

MHT CET 2026 April 26 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 a hollow pollen tube is called:

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

Correct Answer: (D) siphonogamy

Solution:

Concept:

In flowering plants (angiosperms), fertilization involves the transfer of male gametes from the pollen grain to the embryo sac. Since male gametes are **non-motile**, they cannot move on their own. Instead, they are transported via a specialized structure called the **pollen tube**.

This entire mechanism of transporting male gametes through the pollen tube is known as **siphonogamy**. It is a defining feature of higher plants and ensures successful fertilization without the need for water as a medium.

Different modes of pollen tube entry into the ovule are:

- **Porogamy:** Entry through the micropyle (most common)
- **Chalazogamy:** Entry through the chalaza
- **Mesogamy:** Entry through the integuments or middle region

However, these terms describe **the path of entry**, whereas **siphonogamy** refers to the **method of gamete transport**.

Step 1: Understanding double fertilization.

In angiosperms, double fertilization involves:

- One male gamete fusing with the egg to form a zygote
- Another male gamete fusing with polar nuclei to form endosperm

Both male gametes are delivered via the pollen tube.

Step 2: Identifying the transport mechanism.

Since male gametes are **non-motile**, they rely entirely on the pollen tube for movement from the stigma to the ovule.

Step 3: Matching with the correct term.

The process of transporting non-motile male gametes through a pollen tube is specifically termed:

Siphonogamy

Step 4: Eliminating incorrect options.

- (A) Chalazogamy → Refers to entry through chalaza, not transport
- (B) Porogamy → Entry through micropyle
- (C) Mesogamy → Entry through integuments
- (D) Siphonogamy → Correct (transport via pollen tube)

Final Answer: Siphonogamy

Quick Tip: Key Exam Tip:

- Siphonogamy = Transport mechanism (pollen tube)
- Porogamy / Chalazogamy / Mesogamy = Entry routes into ovule

Always distinguish between *mode of transport* and *site of entry* in such questions.

2. In Citrus, embryos develop from diploid cells of nucellus along with the zygotic embryo, resulting in polyembryony. This type of polyembryony is called:

- (A) adventive
- (B) cleavage
- (C) true
- (D) defective

Correct Answer: (A) adventive

Solution:

Concept:

Polyembryony is the phenomenon in which **more than one embryo develops within a single seed**. It is commonly observed in certain plant species such as *Citrus* and *Mango*.

Polyembryony can arise in different ways depending on the origin of embryos:

- **True polyembryony:** Multiple embryos develop from a single fertilized egg (zygote).
- **Cleavage polyembryony:** The zygote divides into several embryos.
- **Adventive polyembryony:** Embryos arise from somatic tissues of the ovule such as the

nucellus or integuments, in addition to the normal zygotic embryo.

In plants like **Citrus**, embryos develop from the **diploid nucellar cells** surrounding the embryo sac along with the fertilized zygote. These additional embryos are genetically identical to the parent plant because they originate from somatic tissue.

Step 1: Understanding the origin of embryos in Citrus.

In Citrus seeds, apart from the zygotic embryo formed by fertilization, several embryos arise from **diploid nucellar cells** present in the ovule.

Step 2: Identifying the type of polyembryony.

Since these extra embryos arise from **somatic cells (nucellus)** rather than from the zygote, the phenomenon is called:

Adventive Polyembryony

Step 3: Eliminating incorrect options.

- (A) Adventive → Embryos arise from nucellus or integuments (**Correct**)
- (B) Cleavage → Zygote splits into multiple embryos
- (C) True → Multiple embryos formed from fertilized egg
- (D) Defective → Not a recognized biological term for polyembryony

Final Answer: Adventive

Quick Tip: Remember:

Citrus and Mango commonly show **adventive polyembryony** where embryos arise from **nucellar cells**. These embryos are genetically identical to the parent plant and are widely used in horticulture for producing uniform plants.

3. During asexual reproduction, gemmule formation occurs in:

- (A) Yeast
- (B) Spirogyra
- (C) Sponges

(D) Amoeba

Correct Answer: (C) Sponges

Solution:

Concept:

Asexual reproduction is a mode of reproduction in which new individuals are produced from a single parent without the involvement of gametes. Many simple organisms use specialized structures for survival and reproduction.

In **sponges (Phylum Porifera)**, asexual reproduction commonly occurs through the formation of **gemmules**.

