CBSE · CLASS 12 · BIOLOGY

CBSE Class 12 Biology Guess Paper 2027

Time: 3 hours · Maximum marks: 70 · 33 questions

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Section A

16 questions of 1 mark each — 12 MCQ + 4 Assertion-Reason

Q1. Plasmodium is a pathogen that causes malaria. Identify the correct sequence of transmission of the pathogen. (Columns: I = Stage of pathogen as it is transferred by vector bite; II = First site in the host body where the pathogens infect and proliferate; III = Second site in the host body where the pathogen infects and manifests clinical symptoms; IV = Stage of pathogen as it is transferred to a new vector) 1 mark

A. Sporozoites | Erythrocyte infection | Liver infection | Gametocytes
B. Gametocytes | Erythrocyte infection | Liver infection | Sporozoites
C. Gametocytes | Liver infection | Erythrocyte infection | Sporozoites
D. Sporozoites | Liver infection | Erythrocyte infection | Gametocytes

Q2. Assertion (A): Flocs are masses of bacteria associated with fungal filaments in secondary treatment of sewage. Reason (R): Flocs help in digestion of solid waste by anaerobic respiration. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true. 1 mark

Q3. Eco R1 cuts the DNA between bases G and A only when the sequence of GAATTC is present. The number of nucleotides present in the resultant sticky ends that will be formed in each of the two strands of DNA after this enzyme cuts the DNA will be: 1 mark

A. Vector DNA: 1 & 5; Foreign DNA: 5 & 1
B. Vector DNA: 2 & 4; Foreign DNA: 4 & 2
C. Vector DNA: 2 & 5; Foreign DNA: 5 & 2
D. Vector DNA: 3 & 4; Foreign DNA: 4 & 3

Q4. Albinism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino? 1 mark

A. 100%
B. 25%
C. 50%
D. 75%

Q5. How many pollen grains and ovules are likely to be formed in the anther and the ovary of an angiosperm bearing 50 microspore mother cells and 50 megaspore mother cells respectively ? 1 mark
(A) 100, 25
(B) 200, 50
(C) 50, 50
(D) 200, 100

Q6. Identify the plant in which emasculation is not required for artificial hybridization. (A) Rice (B) Wheat (C) Pea (D) Papaya 1 mark

Q7. The experimental proof on the thermal stability of genetic material was first provided by experiments of 1 mark
A. Hershey and Chase
B. Meselson and Stahl
C. Frederick Griffith
D. Jacob an Monod

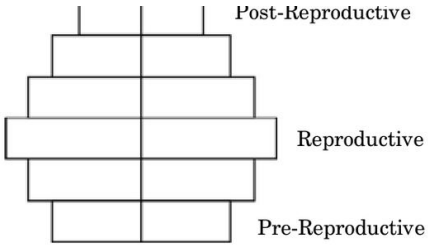
Q8. Amplification of gene of interest by using DNA polymerase may go upto 1 mark
(A) 0.1 million times
(B) 1 million times
(C) 1 billion times
(D) 1 trillion times

Q9. The sequence of nitrogenous bases in a segment of a coding strand of DNA is 5' - AATGCTAGGCAC - 3'. Choose the option that shows the correct sequence of nitrogenous bases in the mRNA transcribed by the DNA. 1 mark
(A) 5' - UUACGAACCGAG - 3'
(B) 5' - AAUGCUAGGCAC - 3'
(C) 5' - UUACGUACCGUG - 3'
(D) 5' - AACGUAGGCAGC - 3'

Q10. RNA interference (RNAi) helps in making tobacco-plant resistant to a nematode (Meloidegyne incognitia). Choose the correct option that shows how RNAi is achieved : 1 mark
(A) Preventing the process of translation of mRNA of the nematode.
(B) Preventing the process of replication of DNA of the nematode.
(C) Preventing the process of transcription of DNA of the plant.
(D) Preventing the process of replication of DNA of the plant.

