CUET UG Biology Sample Paper - 2

Duration: 1 Hour **Maximum Marks: 250**

Instructions

- This paper contains a total of 50 Multiple Choice Questions.
- Each correct answer carries **+5 marks**.
- Each incorrect answer carries **-1 mark**.
- No negative marking for unattempted questions.

Q1. In a typical angiosperm embryo sac, if the haploid number of chromosomes in the pollen grain is 12, what would be the ploidy and chromosome count of the Primary Endosperm Nucleus (PEN)?

(A) 2n = 24

(B) 3n = 36

(C) 3n = 24

(D) n = 12

Q2. Identify the correct sequence of events in the life cycle of the Malarial parasite (Plasmodium) within the human host:

(A) Sporozoites → Liver cells → RBCs → Gametocytes

(B) Gametocytes → Liver cells → Sporozoites → RBCs

(C) Sporozoites → RBCs → Liver cells → Gametocytes

(D) Trophozoites → Liver cells → Sporozoites → RBCs

Q3. Which of the following is an example of an 'In-situ' conservation method used to protect biodiversity in its natural habitat?

(A) Botanical Garden

(B) Zoological Park

(C) Sacred Grove

(D) Cryopreservation

Q4. In the Lac Operon model of gene regulation, which protein is constitutively synthesized by the 'i' gene?

(A) β-galactosidase

(B) Permease

(C) Repressor protein

(D) Transacetylase

Q5. A person suffering from Turner's Syndrome will exhibit which of the following chromosomal compositions?

(A) 44 + XXY

(B) 44 + X0

(C) 44 + XXX

(D) 45 + XY

Q6. Match the Population Interactions in **List-I** with their representative examples in **List-II**:

List-I		**List-II**	
(I)	Commensalism	(a)	Orchid growing on a Mango branch
(II)	Mutualism	(b)	Cuscuta growing on a hedge plant
(III)	Parasitism	(c)	Mycorrhizae in roots of higher plants
(IV)	Amensalism	(d)	Penicillium inhibiting bacterial growth

(A) (I)-(a), (II)-(c), (III)-(b), (IV)-(d)

(B) (I)-(b), (II)-(a), (III)-(c), (IV)-(d)

(C) (I)-(c), (II)-(d), (III)-(a), (IV)-(b)

(D) (I)-(d), (II)-(b), (III)-(c), (IV)-(a)

Q7. Which class of enzymes is popularly referred to as 'molecular scissors' due to their ability to cut DNA at specific palindromic sequences?

(A) DNA Ligase

(B) Restriction Endonuclease

(C) DNA Polymerase

(D) Reverse Transcriptase

Q8. The mechanism of RNA interference (RNAi) has been successfully exploited to make tobacco plants resistant to which specific parasite?

(A) Bacillus thuringiensis

(B) Meloidogyne incognita

(C) Agrobacterium tumefaciens

(D) Escherichia coli

Q9. In a population following Hardy-Weinberg equilibrium, if 'p' and 'q' represent allele frequencies, the frequency of heterozygous individuals is:

(A) p^2

(B) q^2

(C) $2pq$

(D) $p + q$

Q10. The acrosome of the human sperm, which is essential for penetrating the egg during fertilization, is a modified form of the:

(A) Mitochondria

(B) Nucleus

(C) Golgi complex

(D) Centriole

Q11. Statement I: In double fertilization, one male gamete fuses with the egg cell. Statement II: The second male gamete fuses with two polar nuclei to form the triploid primary endosperm nucleus.

(A) Both Statement I and Statement II are correct

(B) Both Statement I and Statement II are incorrect

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

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

Q12. The drug 'Heroin', commonly called smack, is chemically diacetylmorphine, which is extracted from the latex of:

(A) Cannabis sativa

(B) Papaver somniferum

(C) Atropa belladonna

(D) Erythroxylum coca

Q13. Which of the following factors of the 'Evil Quartet' is considered the most significant cause driving animals and plants to extinction?

(A) Over-exploitation

(B) Alien species invasion

(C) Habitat loss and fragmentation

(D) Co-extinctions

Q14. During the process of DNA replication, the discontinuously synthesized fragments (Okazaki fragments) are joined by the enzyme:

(A) Primase

(B) DNA Ligase

(C) Helicase

(D) DNA Polymerase I

Q15. What is the primary role of the 'Ori' (Origin of replication) sequence in a pBR322 cloning vector?

(A) Selection of recombinants

(B) Coding for antibiotic resistance

(C) Controlling the copy number of linked DNA

(D) Providing recognition sites for EcoRI

Q16. In the commercial production of human insulin (Humulin) using rDNA technology, the A-peptide and B-peptide are produced separately and linked by:

(A) Hydrogen bonds

(B) Phosphodiester bonds

(C) Disulfide bridges

(D) Peptide bonds

Q17. Which of the following floral characteristics is NOT typically associated with wind-pollinated (anemophilous) plants?

(A) Well-exposed stamens

(B) Large, feathery stigma

(C) Production of nectar and fragrance

(D) Light and non-sticky pollen grains

Q18. The transgenic variety of rice known as "Golden Rice" was developed to solve the problem of deficiency of:

(A) Vitamin C

(B) Vitamin A

(C) Iron and Iodine

(D) Essential fatty acids

Q19. In the human female reproductive cycle, the temporary endocrine gland formed by the ruptured Graafian follicle is the:

(A) Corpus albicans

(B) Corpus luteum

(C) Corpus callosum

(D) Antrum

Q20. An age pyramid for a human population that is broader at the base and tapers toward the top represents:

(A) A declining population

(B) A stable population

(C) An expanding population

(D) A population with zero growth rate

Q21. Which of the following statements regarding 'Double Fertilization' in angiosperms is incorrect?

(A) It involves both syngamy and triple fusion.

(B) It results in the formation of a diploid zygote and a triploid PEN.

(C) It is a characteristic unique to gymnosperms and angiosperms.

(D) The PEN develops into the endosperm which provides nourishment.

Q22. In the process of Spermatogenesis, which specific cells undergo the first meiotic division to form secondary spermatocytes?

(A) Spermatogonia

(B) Primary spermatocytes

(C) Spermatids

(D) Sertoli cells

Q23. Which of the following is a 'barrier method' of contraception that also provides significant protection against STIs?

(A) Lippes Loop

(B) Condoms

(C) Saheli (Oral pill)

(D) Multiload 375

Q24. If a double-stranded DNA molecule has 20% Adenine, what will be the percentage of Cytosine based on Chargaff's rule?

(A) 20%

(B) 30%

(C) 40%

(D) 80%

Q25. The 'Lac Operon' is considered an inducible operon system because:

(A) It is usually 'on' and needs to be turned 'off'.

(B) The repressor protein is always active in the absence of lactose.

(C) Lactose acts as an inducer by binding to the repressor.

(D) It produces enzymes required for glucose catabolism.

Q26. Which hominid was the first to use fire and possessed a cranial capacity of approximately 900cc?

