



Previous Year Solved Question Papers of

CBSE Class 12 Exams

BIOLOGY – 2017

Compt. All India: Set-1

Original Question Paper + Answer Key

**CBSE: CENTRAL BOARD OF
SECONDARY EDUCATION**



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SET – 1

Series : GBM/C

कोड नं. 57/1
Code No.

रोल नं.

Roll No.

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परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 8 हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 26 प्रश्न हैं ।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें ।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक)

BIOLOGY (Theory)

निर्धारित समय : 3 घंटे

Time allowed : 3 hours

अधिकतम अंक : 70

Maximum Marks : 70

सामान्य निर्देश :

- प्रश्न-पत्र में पाँच खण्डों में 26 प्रश्न दिए गए हैं । सभी प्रश्न अनिवार्य हैं ।
- खण्ड – क में प्रश्न संख्या 1 से 5 अति लघु-उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न एक अंक का है ।
- खण्ड – ख में प्रश्न संख्या 6 से 10 लघु-उत्तरीय प्रश्न प्रकार I के हैं, प्रत्येक प्रश्न दो अंकों का है ।

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[P.T.O.]

- (iv) खण्ड – ग में प्रश्न संख्या 11 से 22 लघु-उत्तरीय प्रश्न प्रकार II के हैं, प्रत्येक प्रश्न तीन अंकों का है।
- (v) खण्ड – घ में प्रश्न संख्या 23 मूल्य आधारित प्रश्न चार अंकों का है।
- (vi) खण्ड – ङ में प्रश्न संख्या 24 से 26 दीर्घ-उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न पाँच अंकों का है।
- (vii) प्रश्न-पत्र में समग्र पर कोई विकल्प नहीं है, फिर भी दो अंकों वाले एक प्रश्न में, तीन अंकों वाले एक प्रश्न में और पाँच अंकों वाले सभी तीनों प्रश्नों में भीतरी चयन-विकल्प दिए गए हैं। प्रत्येक परीक्षार्थी को ऐसे प्रश्नों के दो विकल्पों में से कोई एक प्रश्न हल करना है।

General Instructions :

- (i) There are total **26** questions in **five** sections in the question paper. **All** questions are compulsory.
- (ii) Section **A** contains questions number **1** to **5**, very short answer type questions of **one** mark each.
- (iii) Section **B** contains questions number **6** to **10**, short answer type-**I** questions of **two** marks each.
- (iv) Section **C** contains questions number **11** to **22**, short answer type-**II** questions of **three** marks each.
- (v) Section **D** contains question number **23**, value based question of **four** marks.
- (vi) Section **E** contains questions number **24** to **26**, long answer type questions of **five** marks each.
- (vii) There is no overall choice in the question paper, however, an internal choice is provided in **one** question of **two** marks, **one** question of **three** marks and all the **three** questions of **five** marks. In these questions, an examinee is to attempt any **one** of the **two** given alternatives.

खण्ड – क SECTION – A

1. कशेरुकियों में उस अवस्था का नाम लिखिए जिसमें शरीर अपनी ही कोशिकाओं पर आक्रमण कर देता है। **1**
Name the condition in vertebrates where the body attacks self-cells.
2. बायोरिएक्टर का कार्य लिखिए। **1**
Write the function of a Bioreactor.
3. सामान्य वर्ण दृष्टि वाले जनकों (माता-पिता) से एक वर्णांध (कलर ब्लाइंड) बालक का जन्म होता है। उसके जनकों के जीनोटाइप लिखिए। **1**
A colour blind boy is born to a couple with a normal colour vision. Write the genotype of the parents.

4. किन्हीं दो परिस्थितियों का उल्लेख कीजिए जो बाह्य निषेचन करने वाले जीवों में युग्मक-संलयन के अवसर बढ़ाते हैं । 1

Mention any two conditions that enhance the chances of syngamy in organisms exhibiting external fertilization.

5. ग्रिफीथ द्वारा स्ट्रेप्टोकोकस नीमोनी के साथ किए गए प्रयोगों के अन्त में उनके द्वारा प्राप्त निष्कर्ष लिखिए । 1

Write the conclusion Griffith arrived at the end of his experiment with Streptococcus pneumonia.

खण्ड – ख

SECTION – B

6. आलू तथा गन्ना जैसे पौधों को नए पौधे उत्पन्न करने के लिए बीजों की आवश्यकता नहीं होती । वे नए पौधे किस प्रकार उत्पन्न करते हैं ? ऐसे दो अन्य उदाहरण दीजिए जिसमें नए पौधे इसी प्रकार उत्पन्न होते हैं । 2

Plants like potato, sugarcane do not require seeds for producing new plants. How do they produce new plants ? Give two other examples where new plants are produced in the same way.