Q11. The status of the human population reflected in the human age pyramid given below is: 1 mark

(a) Declining population
(b) Stable population
(c) Expanding population
(d) Extinct population



(a) Declining population
(b) Stable population
(c) Expanding population
(d) Extinct population

Q12. Given below are two columns. In Column I the names of four contraceptive devices are given and in Column II the modes of action of the contraceptives are given. Select the option where the contraceptive devices are correctly matched with their respective modes of action. 1 mark

Column I (Contraceptive devices): P. Lippes loop, Q. Multiload 375, R. Subcutaneous Norplant, S. Saheli
Column II (Modes of action): i. Inhibition of ovulation, ii. Phagocytosis of sperms in uterus, iii. Causes thickening of cervical mucous, iv. Makes cervix hostile to sperms
(a) P-ii, Q-iv, R-iii, S-i
(b) P-i, Q-ii, R-iii, S-iv
(c) P-iii, Q-i, R-iv, S-ii
(d) P-iv, Q-iii, R-ii, S-i

Q13. Assertion (A): The milk produced by transgenic cow 'Rosie' was nutritionally more balanced product for human babies than natural cow milk. Reason (R): It was human protein enriched milk containing human alpha lactalbumin. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true. 1 mark

Q14. Assertion (A): A floating cover placed over the slurry in a biogas plant keeps on rising. 1 mark
Reason (R): This cover keeps on rising due to the gas produced in the tank by the microbial activity.
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.

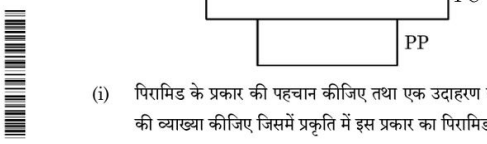
Q15. Two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer from the codes (a), (b), (c) and (d). 1 mark
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (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.
Assertion (A): Birds like pigeon have heterogametic females whereas the males are homogametic.
Reason (R): In pigeons, females have Z and W sex chromosomes whereas males have ZZ sex chromosomes.

Q16. Two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R). Select the appropriate option: (A) Both (A) and (R) are true and (R) is the correct explanation of (A). (B) Both (A) and (R) are true, but (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 mark
Assertion (A) : Saheli is the World's first non-steroidal oral contraceptive pill.
Reason (R) : It has been developed by National Institute of Immunology, New Delhi.

Section B
5 Very Short Answer questions of 2 marks each

Q17. Given below is a pyramid found in an ecosystem, where each bar represents the standing crop available in the trophic level. (i) Identify the kind of pyramid and with the help of an example explain the conditions where this kind of pyramid is possible in nature. (ii) Write any two limitations of ecological pyramids. 2 marks

प्रत्येक पट्टी (शलाका) उपलब्ध पोषण स्तर पर स्थित शस्य (खड़ी फसल) को निरूपित करती है।



(i) पिरामिड के प्रकार की पहचान कीजिए तथा एक उदाहरण की सहायता से उन परिस्थितियों की व्याख्या कीजिए जिसमें प्रकृति में इस प्रकार का पिरामिड संभव है। 1

Q18. In an ecosystem there was loss of biodiversity due to some project in that area. (i) How will biodiversity be affected? (2 points) (ii) List two major causes of loss of biodiversity. 2 marks

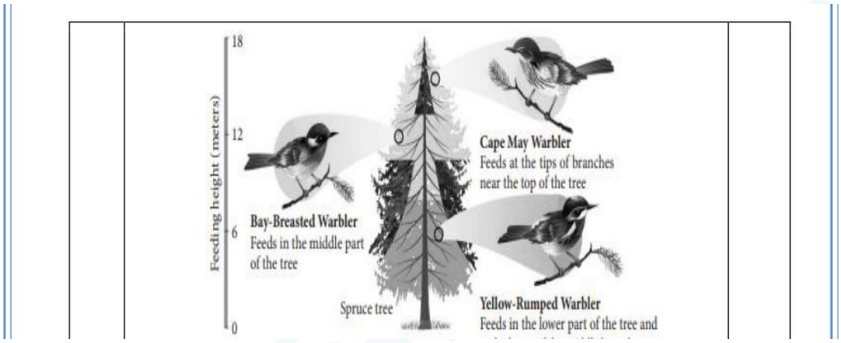
Q19. (a) A farmer while working on his farm was bitten by a poisonous snake. He was rushed to a nearby health centre where the doctor gave him an injection to save his life. (i) What did the doctor inject and why ? (ii) Name the kind of immunity provided by this injection. OR (b) Why do organic farmers not recommend complete eradication of insect pests ? Explain giving reason. 2 marks