(A) Homo habilis

(B) Homo erectus

(C) Homo neanderthalensis

(D) Australopithecus

Q27. Match the Assisted Reproductive Technologies (ART) listed in **List-I** with their correct procedural descriptions in **List-II**:

List-I		List-II	
(I)	GIFT	(a)	Embryo transfer into the uterus
(II)	ZIFT	(b)	Transfer of ovum into the fallopian tube
(III)	IUI	(c)	Transfer of zygote into the fallopian tube
(IV)	IUT	(d)	Semen artificially introduced into the uterus

(A) (I)-(b), (II)-(c), (III)-(d), (IV)-(a)

(B) (I)-(c), (II)-(b), (III)-(a), (IV)-(d)

(C) (I)-(a), (II)-(d), (III)-(b), (IV)-(c)

(D) (I)-(d), (II)-(a), (III)-(c), (IV)-(b)

Q28. The expression of 'Bt' toxin in transgenic Bt-cotton provides resistance against:

(A) Fungal pathogens

(B) Root-knot nematodes

(C) Lepidopteran insects

(D) Viral infections

Q29. In an ecological food chain, the '10% Law' of energy transfer between trophic levels was proposed by:

(A) A.G. Tansley

(B) Raymond Lindeman

(C) Ernst Haeckel

(D) Charles Elton

Q30. The "Evil Quartet" is a term used by ecologists to describe the four major causes of:

(A) Population explosion

(B) Biodiversity loss

(C) Global warming

(D) Eutrophication

Q31. Which of the following enzymes is used to join DNA fragments by catalyzing the formation of a phosphodiester bond?

(A) DNA Polymerase

(B) Helicase

(C) DNA Ligase

(D) Cellulase

Q32. The 'RNA interference' (RNAi) technique involves the silencing of a specific mRNA due to a complementary molecule of:

(A) Single-stranded DNA

(B) Double-stranded RNA

(C) Single-stranded RNA

(D) Double-stranded DNA

Q33. Which of the following is categorized as an 'Auto-immune' disease where the body's immune system attacks its own cells?

(A) AIDS

(B) Rheumatoid Arthritis

(C) Malaria

(D) Cancer

Q34. During the process of Sewage Treatment, the 'activated sludge' refers to:

(A) Settled bacterial flocs in the secondary settling tank

(B) The floating debris removed during primary treatment

(C) The grit removed by sedimentation

(D) The effluent released from the primary settling tank

Q35. The functional unit of nature where living organisms interact among themselves and with the surrounding physical environment is:

(A) Population

(B) Community

(C) Ecosystem

(D) Biome

Q36. Which of the following triplet codons acts as a 'Stop Codon' to terminate the process of translation?

(A) AUG

(B) UGG

(C) UAA

(D) GUG

Q37. In Mendel's Dihybrid cross ($RRYY \times rryy$), the phenotypic ratio observed in the F_2 generation is:

(A) 3:1

(B) 1:2:1

(C) 9:3:3:1

(D) 1:1:1:1

Q38. The process by which the genetic information in a strand of DNA is copied into a new molecule of messenger RNA (mRNA) is:

(A) Translation

(B) Transcription

(C) Replication

(D) Transformation

Q39. 'Saheli', the non-steroidal once-a-week oral contraceptive pill for females, was developed at:

(A) AIIMS, Delhi

(B) CDRI, Lucknow

(C) IVRI, Izatnagar

(D) IARI, Delhi

Q40. Which type of population interaction is observed between Fig trees and their pollinator species of Wasps?

(A) Commensalism

(B) Mutualism

(C) Parasitism

(D) Competition

Q41. Statement I: The Polymerase Chain Reaction (PCR) is used for the amplification of a specific DNA sequence. Statement II: The enzyme Taq polymerase is preferred because it remains active at high temperatures during the denaturation step.

(A) Both Statement I and Statement II are correct

(B) Both Statement I and Statement II are incorrect

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

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

Q42. Which of the following biological agents is commonly used as a 'Biocontrol agent' specifically to control butterfly caterpillars?

(A) Trichoderma

(B) Bacillus thuringiensis

(C) Baculoviruses

(D) Ladybird beetle

Q43. The first clinical gene therapy was conducted in 1990 on a four-year-old girl to treat which of the following conditions?

(A) Type I Diabetes

(B) Adenosine deaminase (ADA) deficiency

(C) Hemophilia A

(D) Cystic Fibrosis

Q44. Which of the following conservation strategies is categorized as 'Ex-situ' conservation?

(A) National Park

(B) Wildlife Sanctuary

(C) Cryopreservation of gametes

(D) Biosphere Reserve

Q45. Identify the correct chronological sequence of the various phases of the human menstrual cycle:

(A) Menstrual → Luteal → Follicular → Ovulatory

(B) Menstrual → Follicular → Ovulatory → Luteal

(C) Ovulatory → Follicular → Luteal → Menstrual

(D) Luteal → Ovulatory → Follicular → Menstrual

Q46. In the context of DNA Fingerprinting, the term 'VNTR' refers to:

(A) Variable Number of Tandem Repeats

(B) Various Number of Terminal Repeats

(C) Variable Nucleotide Tandem Repeats

(D) Vertical Number of Tandem Repeats

Q47. The concepts of 'Struggle for Existence' and 'Survival of the Fittest' are fundamental to the evolutionary theory proposed by:

(A) Jean-Baptiste Lamarck

(B) Hugo de Vries

(C) Charles Darwin

(D) Thomas Malthus

Q48. Primary Productivity in an ecosystem can be expressed in which of the following units?

(A) $g^{-2}yr^{-1}$

(B) $kcal\ m^{-2}yr^{-1}$

(C) $g\ m^{-2}$

(D) Both A and B

Q49. Which of the following is NOT a localized inflammatory response produced by the body's innate immune system?

(A) Redness

(B) Swelling (Oedema)

(C) Pain

(D) Antibody production by B-cells

Q50. The diagnostic technique of 'Amniocentesis' is legally restricted because it is often misused for:

(A) Detecting chromosomal abnormalities

(B) Detecting metabolic disorders

(C) Prenatal sex determination

(D) Assessing fetal lung maturity

Detailed Solutions

Q1.

Solution

Concept: In angiosperms, the ploidy level of various tissues is determined by the process of double fertilization. The male gametophyte (pollen) represents the haploid phase (n).

Solution: 1. Given: The haploid chromosome number (n) in the pollen grain is 12. 2. The **Primary Endosperm Nucleus (PEN)** is formed by **Triple Fusion**, which is the fusion of one haploid male gamete (n) with two haploid polar nuclei (or one diploid secondary nucleus, $2n$). 3. Therefore, the ploidy of PEN is **3n** (Triploid). 4. Calculation: $3 \times 12 = 36$ chromosomes. 5. In contrast, the zygote would be $2n = 24$, and the leaf cells would be $2n = 24$.

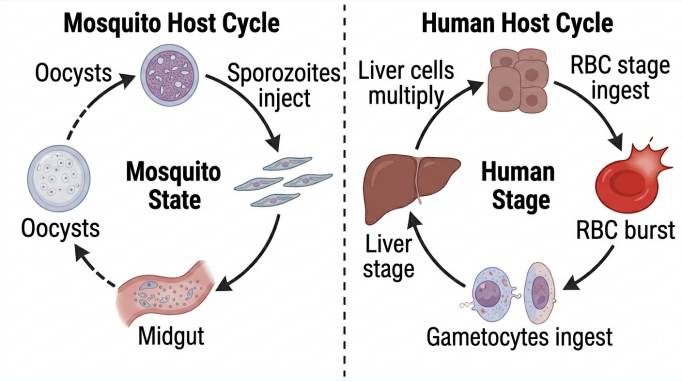
Final Answer: 3n = 36

Answer: (B)

Q2.

