Series OSR/2

कोड नं. **57/2/3**
Code No.

रोल नं.
Roll No.

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 **11** 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 **30** 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 **11** 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 **30** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes 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 घण्टे *अधिकतम अंक : 70*

Time allowed : 3 hours *Maximum Marks : 70*

सामान्य निर्देश :

(i) ***सभी*** *प्रश्न अनिवार्य हैं ।*

(ii) *इस प्रश्न-पत्र में चार खण्ड* ***A, B, C*** *और* ***D*** *हैं । खण्ड* ***A*** *में 8 प्रश्न हैं जिनमें प्रत्येक का* ***एक*** *अंक है, खण्ड* ***B*** *में* ***10*** *प्रश्न हैं जिनमें प्रत्येक के* ***दो*** *अंक हैं, खण्ड* ***C*** *में* ***9*** *प्रश्न हैं जिनमें प्रत्येक के* ***तीन*** *अंक हैं तथा खण्ड* ***D*** *में* ***3*** *प्रश्न हैं जिनमें प्रत्येक के* ***पाँच*** *अंक हैं ।*

(iii) *कोई समग्र चयन-विकल्प (ओवरऑल चॉइस) उपलब्ध नहीं है । फिर भी,* ***2*** *अंकों वाले एक प्रश्न में,* ***3*** *अंकों वाले एक प्रश्न में और* ***5*** *अंकों वाले सभी तीनों प्रश्नों में भीतरी चयन-विकल्प दिए गए हैं । ऐसे प्रश्नों में विद्यार्थी को केवल एक ही विकल्प का उत्तर देना है ।*

(iv) *जहाँ भी आवश्यक हो, बनाए जाने वाले आरेख साफ़-सुथरे तथा समुचित रूप में नामांकित हों ।*

General Instructions :

(i) ***All*** *questions are compulsory.*

(ii) *This question paper consists of four Sections* ***A, B, C*** *and* ***D****. Section* ***A*** *contains* ***8*** *questions of* ***one*** *mark each, Section B is of* ***10*** *questions of* ***two*** *marks each, Section* ***C*** *is of* ***9*** *questions of* ***three*** *marks each and Section* ***D*** *is of* ***3*** *questions of* ***five*** *marks each.*

(iii) *There is no overall choice. However, an internal choice has been provided in one question of* ***2*** *marks, one question of* ***3*** *marks and all the three questions of* ***5*** *marks weightage. A student has to attempt only one of the alternatives in such questions.*

(iv) *Wherever necessary, the diagrams drawn should be neat and properly labelled.*

खण्ड A

SECTION A

1. कोहेन तथा बोयेर द्वारा रचित सबसे पहले कृत्रिम पुनर्योगज DNA अणु के दो घटकों के नाम लिखिए । *1*

Write the two components of the first artificial recombinant DNA molecule constructed by Cohen and Boyer.

2. उस स्रोत जीवधारी का वैज्ञानिक नाम लिखिए जिससे सबसे पहली ऐंटीबायोटिक बनायी गयी थी । *1*

Give the scientific name of the source organism from which the first antibiotic was produced.

3. दात्र कोशिका अरक्तता से पीड़ित किसी व्यक्ति में सामान्य लाल रक्त कोशिकाएँ लम्बी और दात्र आकृति की क्यों हो जाती हैं ? *1*

Why do normal red blood cells become elongated sickle shaped structures in a person suffering from sickle cell anaemia ?

4. किसी आवृतबीजी के परिपक्व भ्रूण-कोष में पाए जाने वाले सूत्राकार उपकरण (तंतुरूप समुच्चय) का कार्य बताइए । *1*

State the function of filiform apparatus found in mature embryo sac of an angiosperm.

5. नाभिकीय ऊर्जा के प्रदूषणकारी न होते हुए भी बिजली उत्पादन के लिए इसके इस्तेमाल पर भारी आशंकाएँ बनी हुई हैं, ऐसा क्यों ? *1*

In spite of being non-polluting, why are there great apprehensions in using nuclear energy for generating electricity ?

6. मॉन्ट्रीयल प्रोटोकोल पर हस्ताक्षर करने का उद्देश्य बताइए । *1*

State the purpose of signing the Montreal Protocol.