Q20. Identify the stage of follicle where primary oocyte undergoes first meiotic division. Also mention the products of this division. 2 marks

Q21. (a) From which end of the ovule, and how does the pollen tube gain its entry into the embryo sac of a Hibiscus flower? 2 marks
(b) State the fate of the male nuclei present in the pollen tube.

Section C
7 Short Answer questions of 3 marks each

Q22. A. Diagram given below depicts different species of Warbler birds feeding on different regions on a Spruce tree (Cape May Warbler feeds at the tips of branches near the top; Bay-Breasted Warbler feeds in the middle part; Yellow-Rumped Warbler feeds in the lower part and at the bases of the middle branches). Explain the mechanism which helps them to co-exist. 3 marks
B. What does Gause's exclusion principle state? Does it apply in the case shown above? Explain.
[For visually impaired students] A. Name and explain the mechanism where two species competing for the same resource co-exist. B. What does Gause's exclusion principle state? Does it apply in the above situation? Explain.



Q23. Bio-fertilisers are organisms that enrich the nutrient quality in the soil. Explain the role of three main sources of bio-fertilisers. 3 marks

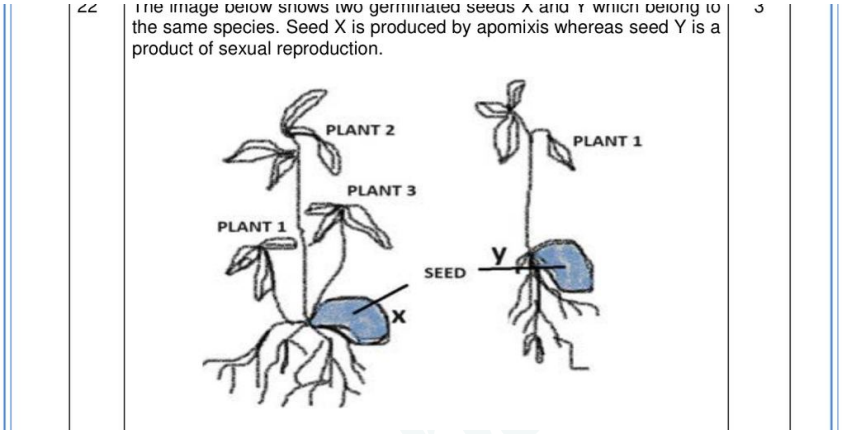
Q24. The image below shows two germinated seeds X and Y which belong to the same species. Seed X is produced by apomixis whereas seed Y is a product of sexual reproduction. 3 marks

A. Write the number of embryo(s), embryo sac(s) and ovules in the ovary of seed X.

B. How multiples embryos are formed in citrus fruits?

C. What advantage will plants developed from seed Y have over seed X?

[For visually impaired students] Each Mango fruit contains one seed. Two mango seeds, X and Y were sown in the soil. From Seed X, 3 plant saplings germinated but from seed Y only 1 plant sapling germinated. A. For seed X which is apomictic, calculate the number of: i) Embryo(s) ii) Embryo sac(s) iii) Ovules in this seed's ovary B. How multiples embryos are formed in citrus fruits? C. What advantage will plants developed from seed Y have over seed X?