Solution

Concept: The life cycle of *Plasmodium* involves a complex sequence of asexual reproduction in humans and sexual reproduction in the mosquito vector.



Solution: 1. **Infection:** The female *Anopheles* mosquito injects **Sporozoites** into the human bloodstream. 2. **Exo-erythrocytic Stage:** Sporozoites travel to the **Liver cells**, where they multiply asexually (schizogony). 3. **Erythrocytic Stage:** Parasites burst from liver cells and infect **Red Blood Cells (RBCs)**, leading to cycles of fever and chills. 4. **Gametogony:** Some parasites inside the RBCs develop into sexual stages called **Gametocytes**, which are later ingested by a mosquito.

Final Answer: Sporozoites → Liver cells → RBCs → Gametocytes

Answer: (A)

Q3.

Solution

Concept: Conservation strategies are divided into *In-situ* (on-site) and *Ex-situ* (off-site). *In-situ* protects species in their natural surroundings.

Solution: 1. **In-situ conservation:** Includes National Parks, Wildlife Sanctuaries, Biosphere Reserves, and **Sacred Groves**. Sacred groves are forest fragments protected by communities due to religious significance. 2. **Ex-situ conservation:** Involves protecting species outside their natural habitat. Examples include **Botanical Gardens**, **Zoological Parks**, and **Cryopreservation** (storage at $-196^{\circ}C$). 3. Therefore, Sacred Grove is the only *In-situ* method listed.

Final Answer: Sacred Grove

Answer: (C)

Q4.

Solution

Concept: The *Lac* Operon consists of regulatory genes and structural genes. "Constitutively synthesized" means the product is produced all the time at a constant rate.

Solution: 1. The ***i* gene** (inhibitor/regulatory gene) codes for the **Repressor protein**. 2. This gene is constitutive, meaning it is always "on" to ensure the repressor is present to shut down the operon in the absence of lactose. 3. The structural genes (z, y, a) code for β-galactosidase, Permease, and Transacetylase respectively, but these are only synthesized when the inducer is present.

Final Answer: Repressor protein

Answer: (C)

Q5.

Solution

Concept: Turner's Syndrome is a chromosomal disorder caused by the absence of one of the X chromosomes (monosomy).

Solution: 1. A normal human female has 46 chromosomes (44 Autosomes + XX). 2. A person with Turner's Syndrome is missing one sex chromosome, resulting in a total of 45 chromosomes. 3. The karyotype is represented as **44 + X0**. 4. Phenotypic features include sterile females, rudimentary ovaries, short stature, and lack of secondary sexual characters. 5. (Note: 44 + XXY is Klinefelter's Syndrome).

Final Answer: 44 + X0

Answer: (B)

Q6.

Solution

Concept: Population interactions describe how two different species interact within a community. These are classified as positive (+), negative (-), or neutral (0) for the species involved.

Solution: 1. **Commensalism (+/0):** One species benefits, the other is unaffected. Example: An **Orchid growing on a mango branch** (Orchid gets space/light; mango is unaffected). 2. **Mutualism (+/+):** Both species benefit. Example: **Mycorrhizae**, where fungi help roots of higher plants absorb nutrients while receiving energy (sugar) from the plant. 3. **Parasitism (+/-):** One benefits (parasite), the other is harmed (host). Example: **Cuscuta** (Amarbel) is a parasitic plant that derives nutrition from a host hedge plant. 4. **Amensalism (-/0):** One species is harmed, the other is unaffected. Example: **Penicillium** secreting penicillin which inhibits bacterial growth without the mold gaining a direct advantage.

Final Answer: (I)-(a), (II)-(c), (III)-(b), (IV)-(d)

Answer: (A)

Q7.

Solution

Concept: Recombinant DNA technology relies on enzymes that can manipulate DNA. 'Molecular scissors' refers to enzymes that can cut the DNA backbone at highly specific locations.

Solution: 1. **Restriction Endonucleases** are called molecular scissors because they inspect the length of a DNA sequence and cut it at specific sites called **palindromic nucleotide sequences**. 2. These enzymes were discovered in bacteria, where they serve as a defense mechanism against bacteriophages. 3. **DNA Ligase** is known as 'molecular glue' as it joins DNA fragments. 4. **DNA Polymerase** synthesizes new DNA strands. 5. **Reverse Transcriptase** converts RNA into cDNA.

Final Answer: Restriction Endonuclease

Answer: (B)

Q8.

Solution

Concept: RNA interference (RNAi) is a biological process in which RNA molecules inhibit gene expression or translation by neutralizing targeted mRNA molecules.

Solution: 1. The nematode **Meloidogyne incognita** infects the roots of tobacco plants, causing a great reduction in yield. 2. Using *Agrobacterium* vectors, nematode-specific genes were introduced into the host plant. 3. The introduction of DNA produced both sense and anti-sense RNA in the host cells. 4. These two RNAs, being complementary, formed a **double-stranded RNA (dsRNA)** that initiated RNAi and silenced the specific mRNA of the nematode. 5. Consequently, the parasite could not survive in a transgenic host expressing specific interfering RNA.

Final Answer: Meloidogyne incognita

Answer: (B)

Q9.

Solution

Concept: The Hardy-Weinberg principle states that allele frequencies in a population are stable and constant from generation to generation in the absence of evolutionary influences.

Solution: 1. Let the frequency of dominant allele 'A' be represented by **p**. 2. Let the frequency of recessive allele 'a' be represented by **q**. 3. The sum of frequencies is $p + q = 1$. 4. The binomial expansion of $(p+q)^2 = p^2+2pq+q^2 = 1$. 5. Here: - p^2 represents the frequency of homozygous dominant individuals (AA). - q^2 represents the frequency of homozygous recessive individuals (aa). - **2pq** represents the frequency of **heterozygous individuals** (Aa).

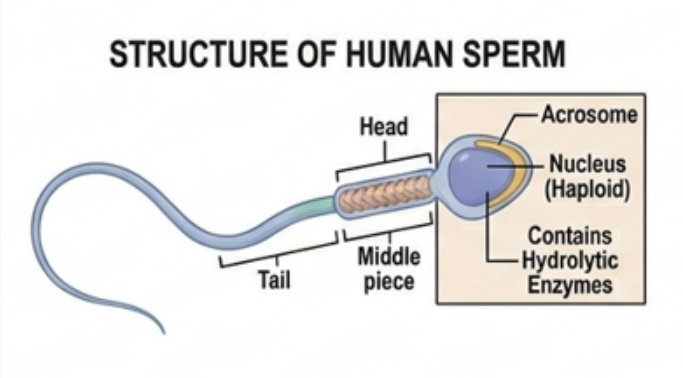
Final Answer: 2pq

Answer: (C)

Q10.

Solution

Concept: A human sperm consists of a head, neck, middle piece, and tail. The head contains the nucleus and a specialized structure at the tip called the acrosome.



