

CUET 2026 May 18 Shift 1 Biology

Question Paper (Memory-Based) With Solutions

Conducted by National Testing Agency (NTA)



General Instructions

- (i) The examination will be conducted in Computer-Based Test (CBT) mode.
- (ii) Each question carries +5 marks for correct answer and -1 mark for wrong answer.
- (iii) The total number of questions are 50.
- (iv) Duration of the exam is 1 hour (60 minutes).

1. In the recombinant DNA technology involving plasmid pBR322, insertion of foreign DNA at the *PstI* restriction site results in the loss of resistance against:

- (A) Tetracycline
- (B) Ampicillin
- (C) Chloramphenicol
- (D) Kanamycin

Correct Answer: (B)

Solution:

Concept:

pBR322 is one of the most commonly used plasmid vectors in recombinant DNA technology. Important features of pBR322 include:

- Origin of replication (*ori*)
- Ampicillin resistance gene (*amp^R*)
- Tetracycline resistance gene (*tet^R*)
- Multiple restriction sites

The *PstI* restriction site is located within the ampicillin resistance gene.

Step 1: Understanding insertional inactivation.

When foreign DNA is inserted into the *PstI* site:

- the ampicillin resistance gene becomes disrupted
- bacteria lose resistance to ampicillin

This phenomenon is called insertional inactivation.

Step 2: Identifying the correct antibiotic resistance lost.

Since *PstI* lies inside the ampicillin resistance gene:

Ampicillin resistance is lost

Final Answer:

(B) Ampicillin

Quick Tip: Important restriction sites in pBR322:

- *PstI* → ampicillin resistance gene
- *BamHI* and *Sall* → tetracycline resistance gene

Insertion inside a resistance gene causes insertional inactivation.

2. Which scientist experimentally demonstrated that DNA replication is semiconservative in nature using ^{15}N and ^{14}N isotopes?

- (A) Watson and Crick
- (B) Meselson and Stahl
- (C) Hershey and Chase
- (D) Griffith

Correct Answer: (B)

Solution:**Concept:**

Semiconservative replication means:

- each daughter DNA molecule contains
 - one parental strand
 - one newly synthesized strand

This was experimentally verified by Meselson and Stahl.

Step 1: Understanding the experiment.

Meselson and Stahl grew *E.coli* in medium containing:



which produced heavy DNA.

The bacteria were then shifted to:



medium.

Step 2: Observation after generations.

After one generation:

- intermediate density DNA was obtained

After second generation:

- one light band
- one intermediate band

These observations supported semiconservative replication.

Final Answer:

(B) Meselson and Stahl

Quick Tip: Meselson and Stahl experiment is called:

The most beautiful experiment in biology

It proved semiconservative DNA replication using nitrogen isotopes.

3. The correct evolutionary sequence in the evolution of modern humans is:

- (A) Homo habilis → Homo erectus → Neanderthal man → Cro-Magnon man
- (B) Homo erectus → Homo habilis → Neanderthal man
- (C) Neanderthal man → Homo habilis → Cro-Magnon man
- (D) Cro-Magnon man → Homo erectus → Homo habilis

Correct Answer: (A)

Solution:

Concept:

Human evolution involved gradual development of:

- larger brain size
- upright posture
- intelligence
- tool-making ability

Different ancestral forms appeared sequentially during evolution.

Step 1: Understanding important stages.

- **Homo habilis:**
first tool maker
- **Homo erectus:**
fully erect posture
- **Neanderthal man:**
larger cranial capacity

- **Cro-Magnon man:**

directly related to modern humans

Step 2: Arranging in chronological order.

Correct evolutionary order:

Homo habilis → Homo erectus → Neanderthal man → Cro-Magnon man

Final Answer:

(A)

Quick Tip: Remember:

Habilis → Erectus → Neanderthal → Cro-Magnon

Brain capacity gradually increased during evolution.

4. Match the following mammals with their correct category and geographical distribution.

Column-I	Column-II
(P) Kangaroo	(1) Monotreme found in Australia
(Q) Platypus	(2) Marsupial found mainly in Australia
(R) Whale	(3) Placental mammal
(S) Echidna	(4) Egg laying mammal

Choose the correct option.

- (A) $P \rightarrow 2, Q \rightarrow 1, R \rightarrow 3, S \rightarrow 4$
- (B) $P \rightarrow 1, Q \rightarrow 2, R \rightarrow 3, S \rightarrow 4$
- (C) $P \rightarrow 2, Q \rightarrow 4, R \rightarrow 1, S \rightarrow 3$
- (D) $P \rightarrow 3, Q \rightarrow 1, R \rightarrow 2, S \rightarrow 4$

Correct Answer: (A)

Solution:**Concept:**

Mammals are divided into three major subclasses:

- Prototheria (monotremes)
- Metatheria (marsupials)
- Eutheria (placental mammals)

Australia possesses a unique diversity of monotremes and marsupials due to long geographical isolation.

Step 1: Identifying Kangaroo.

Kangaroo:

- is a marsupial mammal
- possesses abdominal pouch
- mainly occurs in Australia

Thus:

$$P \rightarrow 2$$

Step 2: Identifying Platypus.

