

# MHT CET 2026 April 25 Shift 1

## Question Paper with Solutions (Memory Based)

Conducted by CET Cell, Maharashtra



### General Instructions

- (i) **Duration:** The total duration of the examination is 3 hours (180 minutes).
- (ii) **Total Marks:** The complete paper carries a maximum of 200 marks.
- (iii) **Structure:** The paper has 3 Sections:
  - **Section A:** 50 Multiple Choice Questions (Physics)
  - **Section B:** 50 Multiple Choice Questions (Chemistry)
  - **Section C:** 100 Multiple Choice Questions (Biology)
- (iv) **Compulsory Questions:** All 200 questions are compulsory.
- (v) Each question has four options. Only **one** option is correct.
- (vi) **Right Answer:** Physics (+1 marks), Chemistry (+1 marks) and Biology(+1 marks).
- (vii) **Incorrect Answer:** (No Negative marking).
- (viii) **Unanswered/Marked for Review:** 0 marks.

1. The process during double fertilization in which non motile male gametes are carried through hollow pollen tube is called

- (A) chalazogamy
- (B) porogamy
- (C) mesogamy
- (D) siphonogamy

**Correct Answer:** (D) siphonogamy

### Solution:

#### Step 1: Understanding the Concept:

The process of fertilization in angiosperms involves the entry of the pollen tube into the ovule. The pollen tube acts as a hollow carrier for the non-motile male gametes, protecting them as they travel towards the female gametophyte.

#### Step 2: Key Formula or Approach:

Identify the correct botanical term based on the etymology and biological definition of the pollen tube's function in carrying gametes.

#### Step 3: Detailed Explanation:

Porogamy is defined as the entry of the pollen tube directly through the micropyle. Chalazogamy occurs when the pollen tube enters the ovule through the chalazal end. Mesogamy is the entry of the pollen tube through the integuments or the funiculus. Siphonogamy, however, is the specific botanical term used to describe the transport of non-motile male gametes through a hollow pollen tube.

#### Step 4: Final Answer:

The correct process is siphonogamy, which corresponds to option (D).

**Quick Tip:** Remember the root words to easily identify the terms: 'poro-' refers to the micropylar pore, 'chalazo-' refers to the chalaza, 'meso-' means middle (integuments), and 'siphono-' refers to a tube.

## 2. Given below are the two statements

**Statement I** Only one strand in the transcription unit functions as template and is called antisense strand.

**Statement II** The coding strand of transcription unit is called sense strand.

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

(A) Both statement I and statement II are correct.

- (B) Both statement I and statement II are incorrect.
- (C) Statement I is correct and statement II is incorrect.
- (D) Statement I is incorrect and statement II is correct.

**Correct Answer:** (A) Both statement I and statement II are correct.

**Solution:**

**Step 1: Understanding the Concept:**

Transcription is the process of copying genetic information from one strand of the DNA into RNA.

A transcription unit in DNA primarily consists of a promoter, the structural gene, and a terminator.

**Step 2: Key Formula or Approach:**

Analyze the standard nomenclature of DNA strands during transcription based on their polarity ( $5' \rightarrow 3'$  or  $3' \rightarrow 5'$ ) and function.

**Step 3: Detailed Explanation:**

Statement I: Only one strand functions as a template and is called the antisense strand. This is correct because the DNA-dependent RNA polymerase catalyzes polymerization in only the  $5' \rightarrow 3'$  direction, so the strand with  $3' \rightarrow 5'$  polarity acts as the template (antisense strand).

Statement II: The coding strand of the transcription unit is called the sense strand. This is also correct. The other strand with polarity  $5' \rightarrow 3'$  has the exact same sequence as the RNA (except thymine is replaced by uracil) and is appropriately called the coding or sense strand.

**Step 4: Final Answer:**

Both statements accurately describe the components of a transcription unit, so option (A) is the correct choice.

**Quick Tip:** Always remember:

Template strand = Antisense strand ( $3' \rightarrow 5'$ ).

Coding strand = Sense strand ( $5' \rightarrow 3'$ ).