7. किसी समुदाय में परभक्षियों की भूमिका का वर्णन कीजिए । 2

Explain the role played by predators in a community.

8. सर्वप्रथम खोजे गए प्रतिजैविक (एंटीबायोटिक) तथा इसकी खोज करने वाले वैज्ञानिक का नाम लिखिए । 2

Name the first antibiotic discovered and by whom.

9. कोशिका विभाजन चक्र के समय क्रोमेटिड विसंयोजन न होने के कारण क्या होता है ? एक उदाहरण द्वारा अपने उत्तर की व्याख्या कीजिए । 2

अथवा

ABO रुधिर वर्ग सह-प्रभाविता (को-डोमिनेंस) का एक अच्छा उदाहरण है । औचित्य बताइए । 2

What happens when chromatids fail to segregate during cell division cycle ? Explain your answer with an example.

OR

ABO blood groups is a good example of co-dominance. Justify.

10. बैक्यूलोवायरेसिस के कौन से रोगजनक गुण के कारण उनका उपयोग जैव कारक के रूप में किया जाता है ? इन जीवों के जीनस का नाम लिखिए । 2

What is the pathogenic property of baculovirus, used as a biological agents ? Name the genus of these organisms.

खण्ड – ग
SECTION – C

11. (अ) 'एलर्जी अनुक्रिया' किसे कहते हैं ?
 (ब) ऐसी दो औषधियों के नाम लिखिए जिनका उपयोग एलर्जी के लक्षणों को शीघ्रता से घटाने के लिए किया जाता है ।
 (स) क्या कारण है कि भारत के महानगरों में रहने वाले अधिकांश बच्चे एलर्जी एवं दमा पीड़ित हैं ? 3
 (a) What is an "allergic reaction" ?
 (b) Name any two drugs used to quickly reduce the symptoms of allergy.
 (c) Why do more and more children in metro cities of India suffer from allergies and asthma ?

12. निम्नलिखित तालिका में अ, आ, इ, ई, उ तथा ऊ की पहचान कीजिए : 3

एंजाइम का नाम / जैव-सक्रिय अणु	स्रोत	कार्य
(i) अ	स्ट्रेप्टोकोकस	आ
(ii) इ	ई	अंग प्रतिरोपण में प्रतिरक्षा निरोधक कारक
(iii) स्टेटिन्स	उ	ऊ

Identify a, b, c, d, e and f in the following table :

Name of Enzyme/ Bioactive Molecule	Source	Function
(i) a	Streptococcus	b
(ii) c	d	Immuno-suppressive agent in organ transplant patients
(iii) Statins	e	f

13. स्त्रियों के लिए उपलब्ध किन्हीं दो आई यू डी के नाम लिखिए तथा उनकी कार्य प्रवृत्ति बताइए । 3
 List any two types of IUDs that are available for human females and state their mode of action.
14. इ. कोलाई क्लोनिंग संवाहक pBR322 में (i) वरण योग्य चिह्नक, (ii) Ori तथा (iii) rop की भूमिका बताइए । 3
 Mention the role of (i) selectable marker, (ii) Ori and (iii) rop in *E. coli* cloning vector pBR322.

15. पशु प्रजनन कार्यक्रम का उद्देश्य लिखिए। कुक्कुट फार्म प्रबंधन के आवश्यक चरणों का वर्णन कीजिए। 3
Write the aim with which animal breeding programmes are carried. Describe the essential steps to be followed in Poultry management.

16. (अ) मानव अंडाशय की आरेखीय काट का चित्र बनाइए तथा (i) प्राथमिक पुटक, (ii) तृतीयक पुटक, (iii) ग्राफी पुटक एवं (iv) पीत पिंड (कार्पस ल्युटियम) को नामांकित कीजिए।
(ब) पीत पिंड का प्रकार्य लिखिए। 3

अथवा

- (अ) आवृतबीजी के स्त्रीकेसर में पराग नलिका की वृद्धि दर्शाते हुए चित्र बनाइए तथा (i) वर्तिकाग्र, (ii) नर युग्मक, (iii) बीजाण्ड द्वार एवं (iv) बीजाण्ड को नामांकित कीजिए।
(ब) बीजाण्ड द्वार का प्रकार्य लिखिए। 3
(a) Draw a diagram of a sectional view of human ovary and label (i) Primary follicle; (ii) Tertiary follicle; (iii) Graafian follicle and (iv) Corpus luteum.
(b) Write the function of corpus luteum.