A **gemmule** is a resistant internal bud composed of:

- A mass of undifferentiated cells called **archaeocytes**
- Surrounded by a protective covering of **spicules and sponge fibers**

Gemmules help sponges survive **unfavorable environmental conditions** such as extreme cold, drought, or lack of nutrients. When favorable conditions return, the gemmule germinates and develops into a new sponge.

Step 1: Understanding gemmule formation.

Gemmules act as **dormant reproductive structures** that ensure survival and propagation during adverse environmental conditions.

Step 2: Identifying organisms that form gemmules.

Gemmule formation is characteristic of **freshwater sponges** such as *Spongilla*.

Step 3: Eliminating incorrect options.

- (A) Yeast → Reproduces by budding
- (B) Spirogyra → Reproduces by fragmentation
- (C) Sponges → Reproduce asexually by gemmules (**Correct**)
- (D) Amoeba → Reproduces by binary fission

Final Answer: Sponges

Quick Tip: Exam Shortcut:

- **Yeast** → Budding
- **Spirogyra** → Fragmentation
- **Amoeba** → Binary fission
- **Sponges** → Gemmule formation

Associating each organism with its typical reproductive method helps solve MCQs quickly.

4. Median vertical depression of external genitalia in females, enclosing the urethral and vaginal opening is called:

- (A) Mons pubis
- (B) Vestibule
- (C) Clitoris
- (D) Hymen

Correct Answer: (B) Vestibule

Solution:

Concept:

The **female external genitalia**, collectively called the **vulva**, consist of several structures such as the mons pubis, labia majora, labia minora, clitoris, hymen, and vestibule. Each structure performs a specific role in protecting the reproductive openings and assisting in reproductive functions.

The **vestibule** is the **median vertical depression present between the labia minora**. It contains important openings including:

- **Urethral opening** – for the excretion of urine
- **Vaginal opening** – for copulation, childbirth, and menstrual flow

Thus, the vestibule acts as a **central space enclosing both the urethral and vaginal openings**.

Step 1: Understanding the structure described in the question.

The question refers to a **median vertical depression** that encloses both urethral and vaginal openings.

Step 2: Identifying the correct anatomical structure.

The region between the labia minora containing these openings is known as the **vestibule**.

Step 3: Eliminating incorrect options.

- (A) Mons pubis → Fatty tissue above the pubic symphysis
- (B) Vestibule → Depression containing urethral and vaginal openings (**Correct**)
- (C) Clitoris → Erectile organ analogous to penis
- (D) Hymen → Thin membrane partially covering vaginal opening

Final Answer: Vestibule

Quick Tip: Remember:

- **Vestibule** → Space containing urethral and vaginal openings
- **Mons pubis** → Fatty cushion above genital region
- **Clitoris** → Erectile sensory organ
- **Hymen** → Membrane at vaginal opening

5. Failure of testis to descend into the scrotum is called:

- (A) Atresia
- (B) Cretinism
- (C) Amenorrhea
- (D) Cryptorchidism

Correct Answer: (D) Cryptorchidism

Solution:

Concept:

During fetal development in males, the **testes develop in the abdominal cavity**. Before birth or shortly after birth, they normally **descend into the scrotum**.

The **scrotum maintains a temperature about 2–2.5°C lower than body temperature**, which is essential for normal sperm production.

If one or both testes fail to descend into the scrotum, the condition is known as **cryptorchidism**. This condition may lead to infertility if not corrected because proper temperature regulation is required for spermatogenesis.

Step 1: Understanding the normal process.

Normally, testes migrate from the abdominal cavity to the scrotal sac during development.

Step 2: Identifying the abnormal condition.

If this descent does not occur, the testes remain in the abdominal cavity or inguinal canal. This condition is termed:

Cryptorchidism

Step 3: Eliminating incorrect options.

- (A) Atresia → Absence or closure of a normal body opening
- (B) Cretinism → Hypothyroidism in infants
- (C) Amenorrhea → Absence of menstruation in females
- (D) Cryptorchidism → Failure of testes to descend into scrotum (**Correct**)

Final Answer: Cryptorchidism

Quick Tip: Key Point for Exams: **Cryptorchidism** = Undescended testis.

Remember that proper sperm formation requires a temperature slightly lower than body temperature, which is maintained in the **scrotum**.

