Previous Year Solved Question Papers of

CBSE Class 12 Exams

BIOLOGY – 2017

Compt. All India: Set-3

Original Question Paper + Answer Key

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SET – 3

Series : GBM/C

कोड नं.
Code No. 57/3

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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 *अधिकतम अंक : 70*
Time allowed : 3 hours *Maximum Marks : 70*

सामान्य निर्देश :

(i) *प्रश्न-पत्र में **पाँच** खण्डों में **26** प्रश्न दिए गए हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *खण्ड – **क** में प्रश्न संख्या **1** से **5** अति लघु-उत्तरीय प्रश्न हैं । प्रत्येक प्रश्न **एक** अंक का है ।*

(iii) *खण्ड – **ख** में प्रश्न संख्या **6** से **10** लघु-उत्तरीय प्रश्न प्रकार **I** के हैं, प्रत्येक प्रश्न **दो** अंकों का है ।*

(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. उस एंजाइम का नाम लिखिए जो डीएनए के खंडों को जोड़ने में सहायक है । **1**
Name the enzyme that helps to join DNA fragments.

2. 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.

3. बायोरिएक्टर का कार्य लिखिए । **1**
Write the function of a Bioreactor.

4. उपार्जित प्रतिरक्षा रोग किसे कहते हैं ? **1**

What is an auto-immune disease ?

5. विभिन्न प्रकार के परागकणों का परागकण बैंक में लम्बी अवधि तक भण्डारण किस प्रकार संभव है ? **1**

How are different varieties of pollen grains stored for long period of time in pollen banks ?

खण्ड – ख

SECTION – B

6. 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.

7. उभयलिंगाश्रयी तथा एकलिंगाश्रयी पौधों में विभेद कीजिए । प्रत्येक का एक-एक उदाहरण दीजिए । **2**

Differentiate between monoecious and diocious plants. Give one example of each.

8. कोशिका विभाजन चक्र के समय क्रोमेटेड 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.

9. कुछ विशेष प्रकार के जीवाणु वर्ग को मीथैनोजेन क्यों कहा जाता है ? मीथैनोजेन की किन्हीं दो अभिलाक्षणिक विशेषताओं की सूची बनाइए । **2**

Why are certain group of bacteria referred to as methanogens ? List any two characteristic features of methanogens.

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

Explain the role played by predators in a community.

खण्ड – ग
SECTION – C

11. 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.

12. (अ) पुनर्योगज डीएनए प्रौद्योगिकी में जीवाणु कोशिकाओं को सबसे पहले 'सक्षम' बनाना अनिवार्य क्यों है ? यह प्रक्रम कैसे संपादित होता है ?

(ब) उस विधि का नाम लिखिए जिसके द्वारा विजातीय डीएनए का निवेशन (i) पादप कोशिका (ii) जन्तु कोशिका में कराया जा सकता है । **3**

(a) Why must bacterial cells be first made 'competent' in r-DNA technology ? How is the process carried ?

(b) Name the method by which an alien DNA can be made to enter (i) plant cell; (ii) animal cell.

13. 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.

14. 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 ?

15. 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

16. 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.

17. 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.

18. (अ) किसी एक एकबीजपत्री बीज (दाना) की अनुप्रस्थ–काट का चित्र बनाइए ।

(ब) प्रांकुर चोल, मूलांकुर चोल तथा भ्रूणपोष को नामांकित कीजिए एवं उनके प्रकार्य लिखिए । **3**

(a) Draw a diagram of a sectional view of a monocot seed (grain).

(b) Label and write the functions of coleoptile, coleorhiza, endosperm.

19. 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.

20. (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.

21. 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

22. ड्रग/ऐल्कोहल कुप्रयोग के संदर्भ में निम्नलिखित की व्याख्या कीजिए :

(अ) व्यसन,

(ब) निर्भरता तथा

(स) विनिवर्तन संलक्षण **3**

Explain the following with reference to drug/alcohol abuse :

(a) Addiction, (b) dependence and (c) withdrawal symptoms.

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 – ङ
SECTION – E

24. (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.

25. (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.

26. (अ) बैंगनी रंग के अक्षीय फूल वाले पौधों तथा सफेद रंग के अंत्यस्थ फूल वाले मटर के पौधों के बीच द्विसंकर क्रॉस को F_2 पीढ़ी तक दर्शाइए । उनका दृश्य प्ररूप (फीनोटाइप) अनुपात बताइए ।

(ब) इस प्रकार के क्रॉस के आधार पर प्रतिपादित मेंडल के वंशागति का नियम लिखिए । **4 + 1 = 5**

अथवा

(अ) फिंच पक्षियों के उदाहरण द्वारा डार्विन ने अनुकूली विकिरण की व्याख्या कैसे की ?