OR

- (a) Draw a diagram of Pistil showing pollen tube growth in angiosperm and label (i) Stigma; (ii) male gametes; (iii) micropyle and (iv) Ovule.
(b) Write the function of micropyle.
17. आर डी एन ए तकनीकों के उपयोग द्वारा इंसुलिन के उत्पादन में क्या चुनौती थी ? आर डी एन ए तकनीक का उपयोग करके एली लिली ने इंसुलिन का उत्पादन कैसे किया ? 3
What was the challenge for production of insulin using rDNA techniques ? How did Eli Lilly produce insulin using rDNA technology ?

18. नीचे दी गई तालिका में अ, आ, इ, ई, उ और ऊ की पहचान कीजिए : 3

क्र.सं.	घटक-I	घटक-II	दो घटकों की बंधनकारी रासायनिक संलग्नता	उत्पाद
i.	अ	आ	इ	न्यूक्लीयोसाइड
ii.	न्यूक्लीयोसाइड	ई	उ	न्यूक्लीयोटाइड
iii.	न्यूक्लीयोटाइड	न्यूक्लीयोटाइड	ऊ	डाइन्यूक्लीयोटाइड

Identify, A, B, C, D, E and F in the table given below :

S. No.	Component-I	Component-II	Chemical linkage bonding the two components	Product
i.	A	B	C	Nucleoside
ii.	Nucleoside	D	E	Nucleotide
iii.	Nucleotide	Nucleotide	F	Dinucleotide

19. उस जीव का नाम लिखिए जिससे 'क्राई' जीन विलगित किए जाते हैं। उचित उदाहरण की सहायता से स्पष्ट कीजिए कि जैव-प्रौद्योगिकी वैज्ञानिकों ने 'क्राई' जीनों का उपयोग क्यों और कैसे किया। 3

Name the organism from which the 'cry' genes are isolated. Mention with the help of suitable example why and how bio-technologists have made use of 'cry' genes.

20. पीड़कनाशियों के अत्यधिक एवं सतत उपयोग के परिणामस्वरूप पीड़कों की कुछ नई प्रजातियों का विकास हुआ। व्याख्या कीजिए कि ऐसा होना किस प्रकार संभव हुआ। इस प्रकार के विकास को क्या कहते हैं? 3

Excessive and continuous use of pesticides has resulted in evolution of some new species of pests. Explain what must have led to this. What is this type of evolution called?

21. दो उदाहरणों की सहायता से समझाइए कि गाय तथा बकरियों जैसे प्राथमिक उपभोक्ताओं से रक्षा हेतु कुछ विशिष्ट पौधों ने किस प्रकार आकारिकीय एवं रासायनिक युक्तियों का विकास किया। 3

Explain with the help of two examples how certain plants have evolved morphological and chemical defenses against primary consumers such as cows and goats.

22. ऑक्टोपस एवं मनुष्य की आँख को किस प्रकार का अंग कहा जाता है? इसी प्रकार के अंग का एक अन्य उदाहरण जन्तुओं से तथा एक उदाहरण पौधों से भी दीजिए। उनके द्वारा प्रदर्शित इस विकास प्रक्रम का नाम लिखिए तथा व्याख्या भी कीजिए। 3

What type of organs eye of an Octopus and that of a human called? Give another example from the animal group and one from the plants of such organs. Name and explain the evolutionary process they exhibit.

खण्ड – घ

SECTION – D

23. सूचना प्रौद्योगिकी में क्रांति के बाद अब यह भारत में ग्रामीण एवं शहरी क्षेत्रों में रहने वाले प्रत्येक व्यक्ति के जीवन का एक अभिन्न हिस्सा बन गया है। आपको अपने पड़ोस के विद्यालयों के इको-क्लब में इलेक्ट्रॉनिक अपशिष्ट (ई-वेस्ट्स) के उत्पादन तथा प्रबंधन पर विद्यार्थियों को संबोधित करने के लिए कहा जाता है –

- (अ) लिखिए, ई-वेस्ट (ई-अपशिष्ट) कैसे जनित होते हैं ?
 (ब) बताइए कि, आप ई-अपशिष्ट के प्रबंधन के विषय पर विद्यार्थियों को किस प्रकार जागरूक करेंगे ?
 (स) ई-अपशिष्ट के प्रबंधन के संदर्भ में विकसित राष्ट्रों ने विकासशील देशों का किस प्रकार शोषण किया है ?