6. During menstrual phase, the blood released from uterus does not clot due to the presence of:

- (A) Fibrinogen
- (B) Fibrinolysin
- (C) Prostaglandin
- (D) Inhibin

Correct Answer: (B) Fibrinolysin

Solution:

Concept:

The **menstrual phase** is the first stage of the menstrual cycle and occurs when the **endometrial lining of the uterus is shed**. This results in the release of blood, mucus, and uterine tissue through the vagina.

Normally, blood clots when fibrin threads are formed. However, during menstruation the blood usually **does not clot**. This is because the uterine fluid contains an enzyme called **fibrinolysin**. **Fibrinolysin** breaks down fibrin and prevents clot formation, ensuring smooth menstrual flow.

Step 1: Understanding menstrual bleeding.

During menstruation, the endometrial lining breaks down and blood is released from uterine blood vessels.

Step 2: Identifying the factor preventing clotting.

The enzyme responsible for preventing clot formation is:

Fibrinolysin

It dissolves fibrin and keeps menstrual blood fluid.

Step 3: Eliminating incorrect options.

- (A) Fibrinogen → Protein involved in clot formation
- (B) Fibrinolysin → Dissolves fibrin and prevents clotting (**Correct**)
- (C) Prostaglandin → Causes uterine contractions

- (D) Inhibin → Hormone regulating FSH secretion

Final Answer: Fibrinolysin

Quick Tip: Quick Memory Trick:

- **Fibrinogen** → Helps in clot formation
- **Fibrinolysin** → Breaks fibrin and prevents clotting

Thus, menstrual blood generally **does not clot** because of **fibrinolysin**.

7. 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:

Concept:

Transcription is the biological process in which genetic information stored in DNA is copied into an RNA molecule, usually messenger RNA (mRNA). Although DNA consists of two complementary strands, only **one strand of DNA serves as the template** for RNA synthesis.

The two strands of DNA involved in transcription are named based on their relationship with the produced mRNA:

- **Template strand (Antisense strand):** This strand is read by RNA polymerase in the

3' → 5' direction to synthesize RNA in the 5' → 3' direction.

- **Coding strand (Sense strand):** This strand has the same nucleotide sequence as the mRNA (except that thymine (T) in DNA is replaced by uracil (U) in RNA).

Step 1: Understanding the template strand.

During transcription, RNA polymerase binds to DNA and reads the **template (antisense) strand**. The sequence of mRNA is formed by pairing complementary bases with this strand. Therefore, the mRNA sequence is **complementary to the template strand**. Hence, the statement that the template strand is also called the **antisense strand** is correct.

Step 2: Understanding the coding strand.

The other DNA strand is known as the **coding (sense) strand**. This strand is not directly used by RNA polymerase during transcription. However, its nucleotide sequence is almost identical to that of the mRNA produced, except that:

Thymine (T) in DNA is replaced by Uracil (U) in RNA.

Because its sequence resembles the final genetic code carried by mRNA, it is referred to as the **sense strand**. Therefore, the second statement is also correct.

Final Answer:

Both **Statement I and Statement II are correct.**

Quick Tip: Memory Trick:

- **Template strand** → Used by RNA polymerase to synthesize mRNA
- **Coding strand** → Has the same sequence as mRNA (T replaced by U)

Although it is called the **coding strand**, it is actually the **template strand that is read during transcription**.

8. 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:

Concept:

The **genetic code** refers to the set of rules by which the sequence of nucleotides in DNA or RNA determines the sequence of amino acids in a protein. Each amino acid is encoded by a specific sequence of nucleotides known as a **codon**.

A key feature of the genetic code is that it is a **triplet code**, meaning that **three nucleotides together specify one amino acid**. The discovery of this triplet nature involved both genetic experiments and biochemical studies carried out by several scientists.

Step 1: Evidence provided by Francis Crick.

In 1961, **Francis Crick** and his colleagues conducted experiments on the *T4 bacteriophage*. They introduced **insertion and deletion mutations** into the DNA sequence and observed their effect on protein synthesis.

They found that:

- When one or two nucleotides were inserted or deleted, the reading frame of the genetic message was disturbed.
- When three nucleotides were inserted or deleted, the original reading frame was restored.

This experiment clearly demonstrated that the genetic message is read in groups of **three nucleotides**, providing the first strong evidence that the genetic code is a **triplet code**.

Step 2: Contributions of other scientists.