(ब) विकास के विषय में डार्विन का दृष्टिकोण डीवेरीज़ के मत से किस प्रकार भिन्न है ? **2 + 3 = 5**

(a) Work out a dihybrid cross upto F_2 generation between pea plants bearing violet coloured axial flowers and white coloured terminal flowers. Give their phenotypic ratio.

(b) State the Mendel's law of inheritance that was derived from such a cross.

OR

(a) How did Darwin explain adaptive radiation by taking an example of finches ?

(b) How did Darwin's view on evolution differ from that of de-Vries ?

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21.07.2017

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 subsitute.

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 57/3

SECTION – A

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

1. Name the enzyme that helps to join DNA fragments. [1 Mark]

Ans (DNA) ligase

2. 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 = ½ + ½

[1 Mark]

3. 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]

4. What is an auto-immune disease

Ans When the body attacks self cells it results in damage

5. How are different varieties of pollen grains stored for long period of time in pollen banks ?

Ans In Liquid nitrogen (- 196 ^{0} C) / cryopreservation

[1 Mark]

SECTION - B

Q Nos. 6-10 are of two marks each

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

Ans Attacks insect, and other arthropods = ½ × 2

Nucleopolyhedrovirus = 1 [2 Marks]

7. Differentiate between monoecious and dioecious plants. Give one example of each.

Ans Monoecious- bisexual condition of a plant / when both male and female flowers are on the same plant , e.g coconut palm /cucurbits / or any other correct example = ½ + ½

Dioecious -unisexual conditon of a plant / male and female flowers present on different plants , eg- Papaya / date palm / or any other correct example = ½ + ½ [2 Marks]

8. 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

= ½ × 4 [2 Marks]

9. Why are certain group of bacteria referred to as methanogens ? List any two characteristic features of methanogens.

Ans There are methane producing bacteria = 1

They are anaerobic , break down cellulose to produce methane ½ + ½ =1

10. 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]

SECTION - C

Q Nos. 11-22 are of three marks each

11 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 = ½ (any other appropriate & correct example)

- Sweet potato (root modification) and potato (stem modification) = ½

They are anatomically dissimilar structure though they perform similar function , convergent evolution = ½ + ½

[3 Marks]

12 (a) Why must bacterial cells be first made 'competent' in r-DNA technology ? How is process carried ?

(b) Name the method by which an alien DNA can be made to enter (i) plant cell; (ii) animal cell.

Ans (a) Since DNA is hydrophillic , it cannot pass through cell membrane hence bacterial cells are made competent = ½ + ½

by treatment with a specific concentration of a divalent cation,such as Ca^{++} which increases efficiency of entry of DNA through the pores of cell wall = 1

(b) i) plant cells - biolistic/ gene guns = ½

ii) animal cells- Micro injection = ½

[3 Marks]

13. 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]

14. 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 = ½ × 4

[3 Marks]

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

S.No.	Component-I	Component-11	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]

16. 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

<u>Steps to be followed in Poultry Management</u>

- 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]

17. 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

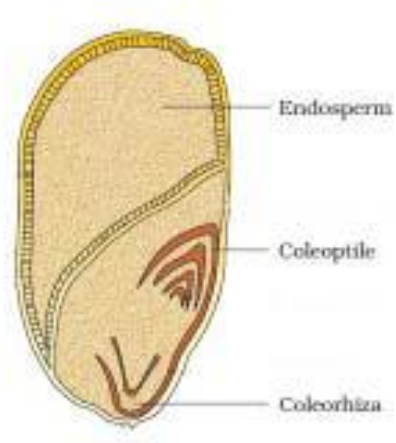
- Specific Bt toxin genes were isolated from *Bacillus thuringiensis* , incorporated into several crop plants such as cotton = ½ × 2

[3 Marks]

18. (a) Draw a diagram of a sectional view of monocoat seed (grain).

(b) Label and write the functions of coleoptile , coleorhiza , endosperm .

Ans



= ½ × 3

Functions

coleoptile- sheath of plumule / protection of plumule

coleorhiza- sheath of radicle / protection of radicle

endosperm- filled with reserve food materials for nutrition of developing embryo. = ½ × 3