4

With the revolution in information technology, now it has become an integral part of everybody's life, living in rural and urban India. You are asked to address the gathering of students of eco-clubs of your neighbourhood schools on generation and management of e-waste.

- (a) Write how e-waste is generated.
 (b) Explain how would you address the awareness issue of e-waste management amongst the students.
 (c) How have the developed countries exploited the developing countries with respect to e-waste managements ?

खण्ड – ड

SECTION – E

24. (अ) पात्रे निषेचन (इनविट्रो फर्टिलाइजेशन), जिसे आमतौर पर टेस्ट ट्यूब बेबी कार्यक्रम से जाना जाता है, के विभिन्न चरणों का वर्णन कीजिए।

- (ब) इस कार्यक्रम का महत्त्व बताइए।

4 + 1 = 5

अथवा

- (अ) सजातपुष्पी परागण तथा परनिषेचन के बीच एक समानता तथा एक असमानता लिखिए।
 (ब) पुष्पी पौधों में विकसित ऐसी तीन युक्तियों की व्याख्या कीजिए जो उनमें स्व-परागण को हतोत्साहित तथा पर-परागण को प्रोत्साहित करते हैं।

5

- (a) Explain the steps involved in *in vitro* fertilisation popularly known as test tube baby programme.
 (b) State the importance of this programme.

OR

- (a) State one difference and one similarity between geitonogamy and xenogamy.
 (b) Explain any three devices developed in flowering plants to discourage self pollination and encourage cross pollination.

25. (अ) हर्षे व चेस ने अपने प्रयोग तीन चरणों : संक्रमण, संमिश्रण तथा अपकेन्द्रण में किए। प्रत्येक चरण की व्याख्या कीजिए।

(ब) प्राप्त परिणामों के आधार पर उनके निष्कर्ष तथा निर्वचन की व्याख्या कीजिए। 5

अथवा

इंग्लैंड में औद्योगिकीकरण के पूर्व तथा औद्योगिकीकरण के पश्चात् के युग में श्वेत पंखी शलभ तथा गहरे वर्ण पंखी शलभों के उदाहरण की सहायता से प्राकृतिक वरण द्वारा विकास की व्याख्या कीजिए। 5

(a) Hershey and Chase carried their experiment in three steps : infection, blending, centrifugation. Explain each step.

(b) Write the conclusion and interpretation of the result they obtained.

OR

Taking an example of white-winged moths and dark-winged moths of England in pre and post industrialised era, explain evolution by natural selection.

26. (अ) पिछली शताब्दी के अन्त में वन आच्छादित भूमि का प्रतिशत लिखिए।

(ब) ऐसी दो गतिविधियों का वर्णन कीजिए जिनके कारण वनोन्मूलन हुआ।

(स) वनोन्मूलन के परिणाम बताइए।

(द) वनोन्मूलन को रोकने का एक उपाय सुझाइए। 1 + 2 + 1 + 1 = 5

अथवा

(अ) बदलती पर्यावरणीय परिस्थितियों के साथ सभी समुदायों के संगठन एवं संरचना में हो रहे परिवर्तनों के पैटर्न पर व्याख्या कीजिए।

(ब) 'चरम समुदाय' तथा 'क्रमक' की व्याख्या कीजिए।

(स) उदाहरणों की सहायता से प्राथमिक तथा द्वितीयक अनुक्रमण में विभेद कीजिए। 1 + 2 + 2 = 5

(a) Write the percentage of land area that was covered by forests by the end of the last century.

(b) Describe any two practices that led to deforestation.

(c) State the consequences of deforestation.

(d) Suggest a method to overcome deforestation.

OR

(a) Comment on the pattern in which all communities undergo a change in composition and structure with changing environmental conditions.

(b) Explain 'Climax community' and 'sere'.

(c) Differentiate between primary and secondary succession with examples.