- **Marshall Nirenberg and Heinrich Matthaei** performed biochemical experiments using synthetic RNA sequences (such as *poly-U*). They showed that the codon **UUU** codes for the amino acid **phenylalanine**. This experiment helped begin the process of deciphering the genetic code.
- **Har Gobind Khorana and Severo Ochoa** later developed advanced techniques using synthetic RNAs to determine many other codon–amino acid relationships, ultimately helping to complete the genetic code table.

Step 3: Identifying the correct answer.

Although several scientists contributed to decoding the genetic code, the **first evidence that the code is triplet in nature** was provided by **Francis Crick** through mutation experiments.

Final Answer: Francis Crick

Quick Tip: Important exam point:

- **Francis Crick** → First evidence that the genetic code is a **triplet**.
- **Nirenberg & Matthaei** → First to identify a specific codon (*UUU*) coding for **phenylalanine**.
- **Khorana** → Helped decipher the **complete genetic code table**.

Remember: **Crick proved the triplet nature**, while Nirenberg began decoding the codons.

9. 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:

Concept:

Chromosomal aberrations are structural alterations in chromosomes that occur due to breakage and abnormal rejoining of chromosome segments. These changes can affect the arrangement or quantity of genetic material.

Chromosomal aberrations are generally classified into two major types:

- **Unbalanced aberrations** – These involve a **loss or gain of genetic material**. Examples include deletion and duplication.
- **Balanced aberrations** – These involve a **rearrangement of chromosome segments**

without changing the total amount of genetic material. Examples include inversion and some forms of translocation.

Step 1: Understanding deletion and duplication.

- **Deletion:** A portion of a chromosome is lost during breakage, resulting in the **loss of genes**.
- **Duplication:** A segment of the chromosome is copied and repeated, leading to an **increase in gene number**.

Both of these changes alter the total genetic content of the chromosome.

Step 2: Understanding inversion.

In an **inversion**, a segment of the chromosome breaks off, rotates by 180°, and reattaches to the same chromosome.

In this process:

- The **same genes remain present**.
- Only the **order or orientation of genes changes**.
- There is **no net loss or gain of genetic material**.

Thus, inversion is considered a **balanced chromosomal rearrangement**.

Step 3: Understanding translocation.

In **translocation**, a segment from one chromosome attaches to a **non-homologous chromosome**. Some translocations may be balanced (no gene loss), but they involve exchange between different chromosomes.

Among the given structural aberrations, the most typical example where the **gene complement remains unchanged within the same chromosome** is **inversion**.

Final Answer: Inversion

Quick Tip: Memory Trick:

- **Deletion** → Loss of chromosome segment
- **Duplication** → Extra copy of chromosome segment
- **Inversion** → Segment flips 180° but genes remain the same
- **Translocation** → Segment moves to another chromosome

Think of **inversion** like flipping a word in a sentence — the letters remain the same, but their order changes.

10. 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:

Concept:

Plants absorb water mainly through their **root hairs**. The absorbed water is transported upward through the xylem to different parts of the plant. Water absorption occurs through two major mechanisms:

- **Passive absorption**
- **Active absorption**

Passive absorption is driven by the **transpiration pull** created by evaporation of water from the leaves. It accounts for nearly **95–96% of total water absorption** in plants.

Active absorption, on the other hand, occurs due to the **metabolic activity of root cells**. Energy in the form of ATP is used to actively absorb ions, which creates an osmotic gradient that helps in water uptake.

Step 1: Understanding passive absorption.

When **stomata are open**, transpiration occurs rapidly. This creates a strong **transpiration pull** in the xylem, which draws water upward from the roots to the leaves.

During this condition:

- Water movement is mainly controlled by transpiration.
- Roots do not need to actively pump water.
- Thus, **passive absorption dominates**.

Step 2: Understanding active absorption.

Active absorption occurs when **transpiration is low or absent**. This typically happens under conditions such as:

- When **stomata are closed**
- During **night time**
- During conditions of **high humidity or low transpiration**

In such situations, root cells actively absorb mineral ions using **ATP**. This creates an osmotic gradient that pulls water into the root cells.

Step 3: Identifying when active absorption does not occur.

When stomata are **open**, transpiration is high and passive absorption supplies most of the water. Therefore, **active absorption is usually not required under this condition**.

Final Answer:

Active absorption usually does **not occur when stomata are open** because passive absorption driven by transpiration pull becomes dominant.

Quick Tip: Easy way to remember:

- **Stomata open** → High transpiration → **Passive absorption dominates**
- **Stomata closed** → Low transpiration → **Active absorption occurs**

Think of transpiration pull as a **strong suction force**. When this suction is strong, plants do not need to actively pump water.

