jeeinfo
Your JEE Guide

CBSE Class XII · Biology (044)

Sample Question Paper 7 · Session 2026-27

Time allowed: 3 hours **Maximum marks: 70**

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission.
This is an original practice paper written to the official CBSE 2026-27 design; it is not issued by CBSE.

General instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions.
3. Section A has 16 questions of 1 mark each; Section B has 5 questions of 2 marks each; Section C has 7 questions of 3 marks each; Section D has 2 case-based questions of 4 marks each; and Section E has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labelled diagrams should be drawn.

Section A

1.	The Yucca plant and the moth that lays its eggs in its ovary: (A) compete for the same food (B) are both harmed by the association (C) cannot complete their life cycles without each other (D) are unrelated to each other	1
2.	A typical angiosperm anther has: (A) one microsporangium (B) four microsporangia (C) two microsporangia (D) eight microsporangia	1
3.	The endosperm is completely consumed by the developing embryo in the seeds of: (A) castor (B) wheat (C) maize (D) pea	1
4.	The Sertoli cells are stimulated by: (A) FSH (B) oxytocin (C) LH (D) prolactin	1
5.	Tubectomy is a surgical method of contraception in which a small part of the following is removed or tied up: (A) ovary (B) vas deferens (C) uterus (D) fallopian tube	1

6.	The genotypic ratio in the F_2 generation of a monohybrid cross is: (A) 1 : 2 : 1 (B) 9 : 3 : 3 : 1 (C) 3 : 1 (D) 1 : 1	1
7.	Which of the following is NOT a feature of the genetic code? (A) it is a triplet code (B) it is ambiguous (C) it is degenerate (D) it is nearly universal	1
8.	The enzyme that makes DNA using RNA as a template is: (A) restriction endonuclease (B) RNA polymerase (C) reverse transcriptase (D) DNA ligase	1
9.	In the lac operon, the regulator gene (i) codes for the: (A) transacetylase (B) β-galactosidase (C) permease (D) repressor protein	1
10.	Which of the following is an example of homologous organs? (A) flippers of penguins and of dolphins (B) the hearts of different vertebrates (C) eyes of an octopus and of a mammal (D) wings of a butterfly and of a bird	1
11.	Antibodies are produced by: (A) red blood cells (B) platelets (C) B-lymphocytes (D) T-lymphocytes	1
12.	An interaction in which one species is harmed and the other is unaffected is called: (A) amensalism (B) parasitism (C) mutualism (D) commensalism	1
13.	**Assertion (A):** Seeds are the basis of agriculture. **Reason (R):** Seed dormancy allows seeds to be stored, to be used as food through the year and to raise crops in the next season. (A) Both A and R are true, and R is the correct explanation of A. (B) Both A and R are true, and R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
14.	**Assertion (A):** In sickle-cell anaemia, red blood cells become sickle-shaped under low oxygen tension. **Reason (R):** Sickle-cell anaemia is controlled by a pair of X-linked alleles. (A) Both A and R are true, and R is the correct explanation of A. (B) Both A and R are true, and R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

15.	**Assertion (A):** The lac operon is regulated only positively. **Reason (R):** In the lac operon, the repressor protein binds to the operator and switches off transcription. (A) Both A and R are true, and R is the correct explanation of A. (B) Both A and R are true, and R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
16.	**Assertion (A):** Biogas is produced under anaerobic conditions. **Reason (R):** Methanogens are found in the rumen of cattle. (A) Both A and R are true, and R is the correct explanation of A. (B) Both A and R are true, and R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1

Section B

17.	Explain why the endosperm of coconut is said to be both free-nuclear and cellular. **OR** How is pollination carried out in sea grasses such as Zostera? How are the pollen grains of water-pollinated species protected?	2
18.	By the end of which month of pregnancy (a) is the heart of the embryo formed, and (b) are the first movements of the foetus usually observed?	2
19.	Name the three steps of each cycle of PCR and state what happens in each. **OR** Why is ethidium bromide used in gel electrophoresis? How is the separated DNA recovered?	2
20.	Name the first transgenic cow. What was special about its milk?	2
21.	Explain species diversity and ecological diversity, with one example each. **OR** What are biodiversity hotspots? Name the three hotspots that cover parts of India.	2