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Senior School Certificate Examination

April 2017

Marking Scheme - Biology (Theory)

Expected Answers/Value Points

General Instructions :

The Marking Scheme and mechanics of marking

1. In the marking scheme the marking points are separated by commas, one oblique line (/) indicates acceptable alternative, two obliques (//) indicate complete acceptable alternative set of marking points.
2. Any words/phrases given within brackets do not have marks.
3. Allow spelling mistakes unless the misspelt word has another biological meaning. Ignore plurals unless otherwise stated in the marking scheme.
4. In any question exclusively on diagram no marks on any description. But in questions on descriptions, same value points may be marked on the diagrams as a substitute.
5. All awarded marks are to be written in the left hand margin at the end of the question or its part.
6. Place a tick (✓) in red directly on the key/operative term or idea provided it is in correct context. Place “Half-tick” ½ wherever there is ½ mark in the marking scheme. (Do not place tick indiscriminately just to show that you have read the answer).
7. If no marks are awarded to any part or question put a cross (×) at incorrect value portion and mark it zero (in words only).
8. Add up ticks or the half ticks for a part of the question, do the calculation if any, and write the part total or the question total in the left hand margin.
9. Add part totals of the question and write the question total at the end. Count all the ticks for the entire question as a recheck and draw a circle around the question total to confirm correct addition.
10. If parts have been attempted at different places do the totalling at the end of the part attempted last.
11. If any extra part is attempted or any question is reattempted, score out the last one and write “extra”.
12. In questions where only a certain number of items are asked evaluate only that many numbers in sequence as is asked ignoring all the extra ones even if otherwise correct.
13. Transcribe the marks on the cover page. Add up question totals. Recheck the script total by adding up circled marks in the script.
14. Points/answer given in brackets in marking scheme are not so important and may be ignored for marking.

Question Paper Code 57/1

SECTION – A

Q. Nos. 1 - 5 are of one mark each

1. Name the condition in vertebrates where the body attacks self-cells.

Ans Auto immune disorder / auto-immune disease. [1 Mark]

2. Write the function of a Bioreactor.

Ans Bioreactors are required to produce large volumes (100 - 1000 litres) of recombinant proteins/ desired protein / enzymes [1 Mark]

3. A colour blind boy is born to a couple with a normal colour vision. Write the genotype of the parents.

Ans Father - XY , Mother -XX^c = 1/2 + 1/2 [1 Mark]

4. Mention any two conditions that enhance the chances of syngamy in organisms exhibiting external fertilization.

Ans Organisms exhibiting external fertilisation show great synchrony between the sexes , release a large number of gametes into the surrounding medium = 1/2 + 1/2 [1 Mark]

5. Write the conclusion Griffith arrived at the end of his experiment with Streptococcus pneumoniae.

Ans He concluded that the R-strain bacteria had somehow been transformed by heat- killed S-strain bacteria, this must be due to transfer of genetic material = 1/2 + 1/2 [1 Mark]

SECTION - B

Q Nos. 6-10 are of two marks each

6. Plants like potato, sugarcane do not require seeds for producing new plants. How do they produce new plants ? Give two other examples where new plants are produced in the same way.

Ans New plants arise from nodes present in the modified stems of these plants / through vegetative propagation = 1/2 when the nodes come in contact with damp soil or water they produce roots and new plants = 1/2 , e.g Banana / Ginger /Dahlia / *Bryophyllum*/any other correct example (Any two) = 1/2 + 1/2 [2 Marks]

7. Explain the role played by predators in a community.

Ans • Predators act as conduits for energy transfer across trophic levels.
• They keep prey population under control.
• They help in maintaining species diversity in a community by reducing intensity of competition among competing prey species.
• An efficient predator may cause extinction of prey species (Any two) = 1 + 1 [2 Marks]

8. Name the first antibiotic discovered and by whom.

Ans Penicillin , Alexander Flemming = 1 +1 [2 Marks]

9. What happens when chromatids fail to segregate during cell division cycle ? Explain your

answer with an example.

Ans Failure of segregation of chromatids during cell division cycle results in the gain or loss of chromosome/ called aneuploidy = 1

E.g Down' syndrome results in the gain of extra copy of chromosome 21 /

Turner's syndrome results due to loss of an X-chromosome in human female = 1

OR

ABO blood groups is a good example of co-dominance. Justify.

Ans -ABO blood group in humans is contributed by gene 'I' that has 3 alleles 'I^A' 'I^B' and 'i.'

- Because human beings are diploid each person has two of the three alleles.

- I^A and I^B produce two different types of sugar while allele i does not produce sugar on the plasma membrane of RBC

- When I^A and I^B are present they both express their own type of sugar- this is codominance

= $\frac{1}{2} \times 4$

[2 Marks]

10. What is the pathogenic property of baculovirus, used as a biological agents ? Name the genus of these organisms.

Ans Attacks insect, and other arthropods = $\frac{1}{2} \times 2$

Nucleopolyhedrovirus = 1

[2 Marks]

SECTION - C

Q Nos. 11-22 are of three marks each

11. (a) What is an “allergic reaction” ?