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### 3. First evidence for triplet genetic code was given by

- (A) Crick
- (B) Nirenberg and Matthaei
- (C) Dr. H. G. Khorana
- (D) Severo Ochoa

**Correct Answer:** (A) Crick

#### **Solution:**

##### **Step 1: Understanding the Concept:**

The genetic code is the set of rules by which the sequence of nucleotides in DNA or RNA is translated into the sequence of amino acids in proteins.

A triplet code means that a sequence of three nucleotides specifies a single amino acid.

##### **Step 2: Key Formula or Approach:**

Recall the historical timeline of genetic code discoveries and specifically who provided the first direct experimental proof of its triplet nature.

##### **Step 3: Detailed Explanation:**

George Gamow theoretically proposed the triplet code.

Francis Crick and his colleagues provided the first experimental evidence for the triplet nature of the genetic code in 1961 using frameshift mutations in the T4 bacteriophage.

Nirenberg and Matthaei were the first to decipher a specific codon (UUU for Phenylalanine) using a cell-free system.

Dr. H. G. Khorana developed chemical methods to synthesize RNA molecules to further decode the dictionary.

##### **Step 4: Final Answer:**

Since Crick provided the first experimental evidence, option (A) is correct.

**Quick Tip:** Key contributions to remember:

Gamow = Proposed the triplet code theoretically.

Crick = Proved the triplet nature experimentally (via frameshift mutations).

Nirenberg & Matthaei = Deciphered the first codon.

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**4. Chromosomal aberration in which there is no loss or gain of gene complement is**

- (A) deletion
- (B) duplication
- (C) inversion
- (D) translocation

**Correct Answer:** (C) inversion

**Solution:**

**Step 1: Understanding the Concept:**

Chromosomal aberrations refer to structural changes in chromosomes that can affect the gene complement (the total number of genes).

These structural modifications are generally classified into deletion, duplication, inversion, and translocation.

**Step 2: Key Formula or Approach:**

Evaluate each type of chromosomal aberration to determine whether genetic material is lost, gained, or merely rearranged internally.

**Step 3: Detailed Explanation:**

Deletion refers to the loss of a chromosomal segment, which inevitably results in a loss of genes.

Duplication involves the presence of an extra chromosomal segment, leading to an abnormal gain of genes.

Translocation is the transfer of a chromosomal segment to a non-homologous chromosome, changing the gene complement of individual chromosomes.

Inversion occurs when a segment of a chromosome breaks off, rotates 180 degrees, and reattaches in the same location. Because the genetic material is only rearranged internally, there is no overall loss or gain of the gene complement.

**Step 4: Final Answer:**

The aberration with no loss or gain of genetic material is inversion, making option (C) correct.

**Quick Tip:** Think of inversion as reading a sentence backwards.

The words (genes) are all still there, just in reverse order, so the total amount of genetic information remains exactly the same.

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**5. In plants, active absorption usually does NOT occur when \_\_\_\_.**

- (A) stomata are open
- (B) stomata are closed
- (C) transpiration stops
- (D) it is night time

**Correct Answer:** (A) stomata are open

**Solution:**

**Step 1: Understanding the Concept:**

Water absorption in plants occurs through active absorption (requiring metabolic energy) and passive absorption (driven by the transpiration pull).

**Step 2: Key Formula or Approach:**

Relate the occurrence and dominance of active versus passive absorption to the rate of transpiration and the corresponding state of the stomata.

**Step 3: Detailed Explanation:**

When stomata are open, the transpiration rate is high, creating a strong transpiration pull.

This pull drives passive water absorption, which is highly efficient and accounts for the vast majority of water uptake, largely dominating over active absorption.

Active absorption only becomes noticeable and prominent when transpiration is very low or absent, such as when stomata are closed or during the night.

Therefore, active absorption usually does not occur (or is negligible) when stomata are open because passive absorption is overwhelming it.

**Step 4: Final Answer:**

Active absorption is minimal when stomata are open, making option (A) correct.

