Step 3:Energy released:

$$\text{Energy released} = 28.0 - 4.4 = \boxed{23.6\,\text{MeV}}$$

Hence, the correct answer is Option (C) 23.6 MeV

11. A nuclear reactor in which uranium-235 is used as fuel uses 2 kg of uranium-235 in 30 days. The power output of the reactor will be (given Energy released per fission = 185 MeV)

(A) 43.5 MW

(B) 58.5 MW

(C) 69.6 MW

(D) 73.1 MW

Solution:

Given:
- Mass of $\mathrm{U}^{235} = 2\,\mathrm{kg} = 2000\,\mathrm{g}$
- Energy per fission = 185 MeV
- 1 MeV = $1.6 \times 10^{-13}\,\mathrm{J}$
- Avogadro number $N_A = 6.022 \times 10^{23}$
- Atomic mass of $\mathrm{U}^{235} = 235\,\mathrm{g/mol}$
- Time = 30 days = $30 \times 24 \times 3600 = 2.592 \times 10^6\,\mathrm{s}$

Step 1: Number of atoms of U^{235}:

$$\frac{2000}{235} \times 6.022 \times 10^{23} = 5.125 \times 10^{24}\ \text{atoms}$$

Step 2: Total energy released:

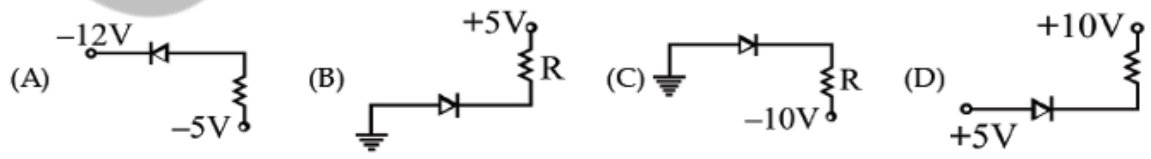
$$E = 5.125 \times 10^{24} \times 185 \times 1.6 \times 10^{-13}\,\mathrm{J} = 1.517 \times 10^{14}\,\mathrm{J}$$

Step 3: Power output:

$$P = \frac{E}{t} = \frac{1.517 \times 10^{14}}{2.592 \times 10^6} \approx \boxed{58.5\,\mathrm{MW}}$$

Hence, the correct answer is Option (B) 58.5 MW

12. Of the diodes shown in the following diagrams, which one is reverse biased?



Solution:
To determine the reverse biased diode, we apply:
A diode is reverse biased if:

$$V_{\text{anode}} < V_{\text{cathode}}$$

Option (A):
Anode at $-12\,\text{V}$, Cathode at $-5\,\text{V}$

$$-12\,\text{V} < -5\,\text{V} \Rightarrow \text{Reverse biased}$$

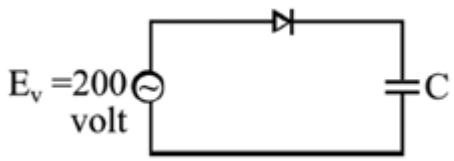
Option (B):
Anode at $+5\,\text{V}$, Cathode at $0\,\text{V} \Rightarrow$ Forward biased

Option (C):
Anode at $0\,\text{V}$, Cathode at $-10\,\text{V} \Rightarrow$ Forward biased

Option (D):
Anode at $+10\,\text{V}$, Cathode at $+5\,\text{V} \Rightarrow$ Forward biased

Hence, the correct answer is Option (A).

13. A sinusoidal voltage of r.m.s. the voltage of 200 volts is connected to the function diode and a capacitor C in the circuit shown in the figure, so that half-wave rectification occurs. The final potential difference in volts across C is



(A) 500

(B) 283

(C) 200

(D) 41

Solution:

Given:
RMS voltage, $V_{\text{rms}} = 200\,\text{V}$

In a half-wave rectifier with a capacitor filter, the capacitor charges up to the peak voltage of the input sinusoidal wave.

Peak voltage is related to RMS voltage by:

$$V_{\text{peak}} = V_{\text{rms}} \times \sqrt{2}$$

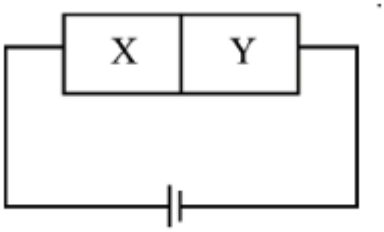
$$V_{\text{peak}} = 200 \times \sqrt{2} = 200 \times 1.414 = 282.8\,\text{V}$$

So, the final potential difference across the capacitor is approximately:

283 V

Hence, the correct answer is Option (B) 283

14. The semiconductor X is made by doping a germanium crystal with arsenic (Z = 33). A second semiconductor Y, is made by doping germanium with indium (Z = 49). The two are joined end to end and connected to a battery as shown. Which of the following statements is correct?