Q25. Name two naturally occurring sources, one that transfers pathogenic genes into a plant cells and the other into an animal cell respectively, for their benefit. Write how have these naturally occurring sources been used for the benefit of human race by the biotechnologists. 3 marks

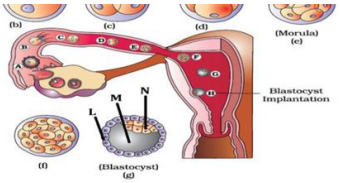
Q26. Given below is a figure showing transport of ovum, fertilisation and passage of growing embryo through fallopian tube in a human female. Answer the questions that follow: 3 marks

(i) What will be the ploidy of cells shown in (a) and (c) stage in the figure given below?

(ii) What will happen if component L as shown in the figure (g) given below does not attach properly to the endometrium?

(iii) In a pregnant mother (case X), during early pregnancy, the fertilised egg splits into two embryos at stage C shown in the figure given below, resulting in the formation of twins. Will the genome of cells of these two embryos exhibit variation? Justify your answer.

[For Visually impaired students: Explain the events and journey of an ovum in the fallopian tube of a mother from fertilisation stage to implantation.]



For Visually impaired students

Explain the events and journey of an ovum in the fallopian tube of a mother from fertilisation stage to implantation.

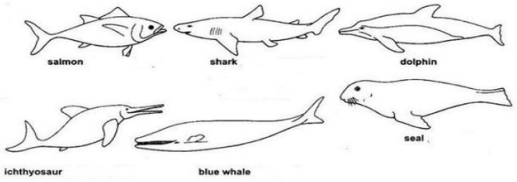
24	In guinea pigs, black coat colour (G) dominates over white (g) and brown eyes (B) dominate over blue (b). The alleles for coat colour and eye colour	3

Q27. Shown below are certain aquatic vertebrates (salmon, shark, dolphin, ichthyosaur, blue whale, seal), where natural selection has favoured them to develop certain characteristics which enable them to live in water. 3 marks

A. Name and explain the phenomenon exhibited by the above animals.

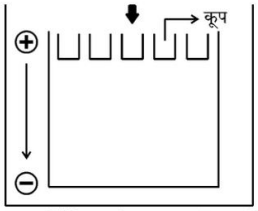
B. Which one of the above is the most primitive one? What is its significance?

[For Visually impaired students: A. What are the basic conceptual similarities and differences between Lamarckian and Darwinian theory of evolution? B. Give an example that supports any one of the above two theories.]

25	Shown below are certain aquatic vertebrates, where natural selection has favoured them to develop certain characteristics which enable them to live in water. 	3

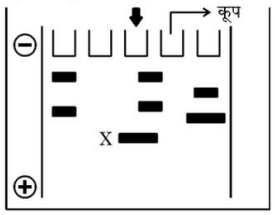
Q28. Observe the given picture carefully. A mixture of DNA with fragments ranging from 100 base pairs to 1800 base pairs were separated by electrophoresis on agarose gel with the following arrangement: (a) What result will be obtained in staining with ethidium bromide? Explain with reasons. (b) The above setup was modified as shown below and a band with 100 base pairs was obtained at X. What changes were made to the previous design to get a band at 'X'. Why did the band appear at 'X'? 3 marks

28. नीचे दिए गए चित्र का सावधानीपूर्वक प्रेक्षण कीजिए। डीएनए अणु के 100 क्षारक युग्मों से 1800 क्षारक युग्मों वाले टुकड़ों (खंडों) के पास वाले मिश्रण का एगरोज़ जैल वैद्युत संचलन (इलेक्ट्रोफोरेसिस) तकनीक द्वारा पृथक्करण किया गया जिसका संयोजन चित्र में दिखाया गया है :



(a) इथीडियम ब्रोमाइड द्वारा अभिरंजित करने पर क्या परिणाम प्रेक्षित होंगे ? कारण सहित व्याख्या कीजिए। 1