Platypus:

- is a monotreme
- lays eggs
- is native to Australia

Thus:

$$Q \rightarrow 1$$

Step 3: Identifying Whale.

Whale:

- is a placental mammal
- gives birth to fully developed young ones

Thus:

$$R \rightarrow 3$$

Step 4: Identifying Echidna.

Echidna:

- is an egg-laying mammal
- belongs to monotremes

Thus:

$$S \rightarrow 4$$

Final matching:

$$P \rightarrow 2, \quad Q \rightarrow 1, \quad R \rightarrow 3, \quad S \rightarrow 4$$

Hence correct option is (A).

Final Answer:

(A)

Quick Tip: Monotremes are the only egg-laying mammals.

Examples:

- Platypus
- Echidna

Marsupials possess a pouch called marsupium.

5. A bioreactor working for industrial production of antibiotics must maintain maximum microbial growth and product formation. Which combination of components is correctly matched with their functions?

Component	Function
(P) Sparger	(1) Uniform oxygen distribution
(Q) Agitator	(2) Uniform mixing of nutrients
(R) Cooling jacket	(3) Removal of excess metabolic heat
(S) Foam breaker	(4) Prevention of foam accumulation

Choose the correct option.

- (A) $P \rightarrow 1, Q \rightarrow 2, R \rightarrow 3, S \rightarrow 4$
 (B) $P \rightarrow 2, Q \rightarrow 1, R \rightarrow 4, S \rightarrow 3$
 (C) $P \rightarrow 3, Q \rightarrow 2, R \rightarrow 1, S \rightarrow 4$
 (D) $P \rightarrow 1, Q \rightarrow 4, R \rightarrow 2, S \rightarrow 3$

Correct Answer: (A)

Solution:

Concept:

Bioreactors are large vessels used for industrial-scale production of useful biological products. Efficient microbial growth requires:

- oxygen supply
- proper mixing
- heat regulation
- foam control

Step 1: Understanding sparger function.

Sparger introduces sterile air bubbles into the medium.

Its primary function is:

uniform oxygen distribution

Thus:

$$P \rightarrow 1$$

Step 2: Understanding agitator function.

Agitator rotates continuously and ensures:

- proper mixing
- nutrient distribution
- homogeneous conditions

Thus:

$$Q \rightarrow 2$$

Step 3: Understanding cooling jacket function.

Microbial metabolism generates large amounts of heat.

Cooling jacket helps in:

removal of excess heat

Thus:

$$R \rightarrow 3$$

Step 4: Understanding foam breaker function.

Foam formation may:

- reduce efficiency
- contaminate cultures

Foam breaker prevents foam accumulation.

Thus:

$$S \rightarrow 4$$

Final matching:

$$P \rightarrow 1, \quad Q \rightarrow 2, \quad R \rightarrow 3, \quad S \rightarrow 4$$

Hence correct option is (A).

Final Answer:

(A)

Quick Tip: Important bioreactor parts:

- Sparger $\rightarrow$ aeration
- Agitator $\rightarrow$ mixing
- Cooling jacket $\rightarrow$ temperature control
- Foam breaker $\rightarrow$ foam prevention

6. Read the following statements carefully regarding scientists and their contributions in genetics.

- (P) Mendel proposed the law of segregation.
- (Q) Sutton and Boveri proposed chromosomal theory of inheritance.
- (R) T.H. Morgan experimentally proved linkage in *Drosophila*.
- (S) Hershey and Chase proved that proteins are genetic material.

Choose the correct option.

- (A) P, Q and R are correct but S is incorrect
- (B) P and R are correct but Q and S are incorrect
- (C) Only P and Q are correct
- (D) All statements are correct

Correct Answer: (A)

Solution:**Concept:**

The development of genetics involved contributions from several important scientists. Understanding the discoveries associated with each scientist is extremely important in modern biology.

Step 1: Analyzing statement P.

Mendel proposed:

- law of segregation
- law of independent assortment

Hence statement P is correct.

Step 2: Analyzing statement Q.

Sutton and Boveri proposed:

Chromosomal theory of inheritance

Thus statement Q is correct.

Step 3: Analyzing statement R.

Morgan worked on:

Drosophila melanogaster

and experimentally demonstrated linkage and recombination.

Thus statement R is correct.

Step 4: Analyzing statement S.

Hershey and Chase demonstrated that:

DNA is the genetic material

not proteins.

Hence statement S is incorrect.

Final conclusion.

Statements P, Q and R are correct while S is incorrect.

Hence option (A) is correct.

Final Answer:

(A)

Quick Tip: Important discoveries:

- Mendel → laws of inheritance
- Sutton and Boveri → chromosomal theory
- Morgan → linkage
- Hershey and Chase → DNA as genetic material

7. Which hormone is secreted by the corpus luteum during pregnancy?

- (A) Estrogen only
- (B) Progesterone only
- (C) Progesterone and relaxin
- (D) Testosterone

Correct Answer: (C)

Solution:

Concept:

Corpus luteum develops from ruptured Graafian follicle after ovulation.