Solution: 1. The **acrosome** is a cap-like structure derived from the **Golgi complex** during the process of spermiogenesis. 2. It is filled with hydrolytic enzymes (sperm lysins) like **hyaluronidase** and **acrosin**. 3. These enzymes are essential for the sperm to penetrate the various layers of the ovum (corona radiata and zona pellucida) to achieve fertilization. 4. The middle piece contains mitochondria (energy), and the tail provides motility.

Final Answer: Golgi complex

Answer: (C)

Q11.

Solution

Concept: Double fertilization is a complex fertilization mechanism of flowering plants (angiosperms). It involves the joining of a female gametophyte with two male gametes.

Solution: 1. **Statement I Analysis:** During the process, the pollen tube releases two male gametes into the synergid. One male gamete moves towards the egg cell and fuses with its nucleus; this fusion is called **Syngamy**, resulting in a diploid zygote ($2n$). Thus, Statement I is correct. 2. **Statement II Analysis:** The other male gamete moves towards the two polar nuclei located in the central cell and fuses with them to produce a triploid **Primary Endosperm Nucleus (PEN)**. This is known as **Triple Fusion**. Thus, Statement II is correct. 3. Since both Syngamy and Triple Fusion occur in the embryo sac, the phenomenon is termed Double Fertilization.

Final Answer: Both Statement I and Statement II are correct

Answer: (A)

Q12.

Solution

Concept: Many drugs are obtained from flowering plants. Opioids are drugs which bind to specific opioid receptors present in our central nervous system and gastrointestinal tract.
Solution: 1. **Heroin**, commonly known as 'smack', is chemically **diacetylmorphine**. It is a white, odorless, bitter crystalline compound. 2. It is obtained by the acetylation of morphine, which is extracted from the latex of the **Poppy plant**, *Papaver somniferum*. 3. Generally taken by snorting or injection, heroin is a depressant and slows down body functions. 4. Other plants mentioned: *Cannabis sativa* produces cannabinoids; *Atropa belladonna* has hallucinogenic properties; *Erythroxylum coca* produces cocaine.
Final Answer: Papaver somniferum

Answer: (B)

Q13.

Solution

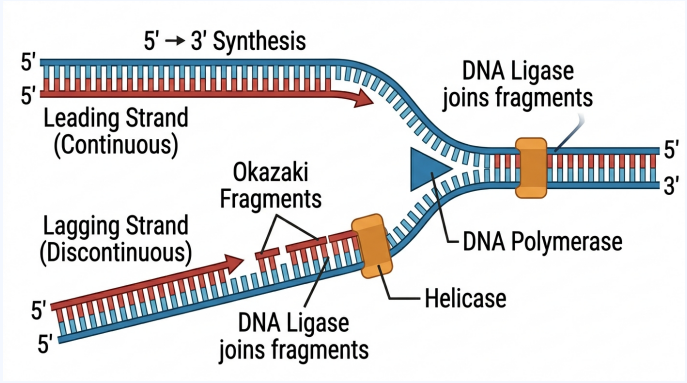
Concept: The "Evil Quartet" is a sobriquet used to describe the four major causes of biodiversity loss: Habitat loss and fragmentation, Over-exploitation, Alien species invasions, and Co-extinctions.
Solution: 1. **Habitat Loss and Fragmentation:** This is the **most important cause** driving animals and plants to extinction. The most dramatic examples come from tropical rain forests (e.g., the Amazon rain forest being cut for soya beans). 2. When large habitats are broken into small fragments due to various human activities, mammals and birds requiring large territories and certain animals with migratory habits are badly affected, leading to population declines. 3. While the other three factors (Over-exploitation, Alien species, and Co-extinctions) contribute significantly, habitat destruction is the primary driver of the current sixth extinction wave.
Final Answer: Habitat loss and fragmentation

Answer: (C)

Q14.

Solution

Concept: DNA replication is semi-discontinuous. While one strand is synthesized continuously (leading strand), the other is synthesized in short stretches called Okazaki fragments (lagging strand).



Solution: 1. DNA polymerase can only polymerize nucleotides in the 5′ → 3′ direction. 2. On the template strand with polarity 5′ → 3′, replication is discontinuous. 3. These small, discontinuously synthesized fragments are called **Okazaki fragments**. 4. The enzyme **DNA Ligase** acts as "molecular glue" to join these fragments together by catalyzing the formation of phosphodiester bonds, creating a continuous DNA strand. 5. **Helicase** unwinds the DNA, and **Primase** synthesizes RNA primers.

Final Answer: DNA Ligase

Answer: (B)

Q15.

Solution

Concept: A cloning vector is a small piece of DNA that can be stably maintained in an organism, and into which a foreign DNA fragment can be inserted for cloning purposes.

Solution: 1. The **Ori (Origin of replication)** is a specific DNA sequence where replication begins. 2. Any piece of DNA linked to this sequence can be made to replicate within the host cells. 3. Crucially, the Ori is also responsible for **controlling the copy number** of the linked DNA. If one wants to recover many copies of the target DNA, it should be cloned in a vector whose origin supports a high copy number. 4. Antibiotic resistance genes (like amp^R or tet^R) act as selectable markers, not the Ori.

Final Answer: Controlling the copy number of linked DNA

Answer: (C)

Q16.

Solution

Concept: Insulin is a hormone produced by the pancreas. Mature human insulin consists of two short polypeptide chains: Chain A and Chain B.

Solution: 1. In humans, insulin is synthesized as a pro-hormone which contains an extra stretch called the C-peptide. This C-peptide is removed during maturation. 2. In 1983, Eli Lilly (an American company) prepared two DNA sequences corresponding to the A and B chains of human insulin and introduced them into plasmids of *E. coli* to produce insulin chains. 3. Chains A and B were produced separately, extracted, and combined by creating **Disulfide bridges** (disulfide bonds) to form mature human insulin (Humulin). 4. These bridges are essential for the structural stability and biological activity of the hormone.

Final Answer: Disulfide bridges

Answer: (C)

Q17.

Solution

Concept: Anemophily refers to pollination by wind. Since wind is a non-directional, abiotic factor, plants must produce specific adaptations to ensure successful pollination.

Solution: 1. **Adaptations for Wind Pollination:** - **Well-exposed stamens** so that pollens are easily dispersed into wind currents. - **Large, feathery stigma** to easily trap air-borne pollen grains. - **Light and non-sticky pollen** so they can be transported over long distances. - Flowers often have a single ovule in each ovary and numerous flowers packed into an inflorescence (e.g., corn cob). 2. **Nectar and Fragrance:** These are "rewards" produced by **insect-pollinated** (entomophilous) plants to attract pollinators. Wind does not need to be "attracted," so wind-pollinated plants lack these features.

Final Answer: Production of nectar and fragrance

Answer: (C)

Q18.

Solution

Concept: Biofortification is the process of breeding crops with higher levels of vitamins, minerals, or proteins to improve public health.

Solution: 1. **Golden Rice** is a transgenic variety (*Oryza sativa*) developed through genetic engineering. 2. It was engineered to biosynthesize **beta-carotene**, a precursor of **Vitamin A**, in the edible parts of the rice. 3. This was intended to help populations in developing countries where Vitamin A deficiency (VAD) is a leading cause of blindness and other health issues. 4. The rice gets its characteristic golden-yellow color from the accumulated beta-carotene.