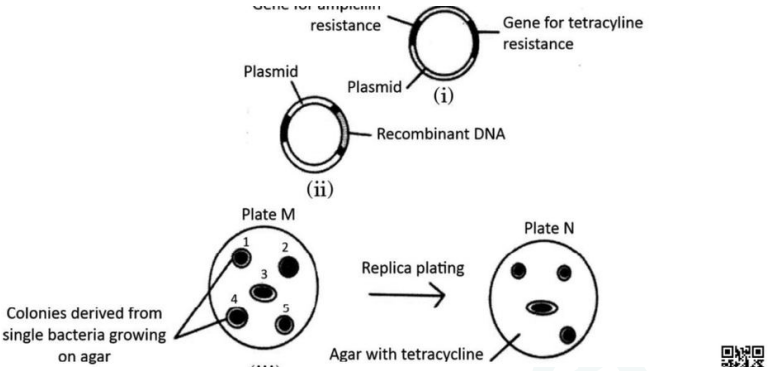
(b) उपरोक्त संयोजन को निम्न रूप से दर्शाए अनुसार पुनःसंयोजित किया गया तथा 'X' पर 100 क्षारक युग्मों वाली पट्टी प्राप्त हुई।



'X' पर पट्टी प्राप्त करने के लिए पहले वाले उपकरण संयोजन में क्या परिवर्तन किए गए ? पट्टी

Section D
2 Case-based questions of 4 marks each (with sub-parts)

Q29. [case context] Study the diagram given below that shows the steps involved in the procedure of selecting transformed bacteria and answer the questions that follow [diagram: (i) plasmid with gene for ampicillin resistance and gene for tetracycline resistance; (ii) recombinant DNA formed in plasmid; (iii) Plate M – colonies (1–5) derived from single bacteria growing on agar; replica plating to (iv) Plate N – agar with tetracycline and ampicillin]. (a) Identify the colony that has got transformed. Justify your answer. (b) What are the sites in a plasmid called where ampicillin and tetracycline resistance genes are inserted ? State their role in genetic engineering. (c) Name two enzymes playing an important role in genetic engineering. OR (c) State the role of β-galactosidase in insertional inactivation. 4 marks



Q30. [case context] Gene expresses itself in a cell system as a protein/enzyme. How does an expression of gene occur in a cell system and when does it need to occur, and how the gene expression is regulated in a prokaryote cell system was studied by the combined efforts of Jacque Monod, the biochemist and Francois Jacob, the geneticist. For their work on lactose metabolism in E. coli and introducing the concept of "lac operon" they were awarded the Nobel Prize in 1965. 4 marks

(a) Why is lac operon said to be a transcriptionally regulated system?
(b) It is said that "the lac operon has to be operational at a very low level in the bacterial cell all the time." Justify.
(c) Why is the regulator gene in lac operon marked as 'i' gene?
(d) Draw a schematic diagram of lac operon in absence of inducer in the culture medium of the bacteria.
OR
(d) Draw a schematic diagram of lac operon in the presence of inducer in the culture medium of the bacteria.

Section E
3 Long Answer questions of 5 marks each

Q31. A. Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below: 3'- ATGCATGCATAC -5' (template strand, read 3' to 5'). 5 marks

B. How is transcription a more complex process in eukaryotic cells? Explain the additional processes that a precursor mRNA has to undergo in these organisms.