It functions as an endocrine structure.

Step 1: Hormones secreted by corpus luteum.

Corpus luteum secretes:

- progesterone
- relaxin

These hormones help maintain pregnancy.

Step 2: Role of progesterone.

Progesterone:

- maintains endometrium
- supports implantation
- prevents menstruation

Final Answer:

(C) Progesterone and relaxin

Quick Tip: Important reproductive hormones:

- Estrogen → follicle development
- Progesterone → maintenance of pregnancy
- Relaxin → relaxation of pelvic ligaments

8. Read the following statements regarding Bt cotton and choose the correct option.

- (P) Bt toxin is produced by *Bacillus thuringiensis*.
- (Q) The inactive protoxin gets activated in the acidic gut of insects.
- (R) Cry proteins create pores in the epithelial cells of insect midgut.
- (S) Different cry genes control different groups of insects.
- (A) P, R and S are correct but Q is incorrect
- (B) P and Q are correct but R and S are incorrect
- (C) Only P and R are correct
- (D) All statements are correct

Correct Answer: (A)

Solution:**Concept:**

Bt cotton is a genetically modified crop developed using genes obtained from the bacterium:

Bacillus thuringiensis

This bacterium produces insecticidal proteins called Cry proteins.

Step 1: Analyzing statement P.

Bt toxin is naturally synthesized by:

Bacillus thuringiensis

Therefore statement P is correct.

Step 2: Analyzing statement Q.

The toxin produced by the bacterium exists in inactive protoxin form.

Activation occurs in:

- alkaline medium of insect gut

and not in acidic medium.

Hence statement Q is incorrect.

Step 3: Analyzing statement R.

Activated toxin binds to epithelial cells of insect midgut and creates pores.

This results in:

- cell swelling
- lysis
- death of insect larvae

Therefore statement R is correct.

Step 4: Analyzing statement S.

Different cry genes target different insects.

Examples:

- *cryIAb* → corn borer
- *cryIAc* → cotton bollworm

Hence statement S is correct.

Final conclusion.

Statements P, R and S are correct while Q is incorrect.

Hence option (A) is correct.

Final Answer:

(A)

Quick Tip: Bt toxin becomes active only in the alkaline gut of insects. The activated toxin forms pores in gut epithelium leading to insect death.

9. Match the following mammals in List-I with their correct characteristics in List-II.

List-I	List-II
(P) Platypus	(1) Marsupial mammal
(Q) Kangaroo	(2) Placental mammal
(R) Blue whale	(3) Egg laying mammal
(S) Koala	(4) Pouch bearing mammal

Choose the correct option.

- (A) $P \rightarrow 3, Q \rightarrow 4, R \rightarrow 2, S \rightarrow 1$
- (B) $P \rightarrow 1, Q \rightarrow 3, R \rightarrow 2, S \rightarrow 4$
- (C) $P \rightarrow 3, Q \rightarrow 1, R \rightarrow 4, S \rightarrow 2$
- (D) $P \rightarrow 2, Q \rightarrow 1, R \rightarrow 3, S \rightarrow 4$

Correct Answer: (A)

Solution:**Concept:**

Mammals are broadly classified into:

- monotremes
- marsupials
- placental mammals

These groups differ in reproductive strategy and embryonic development.

Step 1: Identifying Platypus.

Platypus:

- belongs to monotremes
- lays eggs

Hence:

$$P \rightarrow 3$$

Step 2: Identifying Kangaroo.

Kangaroo:

- possesses a marsupium (pouch)
- gives birth to immature young ones

Hence:

$$Q \rightarrow 4$$

Step 3: Identifying Blue whale.

Blue whale:

- is a eutherian mammal

- possesses placenta

Hence:

$$R \rightarrow 2$$

Step 4: Identifying Koala.

Koala is a marsupial mammal.

Hence:

$$S \rightarrow 1$$

Final matching.

$$P \rightarrow 3, \quad Q \rightarrow 4, \quad R \rightarrow 2, \quad S \rightarrow 1$$

Hence option (A) is correct.

Final Answer:

(A)

Quick Tip: Classification of mammals:

- Monotremes → egg laying mammals
- Marsupials → pouch bearing mammals
- Eutherians → placental mammals

10. During transcription in eukaryotes, the enzyme responsible for synthesis of mRNA is:

- (A) DNA polymerase
- (B) RNA polymerase I
- (C) RNA polymerase II
- (D) RNA polymerase III

Correct Answer: (C)

Solution:

Concept:

Eukaryotes possess three major RNA polymerases:

- RNA polymerase I
- RNA polymerase II
- RNA polymerase III

Each synthesizes different types of RNA.

Step 1: Functions of RNA polymerases.

- RNA polymerase I → rRNA
- RNA polymerase II → mRNA
- RNA polymerase III → tRNA

Step 2: Identifying enzyme for mRNA synthesis.

Messenger RNA is synthesized by:

RNA polymerase II

Final Answer:

(C) RNA polymerase II

Quick Tip: Remember:

- Pol-I → rRNA
- Pol-II → mRNA
- Pol-III → tRNA