Final Answer: Vitamin A

Answer: (B)

Q19.

Solution

Concept: The menstrual cycle involves several hormonal changes. One of the most critical transitions occurs after ovulation when the follicle changes its function.

Solution: 1. During the ovulatory phase, the Graafian follicle ruptures to release the secondary oocyte (ovum) under the influence of LH (Luteinizing Hormone). 2. The remaining parts of the ruptured Graafian follicle transform into a yellow-colored endocrine structure called the **Corpus luteum**. 3. The Corpus luteum secretes large amounts of **progesterone**, which is essential for the maintenance of the endometrium (lining of the uterus) for potential pregnancy. 4. If fertilization does not occur, the corpus luteum degenerates into a scar tissue called the corpus albicans.

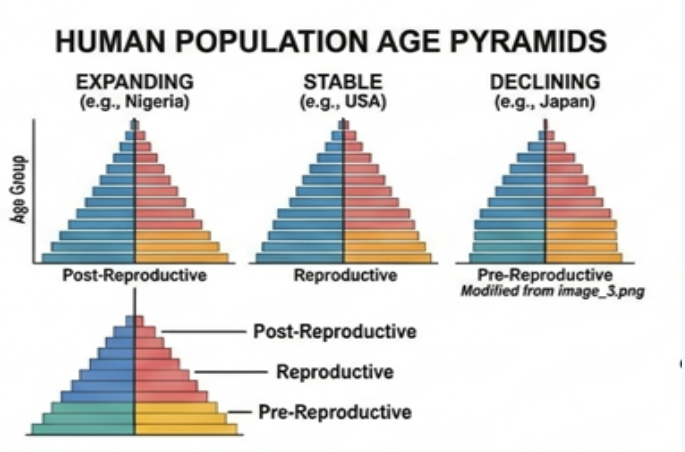
Final Answer: Corpus luteum

Answer: (B)

Q20.

Solution

Concept: An age pyramid is a graphic representation of the distribution of various age groups in a population. It typically shows pre-reproductive, reproductive, and post-reproductive individuals.



Solution: 1. **Expanding Population:** The pyramid has a **broad base** (high percentage of young/pre-reproductive individuals). This indicates a high birth rate and a rapidly growing population. 2. **Stable Population:** The pyramid is bell-shaped (pre-reproductive and reproductive individuals are almost equal). 3. **Declining Population:** The pyramid has a narrow base and is urn-shaped (fewer pre-reproductive individuals than reproductive ones). 4. Since the question describes a pyramid broader at the base and tapering toward the top (triangular), it represents an expanding population.

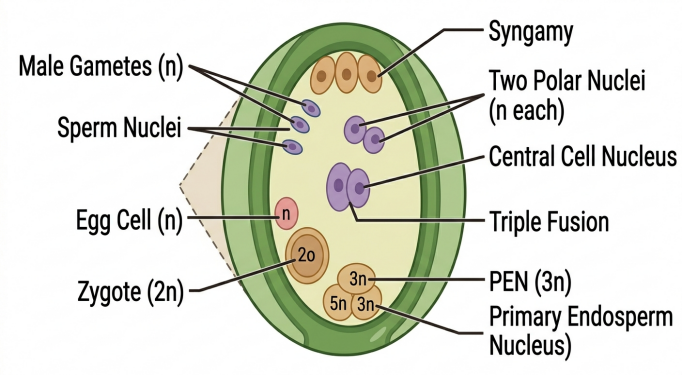
Final Answer: An expanding population

Answer: (C)

Q21.

Solution

Concept: Double fertilization is the hallmark of angiosperm reproduction. It involves two distinct fusion events occurring simultaneously within the embryo sac.



Solution: 1. **Analysis of Options A and B:** These are correct. Double fertilization involves **Syngamy** (1st male gamete + Egg → Zygote) and **Triple Fusion** (2nd male gamete + 2 Polar Nuclei → PEN). 2. **Analysis of Option D:** This is correct. The **Primary Endosperm Nucleus (PEN)** develops into the endosperm, a triploid tissue specialized for nourishing the developing embryo. 3. **Analysis of Option C (Incorrect Statement):** Double fertilization is **unique to angiosperms**. Gymnosperms do not exhibit double fertilization; they undergo single fertilization, and their endosperm is a haploid (n) tissue formed *before* fertilization.

Final Answer: It is a characteristic unique to gymnosperms and angiosperms.

Answer: (C)

Q22.

Solution

Concept: Spermatogenesis is the process of sperm production in the seminiferous tubules of the testes. It involves mitosis, meiosis I, and meiosis II.

Solution: 1. **Spermatogonia:** These are diploid ($2n$) stem cells that multiply by mitosis. 2. **Primary Spermatocytes:** Some spermatogonia grow and prepare for division. These are diploid ($2n$) and undergo the **first meiotic division (Meiosis I)**. 3. **Secondary Spermatocytes:** The completion of Meiosis I in primary spermatocytes results in the formation of two equal, haploid (n) cells called secondary spermatocytes. 4. **Spermatids:** Secondary spermatocytes undergo Meiosis II to produce four haploid spermatids. 5. **Spermiogenesis:** Spermatids transform into spermatozoa (sperms).

Final Answer: Primary spermatocytes

Answer: (B)

Q23.

Solution

Concept: Contraceptive methods are designed to prevent unwanted pregnancies. Barrier methods work by physically preventing the meeting of the ovum and sperm.

Solution: 1. **Condoms:** These are barriers made of thin rubber/latex sheath. They are unique because they not only prevent pregnancy but also act as a shield against **Sexually Transmitted Infections (STIs)** and AIDS by preventing the exchange of body fluids. 2. **Lippes Loop:** An IUD (Intrauterine Device) that prevents implantation but does not protect against STIs. 3. **Saheli:** A non-steroidal oral pill that inhibits ovulation and implantation. 4. **Multiload 375:** A copper-releasing IUD that suppresses sperm motility.

Final Answer: Condoms

Answer: (B)

Q24.

Solution

Concept: Chargaff's Rule states that in a double-stranded DNA, the ratios between Adenine (A) and Thymine (T) and Guanine (G) and Cytosine (C) are constant and equal to one. Thus, $\%A = \%T$ and $\%G = \%C$.

Solution: 1. Given: Adenine $(A) = 20\%$. 2. According to the rule, $A = T$, so Thymine $(T) = 20\%$. 3. Total $(A + T) = 20 + 20 = 40\%$. 4. The remaining percentage must be Guanine (G) and Cytosine (C). 5. Total $(G + C) = 100\% - 40\% = 60\%$. 6. Since $G = C$, then Cytosine $(C) = 60/2 = 30\%$.

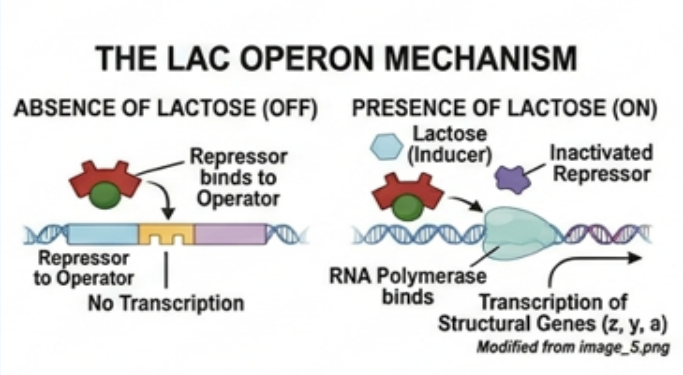
Final Answer: 30%

Answer: (B)

Q25.