7. उन एंज़ाइमों के नाम लिखिए जिनका इस्तेमाल क्रमश: जीवाणु कोशिकाओं के तथा कवक कोशिकाओं के DNA के पृथक्करण के लिए किया जाता है । *1*

Write the names of the enzymes that are used for isolation of DNA from bacterial and fungal cells respectively for Recombinant DNA Technology.

8. उन परपोषी कोशिकाओं का नाम लिखिए जिनके भीतर विजातीय DNA प्रवेश कराने के लिए सूक्ष्म अंतःक्षेपण तकनीक इस्तेमाल की जाती है । *1*

Name the host cells in which micro-injection technique is used to introduce an alien DNA.

खण्ड B

SECTION B

9. आनुवंशिक कूट के मुख्य पहलुओं में से एक यह है कि यह बैक्टीरिया से लेकर मानवों तक सभी में लगभग सार्वत्रिक होता है । इस नियम के दो अपवाद बताइए । यह भी लिखिए कि कुछ कूटों को अपह्रासित क्यों कहा जाता है । *2*

One of the salient features of the genetic code is that it is nearly universal from bacteria to humans. Mention two exceptions to this rule. Why are some codes said to be degenerate ?

10. "अपनयन सिंड्रोम" किसे कहते हैं ? इसके कोई दो विशिष्ट रोगलक्षण लिखिए । *2*

What is "withdrawal syndrome" ? List any two symptoms it is characterised by.

11. एक उपयुक्त उदाहरण की सहायता से विलोमानुक्रमी न्यूक्लियोटाइड अनुक्रम के विषय में समझाइए । *2*

Explain palindromic nucleotide sequence with the help of a suitable example.

12. फ़सली पौधों में कृत्रिम संकरण कराने में कौन-कौन से दो चरण अनिवार्य हैं, सूची बनाइए, और वे ऐसा क्यों हैं, यह भी लिखिए । *2*

List the two steps that are essential for carrying out artificial hybridization in crop plants and why.

13. केवल पौधों से एक-एक उदाहरण लेकर समझाइए कि सहभोजिता तथा सहोपकारिता (परस्परहितता) में क्या अंतर है । *2*

Differentiate between commensalism and mutualism by taking one example each from plants only.

14. (a) ओज़ोन परत के रिक्तीकरण का क्या कारण रहा है, लिखिए ।

(b) ऐसा होने से मानव शरीर पर पड़ सकने वाले कोई दो दुष्प्रभाव बताइए । *2*

(a) State the cause of depletion of ozone layer.

(b) Specify any two ill-effects that it can cause in the human body.

15. अमेरिकी कम्पनी एलि लिल्ली ने पुनर्योगज DNA प्रौद्योगिकी द्वारा इंसुलिन का किस प्रकार उत्पादन किया था, समझाइए । *2*

Explain how Eli Lilly, an American company, produced insulin by recombinant DNA technology.

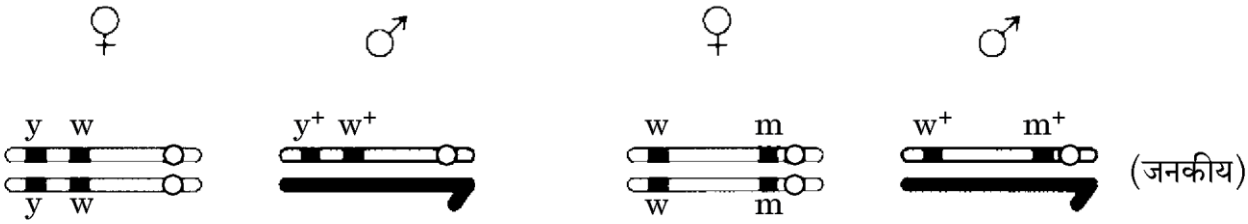
16. नीचे एक रूपदा रज्जुक दिया गया है । उसके अनुरूपी कोडीकरण और बन सकने वाले mRNA रज्जुकों को उनकी ध्रुवता सहित लिखिए । *2*

3′ ATGCATGCATGCATGCATGCATGC 5′

अथवा

नीचे दिए जा रहे चित्रों का अध्ययन कीजिए और पूछे जा रहे प्रश्न का उत्तर दीजिए : *2*

संकरण A **संकरण B**



पहचानकर बताइए कि किस संकरण में जीनों के बीच की सहलग्नता शक्ति उच्चतर है । अपने उत्तर के समर्थन में कारण बताइए ।