11. 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:

Concept:

Monkeys are broadly classified into two major groups based on their **geographical distribution** and **morphological characteristics**. These groups are:

- **New World monkeys (Platyrrhini)**
- **Old World monkeys (Catarrhini)**

This classification mainly depends on differences in **nose structure, tail function, and habitat distribution**.

- **New World monkeys** are found in **Central and South America**.
- **Old World monkeys** are found in **Africa and Asia**.

Step 1: **Characteristics of New World monkeys.**

New World monkeys possess the following features:

- **Broad and flat nose**

- Nostrils directed sideways
- Usually possess **prehensile tails** that can grasp branches
- Mostly arboreal (tree-dwelling)

Examples include:

- Spider monkey
- Howler monkey
- Marmoset

Step 2: Characteristics of Old World monkeys.

Old World monkeys differ in several anatomical features:

- Narrow nose
- Nostrils directed downward
- Tails are **non-prehensile** and mainly used for balance
- Found in Africa and Asia

Examples include:

- Baboon
- Macaque
- Langur

Step 3: Identifying the correct classification.

The **Spider monkey** is native to Central and South America and possesses a **prehensile tail** used for grasping branches while moving through trees.

These characteristics clearly place it under the group:

New World monkeys (Platyrrhini)

Final Answer: Spider monkey is a New World monkey

Quick Tip: Exam Trick:

- **Prehensile tail (grasping tail)** → New World monkeys
- **Non-prehensile tail** → Old World monkeys

If a monkey can hang or grasp branches with its tail like an extra hand, it is most likely a **New World monkey**.

12. 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:

Concept:

Root hairs are thin, tubular extensions of the **epiblema (epidermal cells)** of young roots. They are unicellular structures that greatly increase the **surface area available for the absorption of water and mineral nutrients** from the soil.

Root hairs play a crucial role in plant nutrition because they come in direct contact with soil particles and absorb water through the process of **osmosis**, while mineral ions are absorbed through both passive and active transport mechanisms.

Step 1: Location of root hairs.

Root hairs are present in the **zone of maturation (zone of differentiation)** of the root. This region lies just behind the zone of elongation and is specialized for absorption.

Step 2: Characteristics of root hairs.

Root hairs possess several important features:

- They are **unicellular** outgrowths of epidermal cells.
- They are **very delicate and short-lived**.

- As the root grows, old root hairs are continuously replaced by new ones.
- They grow between soil particles to absorb **capillary water and dissolved minerals**.

Step 3: Determining the typical length of root hairs.

Although root hairs are microscopic structures, their length is relatively larger compared to other epidermal cell projections. The typical length of a root hair generally ranges between:

1 – 10 mm

This length helps them penetrate small spaces between soil particles and effectively absorb water and nutrients.

Final Answer: 1–10 mm

Quick Tip: Interesting fact:

Even though each root hair is only a few millimeters long, a single plant may possess **millions of root hairs**. Together, they create a very large surface area that greatly improves the plant's ability to absorb water and minerals from the soil.

13. Which among the following represents the process of reductive deamination?

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

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

Solution:

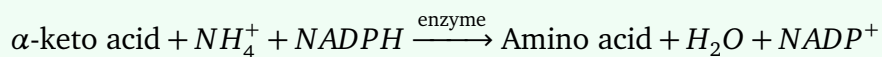
Concept:

In plants, **nitrogen assimilation** involves the incorporation of inorganic nitrogen (mainly ammonia) into organic molecules such as amino acids. One of the key processes involved in this pathway is **reductive amination**.

Reductive amination is the process in which **ammonia (NH_4^+)** combines with a keto acid to form an amino acid in the presence of a reducing agent and a specific enzyme. This reaction plays an essential role in incorporating nitrogen into organic compounds within plant cells.

Step 1: General reaction involved in reductive amination.

The typical reaction can be represented as:



Here:

- α -keto acid acts as the carbon skeleton.
- NH_4^+ provides the amino group.
- $NADPH$ acts as the **reducing agent**.
- The reaction is catalyzed by the enzyme **Glutamate Dehydrogenase**.

Step 2: Example of reductive amination in plants.

A classical example of this reaction occurs when α -ketoglutaric acid reacts with ammonium ions in the presence of NADPH:



In this reaction:

- α -ketoglutaric acid serves as the keto acid.
- The product formed is **glutamic acid**, an important amino acid involved in nitrogen metabolism.

