

# CBSE Class 12 Biology(Set 57/5/1) Question Paper

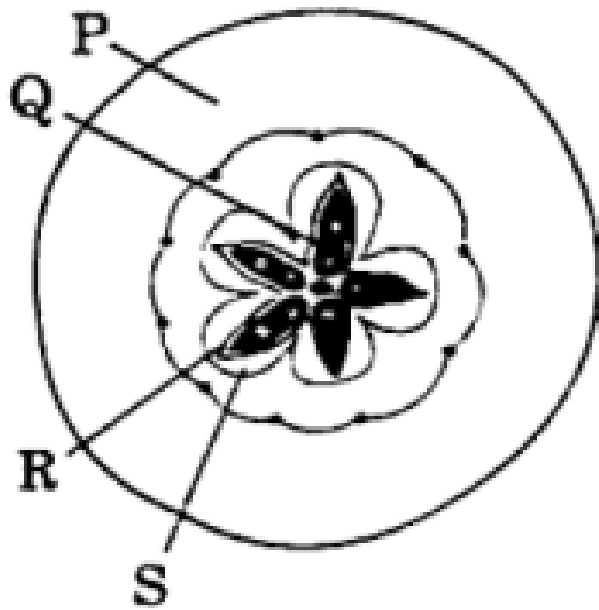
Time Allowed :3 Hour	Maximum Marks :70	Total Questions :33
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## General Instructions

Read the following instructions very carefully and strictly follow them:

- This question paper contains **33 questions**. All questions are compulsory.
- Question paper is divided into **five sections** – Sections A, B, C, D and E.
- **Section A** – questions number 1 to 16 are Multiple Choice Type questions. Each question carries 1 mark.
- **Section B** – questions number 17 to 21 are Very Short Answer Type questions. Each question carries 2 marks.
- **Section C** – questions number 22 to 28 are Short Answer Type questions. Each question carries 3 marks.
- **Section D** – questions number 29 and 30 are Case-Based questions. Each question carries 4 marks. Each question has sub parts with internal choice in one of the sub parts.
- **Section E** – questions number 31 to 33 are Long Answer Type questions. Each question carries 5 marks.
- There is no overall choice. However, an internal choice has been provided in Sections B, D and E of the question paper. A candidate has to write answer for only **one** of the alternatives in such questions.
- Kindly note that there is a separate question paper for Visually Impaired Candidates.
- Wherever necessary, neat and properly labelled diagrams should be drawn.

1. Identify the parts P, Q, R, S in the figure given below and select the option in the correct order.



- (A) P – Seed    Q – Thalamus    R – Mesocarp    S – Endocarp  
 (B) P – Thalamus    Q – Seed    R – Endocarp    S – Mesocarp  
 (C) P – Seed    Q – Thalamus    R – Endocarp    S – Mesocarp  
 (D) P – Thalamus    Q – Seed    R – Mesocarp    S – Endocarp

2. The foetal ejection reflex in humans triggers the release of \_\_\_\_\_ hormone from \_\_\_\_\_. Fill in the blanks by choosing the correct option.

- (A) oxytocin, foetal pituitary  
 (B) oxytocin, maternal pituitary  
 (C) human chorionic gonadotropin, placenta  
 (D) progesterone, corpus luteum