Solution

Concept: An operon is a functional unit of genomic DNA containing a cluster of genes under the control of a single promoter. The *lac* operon is the classic example of an inducible system.



Solution: 1. **Inducible System:** This means the operon is normally "switched off" and only "switched on" when a specific substrate (inducer) is present. 2. In the absence of lactose, the **repressor protein** (produced by the *i* gene) binds to the operator, blocking RNA polymerase. 3. When **lactose** (the inducer) is added, it binds to the repressor and inactivates it. 4. The inactivated repressor can no longer bind to the operator, allowing transcription of the structural genes to proceed. 5. Therefore, it is called inducible because the inducer (lactose) triggers gene expression.

Final Answer: Lactose acts as an inducer by binding to the repressor.

Answer: (C)

Q26.

Solution

Concept: Human evolution is characterized by a gradual increase in cranial capacity, the development of bipedal locomotion, and the use of tools and fire.

Solution: 1. **Homo habilis:** The "handy man," was the first hominid toolmaker with a cranial capacity of 650–800cc. They probably did not eat meat. 2. **Homo erectus:** Appeared about 1.5 million years ago. They had a larger brain with a capacity of around **900cc**. Fossils of *Homo erectus* (like Java Man) provide the first clear evidence of the **use of fire**. 3. **Homo neanderthalensis:** Lived in near East and central Asia with a brain size of 1400cc. They used hides to protect their bodies and buried their dead. 4. **Australopithecus:** Lived in East African grasslands; they hunted with stone weapons but essentially ate fruit. Their brain capacity was much lower (around 400-600cc).

Final Answer: Homo erectus

Answer: (B)

Q27.

Solution

Concept: Assisted Reproductive Technologies (ART) are special techniques used to assist couples to have children when natural conception is not possible.

Solution: 1. **GIFT (Gamete Intra Fallopian Transfer):** Transfer of an **ovum** collected from a donor into the **fallopian tube** of another female who cannot produce one but can provide a suitable environment. 2. **ZIFT (Zygote Intra Fallopian Transfer):** The **zygote** or early embryo (up to 8 blastomeres) is transferred into the **fallopian tube**. 3. **IUI (Intra-Uterine Insemination):** In this technique, the **semen** is collected either from the husband or a healthy donor and is artificially introduced into the **uterus**. 4. **IUT (Intra-Uterine Transfer):** Embryos with more than 8 blastomeres are transferred into the **uterus** to complete further development.

Final Answer: (I)-(b), (II)-(c), (III)-(d), (IV)-(a)

Answer: (A)

Q28.

Solution

Concept: *Bacillus thuringiensis* (Bt) is a soil bacterium that produces proteins toxic to specific insects. This property has been used to create insect-resistant transgenic plants.

Solution: 1. The Bt toxin is produced as an inactive protoxin in the bacterium. When an insect ingests it, the alkaline pH of the gut solubilizes the crystals, converting the protoxin into an active form. 2. The active toxin binds to the surface of midgut epithelial cells, creating pores that cause cell swelling and lysis, eventually leading to the death of the insect. 3. Bt toxins are insect-group specific. The genes (e.g., *cryIAc*, *cryIIAb*) used in Bt-cotton are effective against **Lepidopterans** (tobacco budworm, armyworm) and specifically **bollworms**. 4. It does not provide resistance against fungi, viruses, or nematodes (the latter is handled by RNAi).

Final Answer: Lepidopteran insects

Answer: (C)

Q29.

Solution

Concept: The flow of energy in an ecosystem is unidirectional. As energy moves from one trophic level to the next, a significant amount is lost as heat.

Solution: 1. In 1942, **Raymond Lindeman** proposed the **10% Law** of energy transfer. 2. According to this law, during the transfer of energy from organic food from one trophic level to the next, only about **10%** of the energy is stored as flesh. 3. The remaining 90% is lost during transfer, broken down in respiration, or lost to incomplete digestion by higher trophic levels. 4. This law explains why food chains are usually limited to 4 or 5 trophic levels, as the energy eventually becomes insufficient to support another level.

Final Answer: Raymond Lindeman

Answer: (B)

Q30.

Solution

Concept: The "Evil Quartet" refers to the four major anthropogenic (human-caused) drivers of the current global extinction crisis.

Solution: 1. Ecologists use this term to describe the primary threats to **Biodiversity**: - **Habitat Loss and Fragmentation:** The most important cause. - **Over-exploitation:** When 'need' turns to 'greed' (e.g., Steller's sea cow). - **Alien Species Invasions:** Non-native species outcompeting local ones (e.g., Nile perch in Lake Victoria). - **Co-extinctions:** When a species goes extinct, the plants and animals obligatory associated with it also go extinct. 2. These factors are leading to a rate of species loss that is 100 to 1000 times higher than natural background extinction rates.

Final Answer: Biodiversity loss

Answer: (B)

Q31.

Solution

Concept: In molecular biology and biotechnology, enzymes are the tools used to manipulate DNA. Joining two distinct DNA fragments requires the restoration of the sugar-phosphate backbone.

Solution: 1. **DNA Ligase** is the specific enzyme that facilitates the joining of DNA strands together by catalyzing the formation of a **phosphodiester bond**. 2. It plays a vital role in repairing single-strand breaks in duplex DNA in living organisms, but in the lab, it is used to "glue" a gene of interest into a plasmid vector. 3. **DNA Polymerase** adds nucleotides to a pre-existing strand. 4. **Helicase** unwinds the double helix by breaking hydrogen bonds. 5. **Cellulase** is used to digest the plant cell wall, not to manipulate DNA.

Final Answer: DNA Ligase

Answer: (C)

Q32.

Solution

Concept: RNA interference (RNAi) is a natural cellular defense mechanism in all eukaryotic organisms that involves site-specific silencing of genes.

Solution: 1. The process involves the formation of a **Double-stranded RNA (dsRNA)** molecule. 2. This dsRNA is recognized by an enzyme called Dicer, which cuts it into small interfering RNAs (siRNAs). 3. These siRNAs then bind to a protein complex (RISC) and guide it to a specific, complementary **target mRNA**. 4. The RISC complex then cleaves the mRNA, preventing it from being translated into a protein. 5. This method is highly specific and has been used to create pest-resistant plants by silencing essential genes of the invading parasite.

Final Answer: Double-stranded RNA

Answer: (B)

Q33.

Solution

Concept: The immune system's primary job is to distinguish between 'self' and 'non-self'. An auto-immune disease occurs when this discrimination fails.

Solution: 1. **Rheumatoid Arthritis** is a classic example of an auto-immune disease where the body's immune system mistakenly attacks the synovial membrane of the joints, leading to inflammation and damage. 2. **AIDS** is an immunodeficiency disease caused by a virus (HIV) that destroys T-helper cells. 3. **Malaria** is an infectious disease caused by a protozoan parasite (*Plasmodium*). 4. **Cancer** is a disease characterized by uncontrolled cell division and loss of contact inhibition, usually due to genetic mutations, rather than the immune system attacking healthy self-cells.