Step 3: Distinguishing from other reactions.

- **Transamination:** Transfer of an amino group from one amino acid to a keto acid.
- **Amide formation:** Addition of another amino group to amino acids such as glutamate or aspartate to form **glutamine** or **asparagine**.

Among the given reactions, the one involving α -ketoglutaric acid, NH_4^+ , and $NADPH$ represents **reductive amination**.

Final Answer:



Quick Tip: Memory Trick:

- **Reductive** $\rightarrow$ Involves a reducing agent ($NADPH$)
- **Amination** $\rightarrow$ Addition of an amino group

Thus, reductive amination means **adding an amino group to a keto acid using reducing power**.

α -ketoglutaric acid acts as a major entry point through which inorganic nitrogen becomes incorporated into amino acids.

14. 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:

Concept:

Many important **antibiotics** used in medicine are produced by soil microorganisms, particularly bacteria belonging to the genus *Streptomyces*. These bacteria are well known for producing a wide range of **secondary metabolites** that act as antibiotics and help inhibit the growth of other microorganisms.

Different species of *Streptomyces* produce different antibiotics, which have been widely used in the treatment of bacterial infections.

Step 1: Understanding the role of *Streptomyces* species.

Members of the genus *Streptomyces* are filamentous bacteria commonly found in soil. They play a major role in antibiotic production because they synthesize bioactive compounds that can suppress or kill pathogenic microbes.

Step 2: Important antibiotics produced by different species.

- *Streptomyces erythreus* → Produces **Erythromycin**, an antibiotic used to treat respiratory and skin infections.
- *Streptomyces venezuelae* → Produces **Chloramphenicol**, also known as Chloromycetin.
- *Streptomyces griseus* → Produces **Streptomycin**, the first antibiotic discovered for treating tuberculosis.
- *Streptomyces aurifaciens* → Produces **Chlortetracycline**, which is commercially known as **Terramycin**.

Step 3: Identifying the organism producing Terramycin.

Among the listed species, *Streptomyces aurifaciens* is the microorganism responsible for producing the antibiotic **chlortetracycline**. This antibiotic is marketed under the trade name **Terramycin** and is widely used as a broad-spectrum antibiotic.

Final Answer: *Streptomyces aurifaciens*

Quick Tip: Important antibiotic–microbe pairs for exams:

- *Streptomyces griseus* → Streptomycin
- *Streptomyces erythreus* → Erythromycin
- *Streptomyces venezuelae* → Chloramphenicol
- *Streptomyces aurifaciens* → Terramycin (Chlortetracycline)

Associating each antibiotic with its producing microorganism helps in quickly solving MCQs related to microbes in human welfare.

15. 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:

Concept:

The **International Union for Conservation of Nature (IUCN)** classifies species into different categories according to their **risk of extinction**. These categories are published in the **IUCN Red List**, which serves as a global inventory of the conservation status of plant and animal species.

The classification helps scientists and conservationists determine the **level of threat faced by species** and prioritize conservation measures.

Step 1: Understanding the category “Extinct”.

A species is considered **Extinct (EX)** when there is **no reasonable doubt that the last individual of that species has died**.

This conclusion is usually made after:

- Extensive surveys in the species’ known habitats
- Searches conducted at appropriate times of day and year
- Long periods without any confirmed sightings

Once these investigations fail to find any surviving individuals, the species is declared **extinct**.

Step 2: Other important IUCN conservation categories.

- **Endangered (EN):** Species facing a **very high risk of extinction** in the near future.
- **Vulnerable (VU):** Species facing a **high risk of extinction** in the medium-term future.
- **Near Threatened (NT):** Species that are **close to qualifying for a threatened category**.

These categories indicate different levels of conservation concern but still imply that the species exists in the wild.

Step 3: Identifying the correct category.

Since the question refers to a species whose **last individual has died**, the correct classification according to the IUCN Red List is:

Extinct (EX)

Final Answer: Extinct

Quick Tip: Important IUCN Red List categories (simplified order):

- Least Concern (LC)
- Near Threatened (NT)
- Vulnerable (VU)
- Endangered (EN)
- Critically Endangered (CR)
- Extinct in the Wild (EW)
- Extinct (EX)

If a species survives only in zoos or captivity and not in its natural habitat, it is classified as **Extinct in the Wild (EW)**.