19. 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

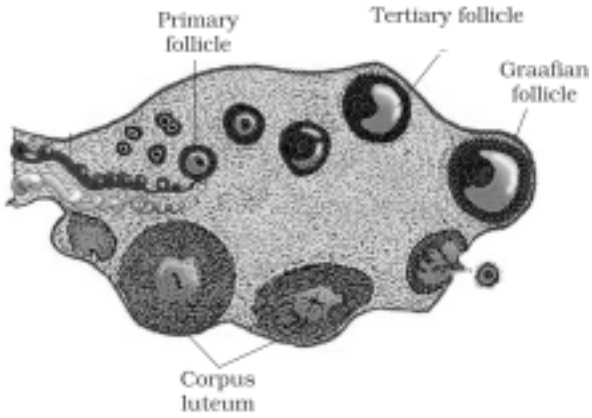
ii) Ori - helps to start replication and any piece of DNA when linked to this sequence can be made to replicate within host cell, responsible for controlling the copy number of the linked DNA = ½ + ½

iii) rop-codes for the proteins involved in the replication of the plasmid = 1 [3 Marks]

20. (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

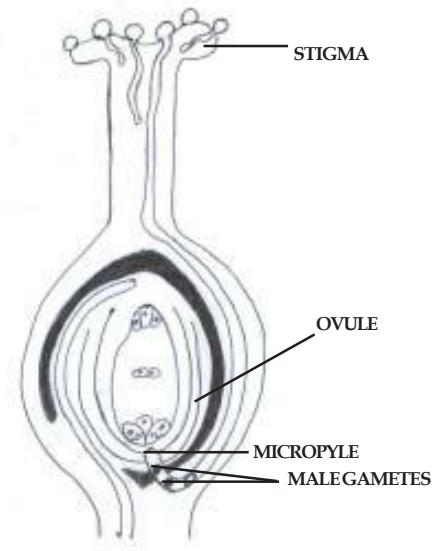
b) Secretes (large amounts of) progesterone , which is essential for maintenance of endometrium = ½ × 2

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)



=½× 4

(b) the pollen tube enters the ovule through micropyle , it facilitates the entry of oxygen and water for seed germination. = ½ + ½ [3 Marks]

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

Name of Enzyme/ Bioactive Molecule		Source	Functions
(i)	a	Streptococcus	b
(ii)	c organ	d	Immuno-suppressive agent in 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]

22. Explain the following with reference to drug/alcohol abuse : (a) Addiction, (b) dependence and (c) withdrawal symptoms.

Ans (a) Addiction- frequent use of drugs / alcohol leads to increase in the level of tolerance of receptors present in our body , thus making these receptors respond to only higher doses of

drugs / alcohol = ½ + ½

//

Psychological attachment to certain effects such as euphoria and temporary feeling of well being associated with drugs and alcohol = 1

(b) Dependence - Due to inherent addictive nature / its psychological attachment to drugs / alcohol and are unable to live without them = 1

(c) Withdrawal syndrome-when a person is taking drugs / alcohol regularly and the intake of drugs is abruptly discontinued it leads to various characteristics symptoms (nausea, anxiety, shakiness, sweating etc.) = 1

[3 Marks]

SECTION - D

Q Nos. 23 are of four marks each

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) 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 succesion	**Secondary sucession**	
(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]

25 (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]

26. (a) Work out a dihybrid cross upto F_2 generation between pea plants bearing violet coloured axial flowers and white coloured terminal flowers. Give their phenotypic ratio.

(b) State the Mendel's law of inheritance that was derived from such a cross.

Ans. (a) **Parents :** **V V A A** × **v v a a** = (1)
Violet , axial **White , terminal**

gametes : VA va

F_1 VvAa (Violet axial) = 1

F_2

	VA	vA	Va	va
VA	VVAA Violet axial	VvAA Violet axial	VVAa Violet axial	VvAa Violet axial
vA	VvAA Violet axial	vvAA White Axial	VvAa Violet axial	vvAa White Axial
Va	VVAa Violet axial	VvAa Violet axial	VVaa Violet terminal	Vvaa Violet terminal
va	VvAa Violet axial	vvAa white Axial	Vvaa Violet terminal	vvaa White terminal

= 1

Phenotypes –	violet axial	:	white axial	:	violet terminal	:	white terminal
Phenotype ratio –	9	:	3	:	3	:	1 =1

(b) Law of Independent Assortment : When two pairs of traits are combined in a hybrid segregation of one pair of characters is independent of the other pair of characters = 1

OR

(a) How did Darwin explain adaptive radiation by taking an example of finches ?
(b) How did Darwin's view on evolution differ from that of de-Vries ?

Ans a) Darwin conjectured that the birds evolved on the island itself = ½

There were seed-eating features and other altered beaks arose allowing different types of food eating habits like insectivorous and vegetarian finches = ½

This process of evolution of different species in a given geographical area starting from a point and radiating to other areas of (geographical) habitats is called adaptive radiation = 1

b)

Darwin	**de Vries**
-Minor Variation(heritable) cause evolution	-Mutation caused evolution
-Variations are small and directional	-Mutation are random and directionless
-Evolution is gradual	-Single step large mutation / saltation causes speciation = 1 × 3 =3

[2 + 3=5]

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