Final Answer: Rheumatoid Arthritis

Answer: (B)

Q34.

Solution

Concept: Secondary sewage treatment is a biological process that uses aerobic microbes to reduce the Biochemical Oxygen Demand (BOD) of the waste.

Solution: 1. In the large aeration tanks, aerobic microbes grow into **flocs** (masses of bacteria associated with fungal filaments to form mesh-like structures). 2. Once the BOD of sewage is significantly reduced, the effluent is passed into a settling tank. 3. In this tank, the bacterial flocs are allowed to sediment. This sediment is called **activated sludge**. 4. A small part of the activated sludge is pumped back into the aeration tank to serve as the inoculum, while the rest is pumped into large tanks called anaerobic sludge digesters.

Final Answer: Settled bacterial flocs in the secondary settling tank

Answer: (A)

Q35.

Solution

Concept: Ecology is studied at different levels of organization: Organism, Population, Community, and Ecosystem.

Solution: 1. An **Ecosystem** is the functional unit of nature where living organisms (biotic factors) interact among themselves and also with the surrounding physical (abiotic) environment. 2. It is characterized by energy flow and nutrient cycling. 3. Examples of ecosystems include a small pond, a forest, or even a large biosphere. 4. A **Population** is a group of individuals of the same species; a **Community** is an assemblage of different populations; a **Biome** is a large regional unit characterized by a major vegetation type and climate.

Final Answer: Ecosystem

Answer: (C)

Q36.

Solution

Concept: Translation is the process of synthesizing a polypeptide chain from an mRNA template. This process requires start and stop signals within the genetic code.

Solution: 1. There are 64 codons in the genetic code; 61 code for amino acids, and 3 do not code for any amino acids. 2. The codons **UAA (Ochre)**, **UAG (Amber)**, and **UGA (Opal)** are called **Stop Codons** or termination codons. 3. When the ribosome encounters any of these three codons on the mRNA, no tRNA can bind to them, causing the translation process to terminate and the newly formed polypeptide chain to be released. 4. **AUG** is the Start Codon (codes for Methionine), and **GUG** can sometimes act as an alternative start codon. **UGG** codes for Tryptophan.

Final Answer: UAA

Answer: (C)

Q37.

Solution

Concept: A dihybrid cross involves the inheritance of two pairs of contrasting traits simultaneously. Mendel used this to propose the Law of Independent Assortment.

Solution: 1. In the F_1 generation of a cross between $RRYY$ (Round Yellow) and $rryy$ (Wrinkled Green), all offspring are $RrYy$ (Round Yellow). 2. When F_1 individuals are self-pollinated, the F_2 generation produces four types of phenotypes: - **Round Yellow:** 9/16 - **Round Green:** 3/16 - **Wrinkled Yellow:** 3/16 - **Wrinkled Green:** 1/16 3. This result yields the classic phenotypic ratio of **9:3:3:1**. 4. The genotypic ratio is much more complex ($1:2:1:2:4:2:1:2:1$), while $3:1$ is the monohybrid phenotypic ratio.

Final Answer: 9:3:3:1

Answer: (C)

Q38.

Solution

Concept: The Central Dogma of Molecular Biology explains the flow of genetic information: DNA → RNA → Protein.

Solution: 1. **Transcription:** The process where the genetic information stored in the template strand of DNA is copied into a complementary strand of **messenger RNA (mRNA)** by the enzyme RNA polymerase. 2. **Translation:** The process where the mRNA sequence is decoded to build a protein (polypeptide). 3. **Replication:** The process of making an identical copy of a DNA molecule. 4. **Transformation:** The process by which a cell takes up foreign genetic material from its surroundings.

Final Answer: Transcription

Answer: (B)

Q39.

Solution

Concept: Population stabilization and reproductive health education led to the development of better contraceptive options in India.

Solution: 1. **Saheli** is a unique oral contraceptive for females because it is **non-steroidal** and contains "centchroman." 2. Unlike traditional daily pills, it is a **"once-a-week"** pill with very few side effects and high contraceptive value. 3. It was developed by scientists at the **Central Drug Research Institute (CDRI)** located in **Lucknow**, India. 4. This development was a significant milestone in India's family planning program, providing a safer alternative to steroid-based contraceptives.

Final Answer: CDRI, Lucknow

Answer: (B)

Q40.

Solution

Concept: Mutualism is a type of symbiotic relationship where both interacting species benefit significantly from each other, often becoming obligately dependent.

Solution: 1. The relationship between **Fig trees and Wasps** is a classic example of **Mutualism** and co-evolution. 2. The fig species can be pollinated only by its "partner" wasp species and no other species. 3. The female wasp uses the fruit not only as an oviposition (egg-laying) site but uses the developing seeds within the fruit for nourishing its larvae. 4. In return, the wasp pollinates the fig inflorescence while searching for suitable egg-laying sites. Neither can complete their life cycle without the other.

Final Answer: Mutualism

Answer: (B)

Q41.

Solution

Concept: The Polymerase Chain Reaction (PCR) is a laboratory technique used to make millions of copies of a specific DNA segment. It involves three main steps: Denaturation, Annealing, and Extension.

Solution: 1. **Statement I Analysis:** PCR is indeed used for the amplification of a specific DNA sequence, allowing scientists to take a tiny amount of DNA and scale it up for analysis. Thus, Statement I is correct. 2. **Statement II Analysis:** Standard DNA polymerases denature (break down) at high temperatures. PCR requires a heat-stable enzyme because the first step (Denaturation) occurs at approximately 94-96°C. **Taq polymerase**, isolated from the bacterium *Thermus aquaticus*, is used because it remains active during these high-temperature cycles. Thus, Statement II is correct. 3. Since both statements are factually accurate and Statement II explains the biochemical requirement of the process, Option A is the right choice.

Final Answer: Both Statement I and Statement II are correct

Answer: (A)

Q42.

Solution

Concept: Biocontrol refers to the use of biological methods for controlling plant diseases and pests, reducing the reliance on toxic chemical pesticides.

Solution: 1. **Bacillus thuringiensis** (Bt) is a bacterium available in sachets as dried spores. These are mixed with water and sprayed onto vulnerable plants. 2. When **butterfly caterpillars** eat the leaves, the bacterial toxin is released in their gut (due to alkaline pH), killing the larvae while leaving other insects unharmed. 3. **Trichoderma** is a free-living fungus used to control several plant pathogens in the root ecosystem. 4. **Baculoviruses** are pathogens that attack insects and other arthropods, used for species-specific, narrow-spectrum insecticidal applications. 5. **Ladybird beetles** are used to get rid of aphids.

Final Answer: Bacillus thuringiensis

Answer: (B)

Q43.

Solution

Concept: Gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child or embryo.

Solution: 1. The first clinical gene therapy was given in 1990 to a 4-year-old girl with **adenosine deaminase (ADA) deficiency**. 2. This enzyme is crucial for the immune system to function. The disorder is caused due to the deletion of the gene for adenosine deaminase. 3. In some children, ADA deficiency can be cured by bone marrow transplantation; in others, it can be treated by enzyme replacement therapy. 4. In the gene therapy approach, lymphocytes from the blood of the patient are grown in a culture outside the body. A functional ADA cDNA (using a retroviral vector) is then introduced into these lymphocytes, which are subsequently returned to the patient.