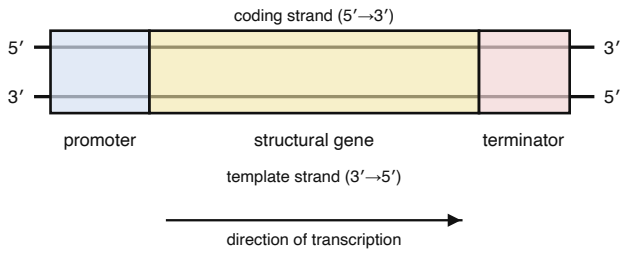
Section C

22.	(a) What are the exine and intine of a pollen grain made of? (b) What are germ pores? (c) How are pollen grains used as food supplements?	3
23.	Describe how the pituitary and ovarian hormones change during the menstrual cycle.	3
24.	Name three hormonal methods of contraception available to women and explain how emergency contraception works.	3

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

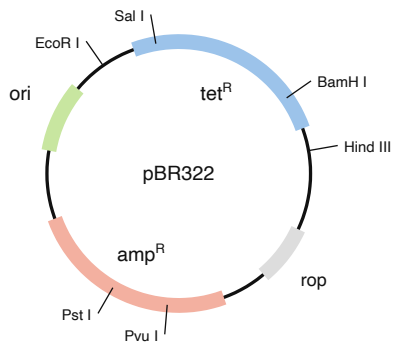
25.	A man with blood group A and a woman with blood group B have a child with blood group O. Work out the genotypes of the parents, and the blood groups possible in their other children.	3
26.	What are split genes? Explain the process of splicing. What does the presence of split genes suggest?	3
27.	What is autoimmunity? Give an example. Name the primary and secondary lymphoid organs.	3
28.	Explain the role of microbes in making (a) curd, (b) dosa or idli batter and (c) toddy.	3

Section D

29.	**Case study.** The figure shows a transcription unit. One strand of the DNA is used as the template for making RNA.  (i) Where is the promoter located with respect to the structural gene? *[1]* (ii) Which strand acts as the template? *[1]* (iii) If the coding strand of a stretch of this gene reads 5′-ATGCATTAC-3′, write the sequence of the RNA transcribed from it. Why is the other strand called the coding strand? *[2]* **OR** (iii) Name the three main types of RNA in bacteria and state the role of each. *[2]*	4
30.	**Case study.** The prickly pear cactus, introduced into Australia in the early 1920s, spread rapidly over millions of hectares of rangeland. It was finally brought under control only after a cactus-feeding predator (a moth) from its natural habitat was introduced into the country. (i) Name the interaction between the moth and the cactus. *[1]* (ii) Why did the prickly pear spread so rapidly in Australia? *[1]* (iii) Explain the principle behind such biological control methods. *[2]* **OR** (iii) Give an example of competition between unrelated species, and one showing that an introduced species can eliminate a native one. *[2]*	4

Section E

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

31.	(a) Draw a labelled diagram of a human sperm. (b) How many sperms does a man release in one ejaculation, and what proportion must be normal and motile for normal fertility? (c) What is the role of the acrosome and of the middle piece? **OR** (a) What is a true fruit and a false fruit? Give an example of each. (b) What are parthenocarpic fruits? How can they be induced? (c) Give two examples of the great longevity of seeds.	5
32.	(a) Show, with a cross, the inheritance of haemophilia when a carrier woman marries a normal man. (b) Why is haemophilia called a "bleeder's disease"? (c) Distinguish between Mendelian and chromosomal disorders, with one example each. **OR** (a) Explain how the lac operon is switched off and on. Draw diagrams to show both states. (b) Why is the lac operon called an inducible operon?	5
33.	(a) Why is it important to protect biodiversity hotspots? (b) Describe three methods of ex situ conservation. (c) Name the international meetings at which nations agreed to conserve biodiversity. **OR** (a) The figure shows the vector pBR322. What is the role of ori and of the selectable markers?  (b) What would happen to a recombinant if foreign DNA were inserted at the Pst I site? (c) Which vectors are used to deliver genes into plant cells and animal cells?	5

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

Answers and Marking Scheme

Marks for each step are shown in brackets. Any correct alternative method gets full credit.