3. A DNA molecule is 160 base pairs long. It has 30% Guanine. How many Adenine bases are present in this DNA molecule?

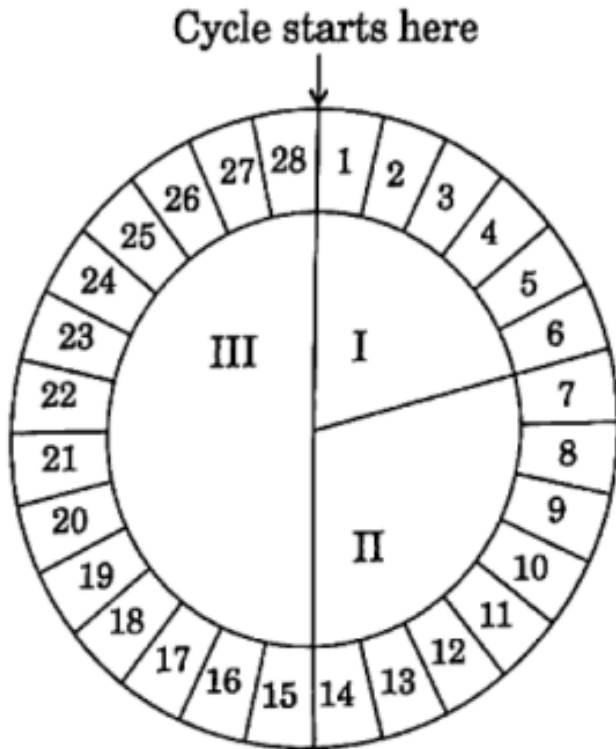
- (A) 48  
 (B) 64  
 (C) 96  
 (D) 192

4. In *Pisum sativum*, the flower colour may be violet (V) or white (v). What proportion of the offspring in a cross of  $VV \times vv$  would be expected to be violet?

- (A) 25%  
 (B) 50%

- (C) 75%  
 (D) 100%

5. In a human female, the menstrual cycle of 28 days is represented by the diagram given below. Select the correct statement related to this diagram.



- (A) Primary follicle of ovary matures into Graafian follicle in phase II.  
 (B) The hormone secreted in large amounts in phase III is also responsible for maintaining pregnancy in human females.  
 (C) Corpus luteum secretes progesterone in phase I, however it degenerates completely in phase III.  
 (D) Both (A) and (B).

6. Arrange the following in the correct sequence of their evolution and select the correct option:

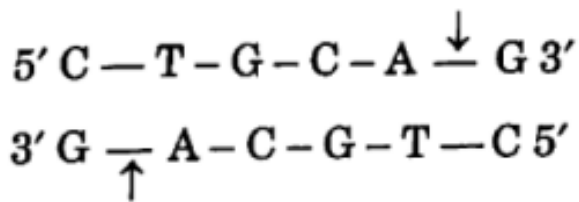
- (i) Seaweed      (ii) Invertebrates      (iii) Jawless fish

- (A) (i), (ii), (iii)  
 (B) (i), (iii), (ii)  
 (C) (ii), (iii), (i)  
 (D) (ii), (i), (iii)

7. *Monascus purpureus* is a yeast used commercially in the production of which one of the following?

- (A) Ethanol
  - (B) Streptokinase
  - (C) Citric acid
  - (D) Statins
- 

8. Given below is the restriction site of a restriction endonuclease Pst I and the cleavage sites on a DNA molecule. Choose the option that gives the correct resultant fragments.



- (A)
 
$$\begin{array}{l}
 5' \text{ C - T - G } \quad \text{C - A - G } 3' \\
 3' \text{ G - A - C - G - T } \quad \text{C } 5'
 \end{array}$$
  - (B)
 
$$\begin{array}{l}
 5' \text{ C - T } \quad \text{G - C - A - G } 3' \\
 3' \text{ G - A - C - G } \quad \text{T - C } 5'
 \end{array}$$
  - (C)
 
$$\begin{array}{l}
 5' \text{ C - T - G - C } \quad \text{A - G } 3' \\
 3' \text{ G - A - C - G } \quad \text{T - C } 5'
 \end{array}$$
  - (D)
 
$$\begin{array}{l}
 5' \text{ C - T - G - C - A } \quad \text{G } 3' \\
 3' \text{ G } \quad \text{A - C - G - T - C } 5'
 \end{array}$$
- 

9. Choose a correct option that shows an interaction in which one species benefits while the other is neither harmed nor benefitted.

- (A) Mycorrhizal associations between fungi and roots of higher plants
  - (B) Sea anemone and clownfish
  - (C) Abingdon tortoises and goats in the Galapagos Island
  - (D) *Cuscuta* on hedge plants
- 

10. Transgenic animals have their genetic material manipulated. Select the correct option in reference to transgenic animals.

- (A) Foreign DNA and RNA are present in their cells.
  - (B) Foreign RNA is present in all of their cells.
  - (C) Foreign DNA is present in all of its cells.
  - (D) Foreign RNA is present in some of its cells.
- 

**11. Select the odd option in the context of convergent evolution.**

- (A) Eyes of Octopus and Mammals
  - (B) Flippers of Penguins and Dolphins
  - (C) Flying Squirrel and Flying Phalanger
  - (D) Thorns of Bougainvillea and Tendrils of Cucurbita
- 

**12. Which of the following fish led to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in Lake Victoria of East Africa?**

- (A) Catla catla
  - (B) Dogfish
  - (C) Nile Perch
  - (D) African Catfish
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**13. Assertion (A):** The embryo with 8 to 16 blastomeres is called a morula.