(b) Name any two drugs used to quickly reduce the symptoms of allergy.

(c) Why do more and more children in metro cities of India suffer from allergies and asthma ?

Ans a) The exaggerated response of the immune system to certain antigens present in the environment (is called allergic reaction)=1

b) anti-histamine / adrenalin / steroids (Any two) = $\frac{1}{2} + \frac{1}{2}$

c) due to deteriorating air quality / sensitivity to the environment /allergens / lowering of immunity due to modern day life style (which could be due to the protected environment provided largely in life) = $\frac{1}{2} + \frac{1}{2}$

[3 Marks]

12. Identify a, b, c, d, e and f in the following table :

Name of Enzyme/ Bioactive Molecule	Source	Function
(i) a	Streptococcus	b
(ii) c	d	Immuno-suppressive agent in organ transplant patients
(iii) Statins	e	f

Ans i) a) Streptokinase b) 'Clot buster' for removing clots from the blood vessels (of patients who have undergone myocardial infaction leading to heart attack) /clot buster enzyme

ii) c) Cyclosporin A d) *Trichoderma polysporum*

iii) e) *Monascus purpureus* (yeast)

f) Blood cholesterol lowering agent.

[3 Marks]

13. list any two types of IUDs that are available for human females and state their mode of action.

- Ans i) Non medicated IUDs = 1 , increase phagocytosis of sperms within the uterus = ½
 ii) Copper releasing IUDs = 1 , Cu ions suppress sperm motility and fertilising capacity of sperms = ½
 iii) Hormone releasing IUDs = 1 , make uterus unsuitable for implantation / makes cervix hostile to sperms = ½
 (Any two) (1½ + 1 ½) [3 Marks]

14. Mention the role of (i) selectable marker, (ii) Ori and (iii) rop in *E. coli* cloning vector pBR322.

- Ans i) Selectable marker - helps in identifying and eliminating non transformants and selectively permitting the growth of the transformants = 1
 ii) Ori - helps to start replication and any piece of DNA when linked to this sequence can be made to replicate within host cell, responsible for controlling the copy number of the linked DNA = ½ + ½
 iii) -codes for the proteins involved in the replication of the plasmid = 1 [3 Marks]

15. Write the aim with which animal breeding programmes are carried. Describe the essential steps to be followed in Poultry management.

- Ans Aims - increasing the yield of animals , improving the desirable qualities of the produce = ½ + ½

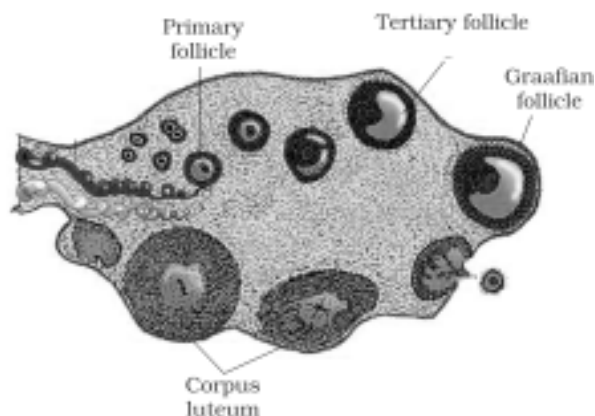
Steps to be followed in Poultry Management

- Selection of disease free and suitable breeds
- Proper and safe farm conditions
- Proper feed and water
- Proper hygiene and health care = ½ × 4

[3 Marks]

16. (a) Draw a diagram of a sectional view of human ovary and label (i) Primary follicle; (ii) Tertiary follicle; (iii) Graafian follicle and (iv) Corpus luteum. (b) Write the function of corpus luteum.

Ans



= ½ × 4

[3 Marks]

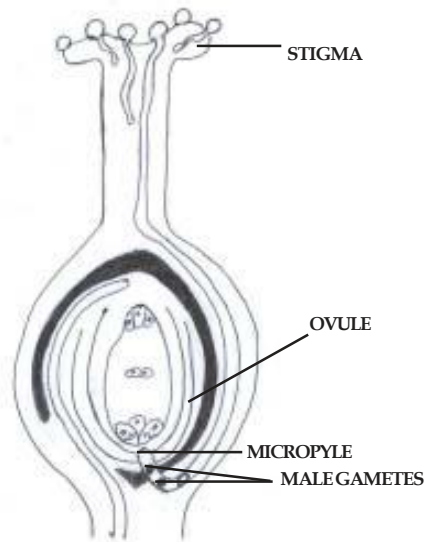
- b) Secretes (large amounts of) progesterone , which is essential for maintenance of endometrium = $\frac{1}{2} \times 2$

OR

(a) Draw a diagram of Pistil showing pollen tube growth in angiosperm and label (i) Stigma; (ii) male gametes; (iii) micropyle and (iv) Ovule.