Section A

1. **(C)** cannot complete their life cycles without each other. *Working:* The moth pollinates the flower and its larvae feed on some of the developing seeds.

2. **(B)** four microsporangia. *Working:* It is bilobed and dithecous, with a microsporangium at each corner.

3. **(D)** pea. *Working:* Pea seeds are non-albuminous.

4. **(A)** FSH. *Working:* FSH acts on the Sertoli cells; LH acts on the Leydig cells.

5. **(D)** fallopian tube. *Working:* It prevents the ovum from reaching the site of fertilisation.

6. **(A)** 1 : 2 : 1. *Working:* TT : Tt : tt.

7. **(B)** it is ambiguous. *Working:* The code is unambiguous: one codon codes for only one amino acid.

8. **(C)** reverse transcriptase. *Working:* It is used by retroviruses such as HIV.

9. **(D)** repressor protein. *Working:* z, y and a code for the three enzymes.

10. **(B)** the hearts of different vertebrates. *Working:* The others are analogous organs.

11. **(C)** B-lymphocytes. *Working:* T-lymphocytes help B cells produce them.

12. **(A)** amensalism. *Working:* In commensalism one benefits and the other is unaffected.

13. **(A)** Both A and R are true, and R is the correct explanation of A. *Working:* R explains why seeds are so important in agriculture.

14. **(C)** A is true but R is false. *Working:* A is true. R is false: it is an autosomal recessive disorder controlled by the alleles Hb^A and Hb^s.

15. **(D)** A is false but R is true. *Working:* A is false: regulation by the repressor is negative regulation. R is true.

16. **(B)** Both A and R are true, and R is not the correct explanation of A. *Working:* Both are true, but biogas is produced anaerobically because the methanogens are anaerobic bacteria; where they are found does not explain it.

Section B

17. The coconut water of a tender coconut is free-nuclear endosperm, made up of thousands of nuclei (1). The surrounding white kernel is the cellular endosperm (1).

OR The female flowers remain submerged; the pollen grains are released inside the water, are long and ribbon-like, and are carried passively until some reach the stigma (1). In most water-pollinated species, the pollen grains are protected from wetting by a mucilaginous covering (1).

18. (a) The first month (1). (b) The fifth month (1).

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

19. Denaturation: the double-stranded DNA is separated by high temperature (½). Annealing: two sets of primers bind to the complementary sequences on the single strands (½). Extension: Taq polymerase extends the primers using the nucleotides provided, copying the DNA region between them (1).

OR It stains DNA so that the bands are seen as bright orange under UV light (1). The bands are cut out from the gel and the DNA is extracted from the gel piece (elution) (1).

20. Rosie, produced in 1997 (1). Its milk contained the human protein alpha-lactalbumin (2.4 g per litre) and was nutritionally more balanced for human babies than natural cow's milk (1).

21. Species diversity: diversity at the species level, e.g. the Western Ghats have greater amphibian species diversity than the Eastern Ghats (1). Ecological diversity: diversity at the ecosystem level, e.g. India, with deserts, rain forests, mangroves, coral reefs, wetlands, estuaries and alpine meadows, has greater ecosystem diversity than a Scandinavian country such as Norway (1).

OR Regions with very high species richness and a high degree of endemism (1). Western Ghats and Sri Lanka, Indo-Burma, and the Himalaya (1).

Section C

22. (a) Exine: sporopollenin, one of the most resistant organic materials known; intine: cellulose and pectin (1). (b) Apertures in the exine where sporopollenin is absent, through which the pollen tube emerges (1). (c) Pollen grains are rich in nutrients and are taken as food supplements in the form of tablets and syrups; they are claimed to increase the performance of athletes and race horses (1).