(A) X is P-type, Y is N-type, and the junction is forward biased.

(B) X is N-type, Y is P-type, and the junction is forward biased.

(C) X is P-type, Y is N-type, and the junction is reverse biased.

(D) X is N-type, Y is P-type, and the junction is reverse biased.

Solution:

Given the image, semiconductor X (doped with Arsenic) is connected to the negative terminal of the battery, and semiconductor Y (doped with Indium) is connected to the positive terminal. This indicates a reverse-biased configuration.

Arsenic (Z = 33) is a pentavalent impurity, making semiconductor X N-type.

Indium (Z = 49) is a trivalent impurity, making semiconductor Y P-type.

With the described connection, the junction is reverse biased.

Hence, the correct answer is (D) X is N-type, Y is P-type, and the junction is reverse biased.

15. An EM wave of maximum frequency 300 kHz and critical frequency 100 kHz is to be transmitted to a height equal to 150 km. Calculate the skip distance.

(A) 624 km

(B) 849 km

(C) 636 km

(D) 942 km

Solution:

Given:

$$f_{\max} = 300\,\text{kHz}, \quad f_c = 100\,\text{kHz}, \quad h = 150\,\text{km}, \quad R = 6400\,\text{km}$$

The skip distance D is calculated using:

$$D = 2h\sqrt{\left(\frac{f_{\max}}{f_c}\right)^2 - 1}$$

Substituting the values:

$$D = 2 \times 150\,\text{km} \times \sqrt{\left(\frac{300}{100}\right)^2 - 1} = 300 \times \sqrt{8} \approx 942\,\text{km}$$

Thus, the nearest accurate selection is $\boxed{942\,\text{km}}$.

Hence, the correct answer is (D) 942 km

General Knowledge

The General Knowledge component of the AIIMS BSc Nursing PYQ book is of importance to candidates sitting for the entrance exam as it examines the candidates' general science, geography, history, and current affairs knowledge. The component examines all manner of questions ranging from national and international issues, historical events, geographical positions, and scientific breakthroughs. The ebook contains last year's practice questions, which assist the students in understanding the trend of the exam and give importance to high-priority areas such as current affairs (30%) and Indian geography and history (25%). If candidates practice these questions at regular intervals and keep themselves updated with current affairs, candidates can improve general knowledge and overall performance in the exam.

Some PYQs from General Knowledge

1. In which state will the country’s first semiconductor fab be established?

(A) Tamil Nadu

(B) Gujarat

(C) Haryana

(D) Uttarakhand

Answer: India's first semiconductor fabrication (fab) facility is being established in Gujarat, specifically in Dholera.

Hence, the correct answer is option B) Gujarat.

2. Six friends, A, B, C, D, E, and F, are standing in a row facing north (not necessarily in the same order). B is standing exactly between F and D. E is standing exactly between A and C. A is not an immediate neighbour of D and F. C is not an immediate neighbour of D but is to the immediate right of F. C is standing between

(A) A and E

(B) E and B

(C) E and F

(D) D and F

Answer: Final arrangement: D - B - F - C - E - A, where C is between F and E.

Hence, the correct answer is option C) E and F.

3. Find the missing number from the given alternatives: 2, 4, 5, 19, 71, _____.

(A) 216

(B) 261

(C) 361

(D) 316

Answer: Deducing the pattern:

2

$4 = 2 \times 2$

$5 = 4 + 1$

$19 = 5 \times 3 + 4$

$71 = 19 \times 3 + 14$

Next number = $71 \times 3 + 48 = 213 + 48 = 261$

Hence, the correct answer is option B) 261

4. When is World Civil Defence Day observed every year?

(A) 27 February

(B) 02 March

(C) 28 February

(D) 01 March

Answer: World Civil Defence Day is observed every year on March 1. This day was established in 1990 by the International Civil Defence Organisation (ICDO) to raise awareness about civil protection and emergency preparedness and to honor the efforts of civil defence organisations worldwide.

Hence, the correct answer is option D) 01 March

5. Introducing a man, Amar says, ”His wife is the only daughter of my maternal grandfather.” How is the man related to Amar?

(A) Grandfather

(B) Father

(C) Grandson

(D) Son

Answer: Amar's maternal grandfather is Amar's mother's father, and the only daughter of Amar's maternal grandfather is Amar's mother. So, "his wife" is Amar's mother. He is the husband of Amar's mother; that makes him Amar's father.

Hence, the correct answer is option B) Father.

Other Useful Resources

Some useful resources for the preparation of NEET are listed below:

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