**Reason (R):** The morula continues to divide and transform into trophoblast.

**Choose the correct option:**

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
  - (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
  - (C) Assertion (A) is true, but Reason (R) is false.
  - (D) Assertion (A) is false, but Reason (R) is true.
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**14. Assertion (A):** Repetitive sequences make up a very large portion of the human genome.

**Reason (R):** Repetitive sequences do not have direct coding functions in the genome.

**Choose the correct option:**

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

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**15. Assertion (A):** *Trichoderma* species are free living fungi that are very common in the root ecosystems.

**Reason (R):** They are effective bio-control agents of several plant pathogens.

**Choose the correct option:**

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

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**16. Assertion (A):** The use of chitinase enzyme is necessary for the separation of DNA from yeast cells but not in the case of *Spirogyra*.

**Reason (R):** Fungal cell wall is made up of fungal chitin.

**Choose the correct option:**

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

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**17 (a). Mention the functions of each of the following:**

- (i) Tassels of Corn Cob
  - (ii) Scutellum
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**17 (b). Farmers prefer apomictic seeds over hybrid seeds. Give any two reasons.**

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**18. Define the term 'amniocentesis'. Why has the government imposed a statutory ban in spite of its importance in the medical field?**

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**19. Name the lymphoid organ that acts as a large reservoir of erythrocytes. Explain its role as a lymphoid organ.**

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20 (a). Suggest how a virus-free healthy plant can be obtained from a diseased sugarcane plant.

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20 (b). In order to force bacteria to take up the recombinant DNA, they must be made competent. Explain how it can be achieved.

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21 (a). Differentiate between grazing food chain and detritus food chain.

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21 (b). Ecological pyramids are widely accepted but they still have some limitations. Write any two limitations.

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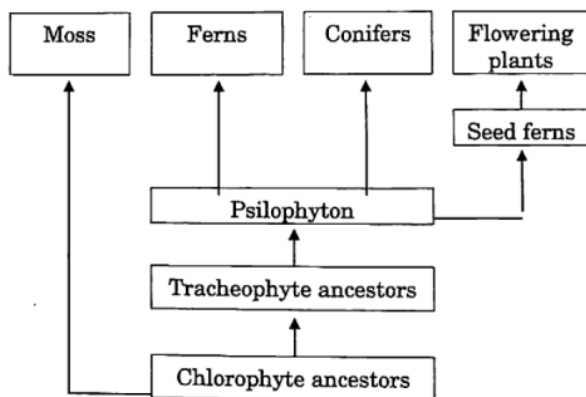
22. List any three outbreeding devices that flowering plants have developed for cross-pollination and explain how they help to encourage cross-pollination.

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23. Draw a labelled diagram of a 'replicating fork' showing the polarity. Why does DNA replication occur within such fork?

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24. Study the given chart showing evolution of plants and answer the following questions.



25. Mention a product of human welfare obtained with the help of each one of the following:

- (a) *Saccharomyces cerevisiae*
- (b) *Propionibacterium shermanii*
- (c) *Aspergillus niger*

- (d) *Trichoderma polysporum*
  - (e) *Acetobacter aceti*
  - (f) *Streptococcus*
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26. Transgenic animals are produced by man. Explain any three ways in which such animals can be beneficial to humans.

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27. Explain Gause's 'Competitive Exclusion Principle' with the help of a suitable example.

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28. Explain the level of biodiversity at genetic, species and ecological levels with the help of one example each.

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29. Read the following passage and answer the questions that follow:

*The process of copying genetic information from template strand of DNA into RNA is called transcription. It is mediated by RNA polymerase. Transcription takes place in the nucleus of eukaryotic cells. In transcription, only a segment of DNA and only one of the strands is copied into RNA.*

(a) Why is the strand of DNA with 3' → 5' polarity transcribed and not the other strand of 5' → 3' polarity?

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(b) (i) Why is hnRNA required to undergo splicing?

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(b) (ii) Mention the two additional processes which hnRNA needs to undergo after splicing to become functional.