23. In the follicular phase, the secretion of LH and FSH increases gradually and stimulates follicular development and the secretion of oestrogen by the growing follicles (1). Both LH and FSH peak in the middle of the cycle (about day 14); the rapid secretion of LH (LH surge) induces ovulation (1). In the luteal phase the corpus luteum secretes large amounts of progesterone, which maintains the endometrium; in the absence of fertilisation the corpus luteum degenerates, progesterone falls, and menstruation follows (1).

24. Oral pills, injections, and implants under the skin, containing progestogens alone or with oestrogens (1½). Emergency contraception: administration of progestogens or progestogen–oestrogen combinations, or insertion of an IUD, within 72 hours of coitus (1); it is effective in avoiding possible pregnancy after rape or casual unprotected intercourse (½).

25. The O child is ii, so each parent must carry i: father I^Ai, mother I^Bi (1). Cross $I^Ai \times I^Bi$ gives I^AI^B, I^Ai, I^Bi and ii in equal proportion (1). Possible groups: AB, A, B and O, each with probability ¼ (1).

26. In eukaryotes, the coding sequences (exons) of a gene are interrupted by non-coding intervening sequences (introns) (1). The primary transcript (hnRNA) contains both; in splicing the introns are removed and the exons joined in a defined order (1). Split-gene arrangements probably represent an ancient feature of the genome, and splicing is a reminder of the dominance of RNA in the early "RNA world" (1).

27. Autoimmunity: due to genetic and other unknown reasons, the body attacks its own (self) cells, e.g. rheumatoid arthritis (1). Primary lymphoid organs: bone marrow and thymus, where

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

lymphocytes are produced and mature (1). Secondary lymphoid organs: spleen, lymph nodes, tonsils, Peyer's patches of the small intestine and appendix (1).

28. (a) Lactic acid bacteria (LAB) such as Lactobacillus convert milk to curd by producing acids that coagulate and partially digest milk proteins; they also increase vitamin B_{12} and check disease-causing microbes in the stomach (1). (b) The dough is fermented by bacteria; the puffed-up appearance is due to the CO_2 they produce (1). (c) Toddy, a traditional drink of parts of southern India, is made by fermenting sap from palms (1).

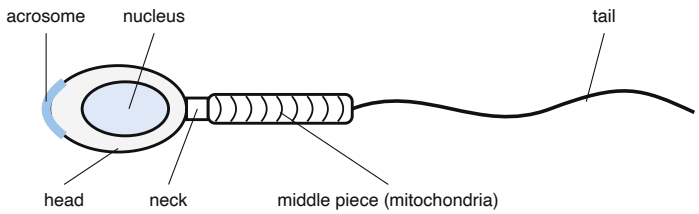
Section D

29. (i) Towards the 5′ end (upstream) of the structural gene, with reference to the coding strand.
(ii) The strand with polarity 3′→5′.
(iii) 5′-AUGCAUUAC-3′ (the same as the coding strand, with U in place of T). The coding strand does not code for anything; it is called so because its sequence is the same as that of the RNA (except T for U). **OR** mRNA provides the template (the code); tRNA brings amino acids and reads the genetic code; rRNA plays a structural and catalytic role during translation.

30. (i) Predation (herbivory).
(ii) In the new area it had no natural predator, so it multiplied unchecked (invasive species).
(iii) A predator or parasite from the pest's natural habitat is introduced to keep the pest population under control. This mimics the role of predators in nature, where they regulate prey numbers; the agent must be specific so that it does not harm non-target species. **OR** Flamingoes and resident fishes compete for zooplankton in some shallow South American lakes. The Abingdon tortoise of the Galapagos Islands became extinct within a decade after goats were introduced, because of the greater browsing efficiency of the goats.

Section E

31. (a) Diagram (2), as shown below. (b) About 200 to 300 million sperms (½); at least 60% must have normal shape and size and at least 40% must show vigorous motility (1). (c) The acrosome is filled with enzymes that help in fertilisation of the ovum (½); the mitochondria in the middle piece provide energy for movement (1).