**Quick Tip:** High Transpiration (Open Stomata) → Passive Absorption dominates.

Low Transpiration (Closed Stomata/Night) → Active Absorption becomes noticeable (e.g., causing guttation).

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**6. Which one of the following belongs to New World monkey?**

- (A) Baboons
- (B) Macaques
- (C) Spider monkeys
- (D) Langurs

**Correct Answer:** (C) Spider monkeys

**Solution:**

**Step 1: Understanding the Concept:**

Within the evolutionary history of primates, Anthropoids are broadly divided into two main geographical and evolutionary groups: New World monkeys and Old World monkeys.

**Step 2: Key Formula or Approach:**

Identify the characteristics and typical examples of New World monkeys versus Old World monkeys based on evolutionary biology.

**Step 3: Detailed Explanation:**

New World monkeys are native to the Americas (Central and South America). They typically have broad, flat noses and often possess prehensile (grasping) tails. Examples include spider monkeys, howler monkeys, and squirrel monkeys.

Old World monkeys are native to Africa and Asia. They have downward-facing nostrils and lack prehensile tails. Examples include baboons, macaques, and langurs.

Among the given options, spider monkeys are the only primates that belong to the New World monkey category.

**Step 4: Final Answer:**

Spider monkeys belong to the New World monkey group, corresponding to option (C).

**Quick Tip:** New World Monkeys: Prehensile tails + flat noses (e.g., Spider monkey, Howler monkey).

Old World Monkeys: Non-prehensile tails + downward noses (e.g., Baboons, Macaques, Langurs).

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**7. The length of root hair is**

- (A) 1-10 mm
- (B) 11-20 mm
- (C) 21-30 mm
- (D) 31-40 mm

**Correct Answer:** (A) 1-10 mm

**Solution:****Step 1: Understanding the Concept:**

Root hairs are unicellular, tubular extensions of the root epidermis (epiblema) found specifically in the maturation zone of the root.

Their primary function is to increase the surface area available for water and mineral absorption.

**Step 2: Key Formula or Approach:**

Recall the factual biological data regarding the standard dimensions of root hairs as prescribed by the curriculum.

**Step 3: Detailed Explanation:**

Root hairs are incredibly delicate and short-lived (ephemeral) structures.

They are microscopic in diameter but grow to a measurable length that can be seen.

According to standard botanical observations and biological textbooks, the typical length of a root hair ranges strictly from 1 to 10 millimeters.

Any length greater than this would make the single-celled hair too fragile to survive the mechanical friction of soil particles.

**Step 4: Final Answer:**

The standard length of a root hair is 1-10 mm, matching option (A).

**Quick Tip:** Factual data questions are common. Always remember: Root hairs are strictly unicellular and constantly measure between 1 to 10 mm in length.

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**8. Which among the following represents the process of reductive deamination?**

- (A)  $\text{ketoglutaric acid} + \text{NH}_4 + \text{NADPH}_2 \alpha \rightarrow \text{Glutamic acid} + \text{H}_2\text{O} + \text{ADP}$
- (B)  $\text{Glutamic acid} + \text{Oxaloacetic acid} \rightarrow \alpha\text{-ketoglutaric acid} + \text{Aspartic acid}$
- (C)  $\text{Glutamic acid} + \text{NH}_4 + \text{ATP} \rightarrow \alpha\text{-Glutamine} + \text{ADP}$
- (D)  $\text{Aspartic acid} + \text{NH}_4 \alpha \rightarrow \text{Asparagine} + \text{ADP}$

**Correct Answer:** (A)  $\text{ketoglutaric acid} + \text{NH}_4 + \text{NADPH}_2 \alpha \rightarrow \text{Glutamic acid} + \text{H}_2\text{O} + \text{ADP}$

**Solution:****Step 1: Understanding the Concept:**

The question asks for the reaction representing "reductive deamination", which is a widely

recognized typographical error in exam papers meant for "reductive amination".

Reductive amination is the process where ammonia reacts with an  $\alpha$ -keto acid to form an amino acid.