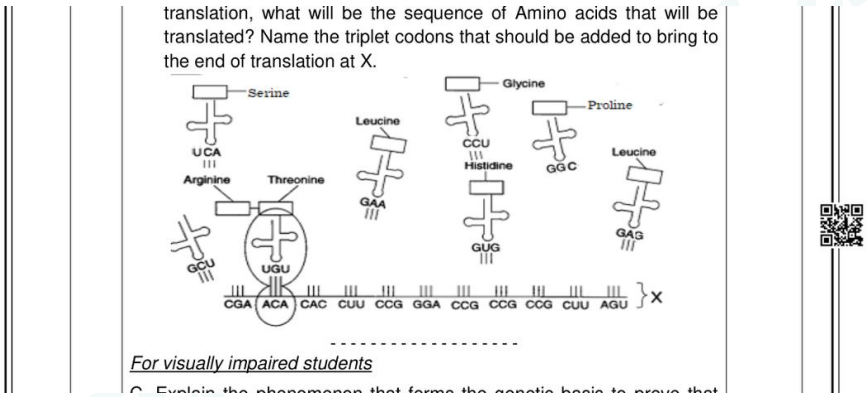
OR

A. Explain the process of aminoacylation of tRNA. Mention its role in translation.

B. How do ribosomes in the cells act as factories for protein synthesis?

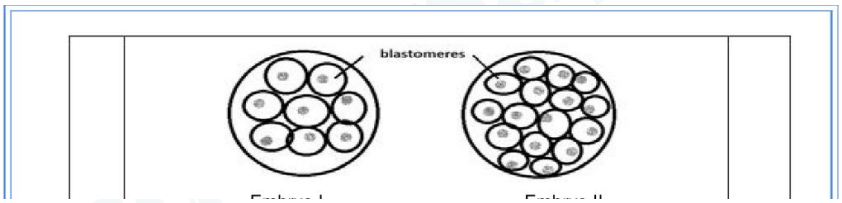
C. Given below is a strand of mRNA undergoing the process of translation, what will be the sequence of Amino acids that will be translated? Name the triplet codons that should be added to bring to the end of translation at X. (mRNA read on ribosome: CGA ACA CAC CUU CCG GGA CCG CCG CCG CUU AGU ... X; charged tRNAs shown: Serine-UCA, Arginine-GCU, Threonine-UGU, Leucine-GAA, Histidine-CCU, Glycine-GGC, Proline-GUG/GGC, Leucine-GAG)

[For visually impaired students: A. Why are both the strands not copied during transcription? B. How is transcription a more complex process in eukaryotic cells? Explain the additional processes that a precursor mRNA has to undergo in these organisms. OR C. Explain the phenomenon that forms the genetic basis to prove that codon is a triplet and it is read in a contiguous manner.]



Q32. Attempt either option A or B. 5 marks

A. Cryptorchidism is a condition in which the testes fail to descend into the scrotum. It can also lead to compromised Sertoli cell function and has an impact on Leydig cell function.
(i) Identify at least 3 parameters of male fertility which get affected due to cryptorchidism.
(ii) Which process will be affected if mature spermatids are not released from Sertoli cells?
(iii) Name and explain one assisted reproductive technology (ART process) in which the sperm/semen is used to assist fertilization.
(iv) Name and explain the assisted reproductive technology that should be used to complete the development of embryos I and II shown in the figure given below (Embryo I with fewer blastomeres and Embryo II with more blastomeres).
[For visually impaired students] (iv) An infertile couple decided to use ART to conceive. After IVF they decided for Embryo transfer of the following 2 embryos. Embryo 1 consisted of 8 blastomeres and Embryo 2 consisted of 16 blastomeres. Name and explain the techniques they should deploy to complete further development of the given embryos.
OR
B. (i) Explain the significance of each of the following features present in plants given below: a) In rose-bay plant the stamens ripen before the stigma. b) In certain species of primrose, the flowers have short stamen and long style. c) The bisexual flower of mustard exhibits rejection of self-pollen grain. (ii) Explain how autogamy is prevented in castor and papaya plant respectively.



Q33. (a) (i) Name and explain the property present in normal cells but is lost in cancer cells. (ii) All normal human cells have genes that may become cancerous under certain conditions. Name them and explain how. (iii) State the role of the following techniques in detection and diagnosis of cancer : (1) Biopsy and Histopathology (2) Magnetic Resonance Imaging. OR (b) Large quantities of sewage are generated every day in cities as well as in towns and are treated in Sewage Treatment Plants (STPs) to make them less polluting. Given below is the flow diagram of stages of STP [flow diagram: Primary effluent passed into large aeration tanks → Effluent passed into settling tanks to form 'sediment']. (i) (1) Why is primary effluent passed into large aeration tanks ? (2) What is the 'sediment' formed, referred to as ? Mention its significance. (3) Explain the final step in the settling tank before the treated effluent is released into water bodies. (ii) Name any two organisms commonly used as biofertilisers, belonging to different kingdoms. Write how each one acts as a biofertiliser. 5 marks

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