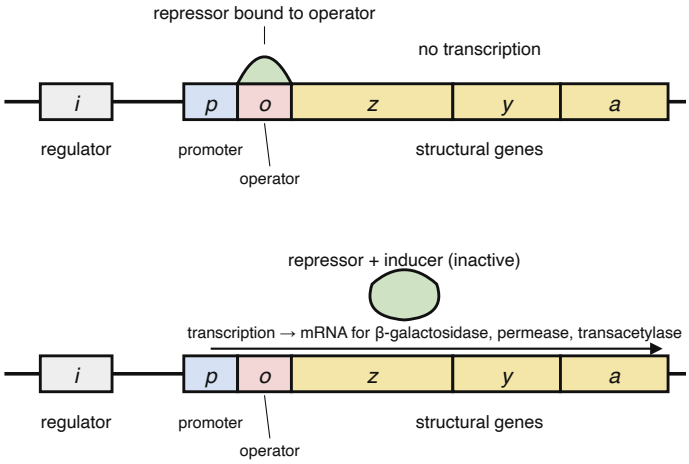
OR (a) A true fruit develops only from the ovary, e.g. mango; in a false fruit the thalamus also contributes, e.g. apple, strawberry, cashew (2). (b) Fruits developed without fertilisation, e.g. banana; parthenocarpy can be induced through the application of growth hormones, and such fruits are seedless (1½). (c) Lupinus arcticus seeds from the Arctic tundra germinated after an estimated 10 000 years of dormancy; a 2000-year-old viable seed of the date palm (Phoenix dactylifera) was found at King Herod's palace near the Dead Sea (1½).

32. (a) $X^HX^h \times X^HY$ gives X^HX^H (normal daughter), X^HX^h (carrier daughter), X^HY (normal son), X^hY (haemophilic son) (2). Half the sons are expected to be haemophilic and half the daughters

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.

carriers (½). (b) A single protein of the cascade of proteins involved in blood clotting is affected, so a simple cut can cause non-stop bleeding (1). (c) Mendelian disorders are caused by alteration or mutation in a single gene, e.g. haemophilia, colour blindness, sickle-cell anaemia, phenylketonuria, thalassemia; chromosomal disorders are caused by the absence, excess or abnormal arrangement of one or more chromosomes, e.g. Down's, Turner's or Klinefelter's syndrome (1½).

OR (a) In the absence of the inducer, the repressor protein, made by the i gene, binds to the operator and prevents RNA polymerase from transcribing the operon (1). When lactose is present, it acts as the inducer: it binds the repressor and inactivates it, so the repressor cannot bind the operator; RNA polymerase now transcribes the z, y and a genes, which code for β-galactosidase, permease and transacetylase (1). Diagrams (2):



(b) It is switched on only in the presence of its inducer, the substrate lactose (1).

33. (a) Although all the hotspots together cover less than 2 per cent of the Earth's land area, they harbour an extremely large number of species, many of them endemic (1); strict protection of the hotspots could reduce the ongoing mass extinctions by almost 30 per cent (1). (b) Zoological parks, botanical gardens and wildlife safari parks (1); cryopreservation of gametes, in vitro fertilisation and tissue culture to propagate plants (½); seed banks for commercially important plants (½). (c) The Earth Summit at Rio de Janeiro (1992), which gave the Convention on Biological Diversity, and the World Summit on Sustainable Development at Johannesburg (2002) (1).

OR (a) ori is the sequence from where replication starts; it also controls the copy number of the linked DNA (1). Selectable markers, here the ampicillin- and tetracycline-resistance genes, help identify and eliminate non-transformants and selectively permit the growth of transformants (1). (b) The Pst I site lies in the ampicillin-resistance gene, so it would be inactivated (insertional inactivation): the recombinant would be sensitive to ampicillin but still resistant to tetracycline (2). (c) Plants: the Ti plasmid of Agrobacterium tumefaciens; animals: disarmed retroviruses (1).

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official CBSE paper.