**Step 2: Key Formula or Approach:**

Identify the general biochemical equation for reductive amination:  $\alpha$ -ketoglutaric acid +  $\text{NH}_4^+$  + NAD(P)H  $\rightarrow$  Glutamate +  $\text{H}_2\text{O}$  + NAD(P) $^+$ .

**Step 3: Detailed Explanation:**

In the reductive amination process, ammonia (represented as  $\text{NH}_4$ ) reacts with  $\alpha$ -ketoglutaric acid in the presence of a reducing agent like NADPH $_2$ .

This specific reaction forms glutamic acid and water.

Option (A) is the only option structurally depicting this amination process. Despite the misprint of "ADP" instead of NADP $^+$ , and the misplaced " $\alpha$ " symbol in the printed option, it accurately identifies the core reactants and products.

Option (B) represents transamination.

Options (C) and (D) represent amidation (formation of glutamine and asparagine).

**Step 4: Final Answer:**

Option (A) is the closest representation of the intended reductive amination reaction.

**Quick Tip:** Always look for the key reactants and products:  $\alpha$ -ketoglutaric acid + Ammonia forming Glutamic acid is the signature of reductive amination. Do not let minor typographical errors in exam options distract you from the main biochemical pathway.

**9. Which of the following microbial sources is used for the production of antibiotic terramycin?**

- (A) *Streptomyces erythreus*
- (B) *Streptomyces venezuelae*
- (C) *Streptomyces griseus*
- (D) *Streptomyces aurifaciens*

**Correct Answer:** (D) *Streptomyces aurifaciens*

**Solution:**

**Step 1: Understanding the Concept:**

Antibiotics are potent secondary metabolites produced by certain microorganisms that inhibit the growth of other microbes.

The bacterial genus *Streptomyces* is heavily utilized as a major biological source of naturally occurring antibiotics.

**Step 2: Key Formula or Approach:**

Memorize the specific *Streptomyces* species and the corresponding antibiotics they produce according to the standard biology syllabus.

**Step 3: Detailed Explanation:**

*Streptomyces erythreus* is the microbial source for the antibiotic Erythromycin.

*Streptomyces venezuelae* is utilized for the production of Chloramphenicol.

*Streptomyces griseus* is widely known as the source of Streptomycin.

According to the officially prescribed state board curriculum, *Streptomyces aurifaciens* is explicitly cited as the microbial source for the antibiotic Terramycin.

**Step 4: Final Answer:**

*Streptomyces aurifaciens* is used for Terramycin production, making option (D) correct.

**Quick Tip:** Create a quick matching table in your notes for Microbes and their Products:

*S. griseus* → Streptomycin

*S. venezuelae* → Chloramphenicol

*S. aurifaciens* → Terramycin/Aureomycin

**10. The term used for species in which the last individual has died or is not recorded is**

(A) Extinct

- (B) Near threatened
- (C) Endangered
- (D) Vulnerable

**Correct Answer:** (A) Extinct

**Solution:**

**Step 1: Understanding the Concept:**

The International Union for Conservation of Nature (IUCN) classifies species into different categories based on their conservation status, population size, and risk of global extinction.

**Step 2: Key Formula or Approach:**

Recall the specific definitions for the various IUCN Red List categories to identify the one that precisely matches the given description.

**Step 3: Detailed Explanation:**

An 'Extinct' species is defined as a taxon when there is no reasonable doubt that the last individual has died, or when exhaustive surveys in its known or expected habitat have failed to record an individual.

An 'Endangered' species is one that is facing a very high risk of extinction in the wild in the near future.

A 'Vulnerable' species is one that is considered to be at a high risk of unnatural (human-caused) extinction without further human intervention.

A 'Near threatened' species is one that has been evaluated but does not currently qualify for the Endangered or Vulnerable status, though it is close to qualifying or is likely to qualify in the near future.

Based on the exact definition provided in the question, the correct term is 'Extinct'.

**Step 4: Final Answer:**

The correct term is Extinct, which corresponds to option (A).

**Quick Tip:** Familiarize yourself with the main IUCN categories in order of severity: Least Concern → Near Threatened → Vulnerable → Endangered → Critically Endangered → Extinct in the Wild → Extinct.

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