(b) Write the function of micropyle.

Ans (a)



= $\frac{1}{2} \times 4$

- (b) the pollen tube enters the ovule through micropyle , it facilitates the entry of oxygen and water for seed germination. = $\frac{1}{2} + \frac{1}{2}$

[3 Marks]

17. What was the challenge for production of insulin using rDNA techniques ? How did Eli Lilly produce insulin using rDNA technology ?

Ans The challenge for production of insulin using r DNA technique was getting insulin assembled into a mature form = 1

- Prepared two DNA sequence corresponding to A and B chains of human insulin.
- introduced them in plasmids of *E.coli* to produce insulin chains.
- chains A and B were produced separately.
- extracted and combined by creating disulfide bonds to form human insulin = $\frac{1}{2} \times 4$

[3 Marks]

18. Identify A, B, C, D, E and F in the following table

S.No.	Component-I	Component-II	Chemical linkage bonding the two components	Product
i.	A	B	C	Nucleoside
ii.	Nucleoside	D	E	Nucleotide
iii.	Nucleotide	Nucleotide	F	Dinucleotide

- Ans i) A - Nitrogenous base / A - Pentose sugar .
 B - Pentose Sugar / B- Nitrogenous base
 C - N glycosidic linkage.
- ii) D - phosphate group.
 E - phospho ester linkage

iii) F- (3 -'5') phosphodiester linkage.

[3 Marks]

19. Name the organism from which the 'cry' genes are isolated. Mention with the help of suitable example why and how bio-technologists have made use of 'cry' genes.

Ans *Bacillus thuringiensis* = 1

- Source of insecticidal (crystal) protein that control the cotton bollworms / corn borer = 1

- Specific Bt toxin genes were isolated from *Bacillus thuringiensis* , incorporated into several crop plants such as cotton = $\frac{1}{2} \times 2$

[3 Marks]

20. Excessive and continuous use of pesticides has resulted in evolution of some new species of pests. Explain what must have led to this. What is this type of evolution called ?

Ans Excessive use of pesticides has resulted in selection of resistant varieties in a much lesser time scale, as evolution is a stochastic process based on chance events in nature and chance mutation in organism = 1 +1

Evolution by anthropogenic action = 1

[3 Marks]

21. Explain with the help of two examples how certain plants have evolved morphological and chemical defenses against primary consumers such as cows and goats.

Ans - Thorns of *Acacia* / Cactus are morphological means of defence against cows & goats = 1

- Plants produce & store chemicals that make herbivore sick when they are eaten inhibit feeding or digestion and disrupt its reproduction or even kill it = 1

- *Calotropis* produces highly poisonous cardiac glycosides so cows and goats can never browse on these plants / Chemical substances like nicotine / caffeine / defences / strychnine / opium are actually defences against grazers & browsers = 1

[3 Marks]

22. What type of organs eye of an Octopus and that of a human called ? Give another example from the animal group and one from the plants of such organs. Name and explain the evolutionary process they exhibit.

Ans Analogous = 1

- Flippers of Penguins & Dolphins / Eye of octopus and mammals = $\frac{1}{2}$ (any other appropriate & correct example)

- Sweet potato (root modification) and potato (stem modification) = $\frac{1}{2}$

They are anatomically dissimilar structure though they perform similar function , convergent evolution = $\frac{1}{2} + \frac{1}{2}$

[3 Marks]

SECTION - D

Q No. 23 is of four mark

23. With the revolution in information technology, now it has become an integral part of everybody's life, living in rural and urban India. You are asked to address the gathering of students of eco-clubs of your neighbourhood schools on generation and management of e-waste.

(a) Write how e-waste is generated.

(b) Explain how would you address the awareness issue of e-waste management amongst the students.

(c) How have the developed countries exploited the developing countries with respect to e-waste managements ?