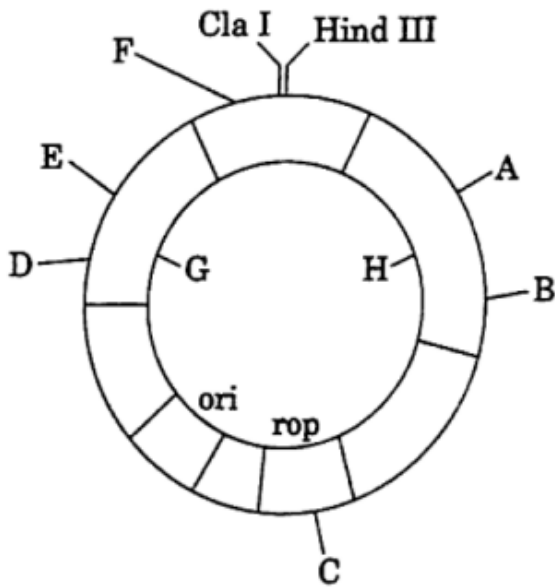
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(c) Why is only one strand of the DNA transcribed? Give two reasons.

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30. Read the following passage and answer the questions that follow:

*We know that plasmids and bacteriophages are the most commonly used vectors in biotechnology experiments. If we can link an alien piece of DNA to the plasmid DNA, the alien DNA can be multiplied equal to the copy number of the plasmid. Engineered vectors are used these days. Study the diagram of the *E. coli* cloning vector pBR322 and answer the questions that follow.*



(a) Why are plasmids and bacteriophages used as cloning vectors?

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(b) (i) Identify:

(I) The gene in the cloning vector that controls the copy number of the vector.

(II) The restriction site – C in the ‘rop’ gene.

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OR (b) (ii) Identify and name two selectable markers shown in the diagram.

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(c) Name the two restriction sites each in the two genes you have identified as selectable markers.

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31 (a). Briefly explain the events of fertilisation and implantation in an adult human female.

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OR

31 (b) (i). Arrange the following hormones in sequence of their secretion in a pregnant woman:

hCG, LH, FSH, Relaxin

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31 (b) (ii). Mention the source and the functions of the above mentioned hormones.

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32 (a). Work out separate monohybrid crosses up to  $F_2$  generation between two pea plants and two *Antirrhinum* plants, both having contrasting traits with respect to the colour of the flower. Comment on the patterns of inheritance in the crosses carried out in such two cases.

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OR

32 (b) (i). How does a chromosomal disorder differ from a Mendelian disorder? Write one example for each.

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32 (b) (ii). Name the phenomenon that leads to situations like 'XO' abnormality in humans. Also name this genetic disorder. How are individuals with an XO chromosomal abnormality affected? Write its symptoms as well as karyotype.

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33 (a) (i). Draw the structure of an antibody molecule and label any four of its parts.

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33 (a) (ii). Differentiate between active and passive immunity. Write any three differences.

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OR

33 (b) (i) (I). Write the scientific names of the two species of filarial worms causing filariasis.

Solution:

<i>Wuchereria bancrofti</i> and <i>Wuchereria malayi</i>
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33 (b) (i) (II). How do they affect the body of infected persons?

Solution:

The filarial worms live in the **lymphatic vessels** of humans. They cause:

- Blockage of lymphatic vessels
- Accumulation of lymph fluid
- Severe swelling of body parts such as legs and scrotum

This condition is commonly known as:

Elephantiasis

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**33 (b) (i) (III). How does the disease spread?**

**Solution:**

Filariasis spreads through the bite of infected **female Culex mosquitoes**. The mosquito acts as a vector transmitting the infective larvae to humans.

Transmission occurs through mosquito bites

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**33 (b) (ii). Mention the source and the role of the following in providing defence against infection in the human body:**

- (I) Histamine
- (II) Interferons

**Solution:**

**(I) Histamine**

- **Source:** Mast cells and basophils
- **Role:** Causes inflammation and increases blood flow to infected tissues.

**(II) Interferons**

- **Source:** Virus-infected cells
- **Role:** Protect neighbouring cells by inhibiting viral replication.

Both histamine and interferons help the body defend against infections

#### Quick Tip

Histamine is involved in inflammatory responses, whereas interferons provide defence against viral infections.

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