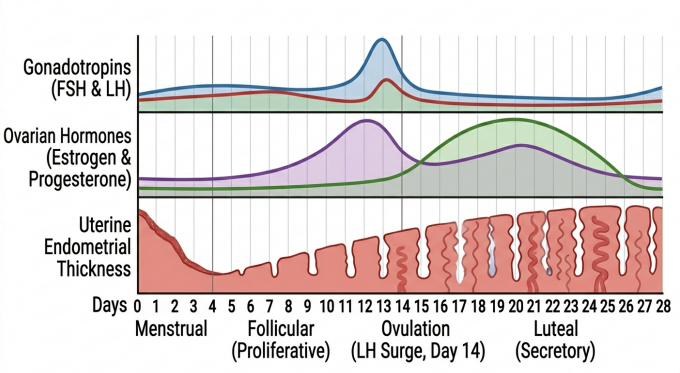
Final Answer: Adenosine deaminase (ADA) deficiency

Answer: (B)

Q44.

Solution

Concept: Conservation of biodiversity is categorized based on where the protection takes place. *Ex-situ* (off-site) conservation involves moving threatened animals and plants from their natural habitat to special settings.



Solution: 1. **Ex-situ methods** include Zoological parks (Zoos), Botanical gardens, wildlife safari parks, and seed banks. 2. **Cryopreservation** is an advanced *ex-situ* technique where gametes of threatened species are preserved in viable and fertile conditions for long periods using liquid nitrogen at -196°C. 3. **In-situ methods** (on-site) include National Parks, Wildlife Sanctuaries, and Biosphere Reserves, where the entire ecosystem is protected in its original location. 4. Therefore, Cryopreservation is the *Ex-situ* strategy among the choices.

Final Answer: Cryopreservation of gametes

Answer: (C)

Q45.

Solution

Concept: The menstrual cycle is the reproductive cycle in female primates. It is divided into four main phases based on hormonal and endometrial changes.

Solution: 1. **Menstrual Phase:** Lasts for 3-5 days; the endometrial lining breaks down and is discharged. 2. **Follicular (Proliferative) Phase:** Primary follicles grow into Graafian follicles, and the endometrium regenerates. 3. **Ovulatory Phase:** Rapid secretion of LH (LH surge) induces the rupture of the Graafian follicle and release of the ovum (day 14). 4. **Luteal (Secretory) Phase:** The ruptured follicle transforms into the corpus luteum, which secretes progesterone to prepare the uterus for implantation. 5. If fertilization doesn't occur, the cycle restarts with the menstrual phase.

Final Answer: Menstrual → Follicular → Ovulatory → Luteal

Answer: (B)

Q46.

Solution

Concept: DNA Fingerprinting involves identifying differences in specific regions of DNA sequence called repetitive DNA.

Solution: 1. A major part of the human genome consists of repetitive DNA sequences. These can be separated from bulk genomic DNA as different peaks during density gradient centrifugation. 2. The small peaks are referred to as satellite DNA. High degree of polymorphism (variation) is found in these sequences. 3. **VNTR** stands for **Variable Number of Tandem Repeats**. It belongs to a class of satellite DNA referred to as mini-satellite. 4. The size of VNTR varies from 0.1 to 20 kb. Since every individual (except monozygotic twins) has a unique pattern of VNTRs, it serves as the basis of DNA identification in forensic science.

Final Answer: Variable Number of Tandem Repeats

Answer: (A)

Q47.

Solution

Concept: Evolutionary biology seeks to understand how species change over time. Different scientists proposed various mechanisms for this change.

Solution: 1. **Charles Darwin** based his theory of Natural Selection on two key observations: "Limited Natural Resources" and "Variation within a population." 2. He proposed that since resources are limited, there is a **Struggle for Existence**. 3. Those individuals with variations that allow them to adapt better to their environment will survive and reproduce more than others. This was termed **Survival of the Fittest** (a term coined by Herbert Spencer but adopted by Darwin). 4. **Lamarck** proposed the use and disuse of organs; **Hugo de Vries** proposed the Mutation Theory; **Thomas Malthus** wrote on population growth which heavily influenced Darwin's thinking.

Final Answer: Charles Darwin

Answer: (C)

Q48.

Solution

Concept: Primary productivity is the rate at which biomass or organic matter is produced per unit area over a time period by plants during photosynthesis.

Solution: 1. It is a "rate," so it must include a time component (usually per year). 2. It can be measured in terms of weight (mass) or energy. 3. As weight: It is expressed as $\mathbf{g\ m^{-2}\ yr^{-1}}$ (grams per square meter per year). 4. As energy: It is expressed as $\mathbf{kcal\ m^{-2}\ yr^{-1}}$ (kilocalories per square meter per year). 5. Option A ($g^{-2}yr^{-1}$) is a typo for $g\ m^{-2}yr^{-1}$ in many contexts, but assuming the standard intent of mass vs energy units: 6. Primary productivity must be a rate. Therefore, both mass-based and energy-based units are used to compare the productivity of different ecosystems.

Final Answer: Both A and B

Answer: (D)

Q49.

Solution

Concept: Innate immunity is non-specific defense present at the time of birth. It consists of physical, physiological, cellular, and cytokine barriers.

Solution: 1. When tissues are injured or infected, the body initiates an **inflammatory response**. 2. Characteristics of localized inflammation include **Redness** (due to vasodilation), **Swelling** (leakage of fluid into tissues), **Pain** (stimulation of nerve endings), and **Heat**. 3. **Antibody production by B-cells** is a characteristic of **Acquired (Adaptive) Immunity**, not innate immunity. It is a highly specific response that occurs after the body has been exposed to a particular pathogen. 4. Innate responses are immediate; acquired responses take time to build up but provide memory.

Final Answer: Antibody production by B-cells

Answer: (D)

Q50.

Solution

Concept: Amniocentesis is a medical procedure used in prenatal diagnosis of chromosomal abnormalities and fetal infections.

[Image of the process of Amniocentesis]

Solution: 1. In this procedure, a small amount of amniotic fluid (containing fetal cells) is sampled from the amniotic sac surrounding a developing fetus. 2. The primary medical purpose is to detect genetic disorders like Down's syndrome, hemophilia, or sickle-cell anemia. 3. However, because the cells also reveal the sex chromosomes (XX or XY), it is often misused for **prenatal sex determination**. 4. To prevent female foeticide and maintain a healthy sex ratio, the Government of India has legally restricted the use of amniocentesis for sex determination under the PCPNDT Act.

Final Answer: Prenatal sex determination

Answer: (C)

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	A	3	C	4	C	5	B
6	A	7	B	8	B	9	C	10	C
11	A	12	B	13	C	14	B	15	C
16	C	17	C	18	B	19	B	20	C
21	C	22	B	23	B	24	B	25	C
26	B	27	A	28	C	29	B	30	B
31	C	32	B	33	B	34	A	35	C
36	C	37	C	38	B	39	B	40	B
41	A	42	B	43	B	44	C	45	B
46	A	47	C	48	D	49	D	50	C