- Ans (a) irreparable computers / any other electronic good = 1
 (b) Recycling is the only possible solution of e-waste management keeping in mind the safety measures to be adopted by the worker involved in the cycling of e- wastes , so as to avoid their exposure to the toxic substance present in the e- wastes = 1 + 1
 (c) By exporting their e-waste to the developing countries / China / India / Pakistan = 1

[4 Marks]

SECTION - E**Q Nos. 24-26 are of five marks each**

24. (a) **Explain the steps involved in *in vitro* fertilisation popularly known as test tube baby programme.**
 (b) **State the importance of this programme.**

- Ans (a) i) Ova from wife / donor and sperms from husband / donor are collected
 ii) They are induced to form zygote under simulated conditions (in the labortory)
 iii) The zygote or early embryos upto 8 blastomeres could then be transferred to fallopian tube /ZIFT
 iv) Embryos more than 8 blastomeres, into the uterus / IUT/ Intra uterin transfer = 1 × 4
 (b) Allows couples to bear children who were unable to do so naturally = 1

[4+1=5]

OR

- (a) **State one difference and one similarity between geitonogamy and xenogamy.**
 (b) **Explain any three devices developed in flowering plants to discourage self pollination and encourage cross pollination.**

- Ans (a) Difference- In geitonogamy pollen grains from one flower are transferred to the stigma of another flower on the same plant whereas in xenogamy the pollen grains are transferred to the stigma of a flower on another plant(of the same species) genetically similar , genetically different
 Similarity -In both types of pollination pollen grains from the anther are transferred to the stigma of another flower of the same species =1
 (b) - Pollen release & stigma receptivity not synchronised / hence the maturity of stigma and pollen are different /Protandry / Protogyny
 - Anther and Stigma are placed at different positions so that pollen cannot come in contact with stigma of the same flower.
 - Self incompatibility/ Self sterility.
 - Production of unisexual flowers (Any three)= 1 × 3

[5Marks]

25. (a) **Hershey and Chase carried their experiment in three steps : infection, blending, centrifugation. Explain each step.**
 (b) **Write the conclusion and interpretation of the result they obtained.**

- (a) • Infection- Radioactive phosphorus / phosphorus labelled bacteriophages were allowed to infect *E.coli* - growing in a culture medium, simultaneously radioactive sulphur / sulphur labelled bacteriophage was allowed to infect *E.coli* growing in another culture medium = 1+1
 • Blending- As infection proceeds- the viral coats are removed from the bacteria by agitating in a blender =½

- Centrifugation - virus particles were separated from bacteria by spinning them in a centrifuge = ½

(b) Conclusion - DNA is the genetic material = 1

Interpretation - sulphur labelled viral protein did not enter the bacteria during infection, whereas phosphorus labelled viral DNA entered into the bacteria to cause infection = ½ + ½

OR

Taking an example of white-winged moths and dark-winged moths of England in pre and post industrialised era, explain evolution by natural selection.

Ans The number of light winged moths was more during the pre industrialised period in England than dark winged moth where as it reversed in the post industrialised period = 1

In Pre industrialised period the tree trunks were covered with white coloured thick growth of lichens = 1

hence the light coloured moth were not spotted by the predator and their number increased, where as the dark coloured moths were captured and their numbers decreased = 1

During post industrialisation period the tree trunks became dark due to industries smoke and hence the dark coloured moths were not captured by the predators and their number increased where as the light coloured moths were captured and their number decreased = 1

In a mixed population those moths that are better adapted camouflaged to the changed environment survive and increase in population size = 1 [5Marks]

26. (a) **Write the percentage of land area that was covered by forests by the end of the last century.**

(b) **Describe any two practices that led to deforestation.**

(c) **State the consequences of deforestation.**

(d) **Suggest a method to overcome deforestation.**

Ans (a) 19.4% = ½

(b) -Trees are axed for timber / firewood / land for industrial requirement

-Slash and burn agriculture

- habitat loss and fragmentation- clearing of forest land into grass land for raising cattle

(Any two) = 1+1

(c) -Deterioration of our environment in terms of air - water and soil quality.

-causes loss of bio diversity

- disturbance in hydrological cycle / biogeochemical cycle

(Any two) = 1 + 1

(d) Reforestation or any other appropriate alternative = ½

[5Marks]

OR

(a) **Comment on the pattern in which all communities undergo a change in composition and structure with changing environmental conditions.**

(b) **Explain 'Climax community' and 'sere'.**

(c) **Differentiate between primary and secondary succession with examples.**

Ans (a) Orderly and sequential changes parallel with changes in physical environment = 1

(b) climax community-changes finally lead to a community that is in equilibrium with environment = 1

Sere-the entire sequence of communities that successively change in a given area = 1

(c) **Primary succession**

Secondary succession

(i) occurs in newly cooled lava / bare rock / newly created pond.

occurs in abandoned / destroyed forest

(ii) Slow process

Fast Process

½ × 4 = 2

[5Marks]

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