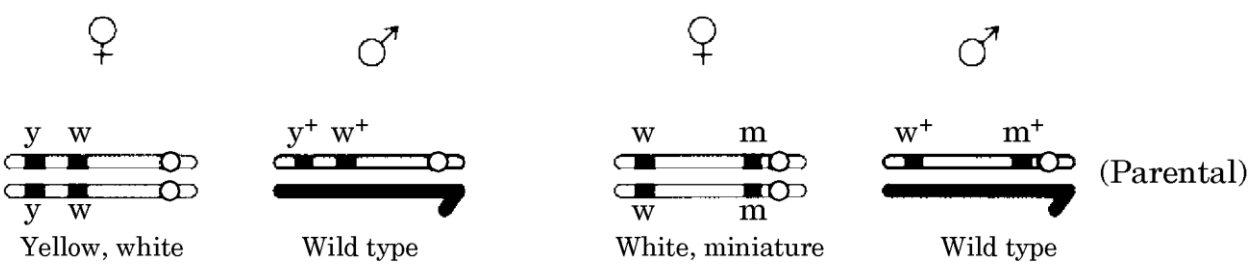
A template strand is given below. Write down the corresponding coding strand and the mRNA strand that can be formed, along with their polarity.

3′ ATGCATGCATGCATGCATGCATGC 5′

OR

Study the figures given below and answer the question.

Cross A **Cross B**



Identify in which of the crosses is the strength of linkage between the genes higher. Give reasons in support of your answer.

17. न्यूक्लिओसोम का एक नामांकित आरेख बनाइए । कोशिका के भीतर यह कहाँ पाया जाता है ? *2*

Draw a labelled diagram of a nucleosome. Where is it found in a cell ?

18. किन्हीं ऐसे दो जीवधारियों के नाम और निहित परिघटना लिखिए जिनमें बिना निषेचन हुए ही मादा युग्मक में परिवर्धन होकर नए जीव बन जाते हैं । *2*

Name any two organisms and the phenomenon involved where the female gamete undergoes development to form new organisms without fertilization.

खण्ड C

SECTION C

19. "जैव-प्रबलीकरण" किसे कहते हैं ? इसका महत्त्व बताइए । भारतीय कृषि अनुसंधान संस्थान का इसमें क्या योगदान रहा है, दो उदाहरणों की सहायता से इसे बताइए । *3*

What is "biofortification" ? Write its importance. Mention the contribution of Indian Agricultural Research Institute towards it with the help of two examples.

20. (a) पौलीमरेज़ चेन रिऐक्शन (PCR) में निहित तीन चरण क्या-क्या हैं, सूची बनाइए ।

(b) Taq पौलीमरेज़ के स्रोत जीव का नाम लिखिए । PCR में इस एंज़ाइम की विशिष्ट भूमिका क्या है, समझाइए । *3*

(a) List the three steps involved in Polymerase Chain Reaction (PCR).

(b) Name the source organism of Taq polymerase. Explain the specific role of this enzyme in PCR.

21. नीचे दी जा रही तालिका में a, b, c, d, e तथा f को पहचानिए, वे क्या हैं : *3*

जीव का वैज्ञानिक नाम	बनाया गया उत्पाद	मानव कल्याण में उपयोग
स्ट्रेप्टोकॉक्कस	स्ट्रेप्टोकाइनेज़ जिसे बाद में रूपांतरित किया गया	*a*
b	साइक्लोस्पोरिन A	*c*
मोनैस्कस परप्यूरियस	*d*	*e*
लेक्टोबैसिलस	*f*	दूध को दही में बदल देता है

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

Scientific Name of the organism	Product produced	Use in human welfare
Streptococcus	Streptokinase that was later modified	*a*
b	Cyclosporin A	*c*
Monascus purpureus	*d*	*e*
Lactobacillus	*f*	sets milk into curd

22. *प्लाज़्मोडियम* के उस स्वरूप का नाम लिखिए जो मानव शरीर में प्रविष्ट हुआ करता है । मानव शरीर में इसके जीवन-चक्र की विभिन्न अवस्थाएँ समझाइए । *3*

अथवा

(a) कोलोस्ट्रम (नवस्तन्य) तथा टीकाकरणों से नवजात को प्रदान होने वाली प्रतिरक्षा के प्रकार का नाम लिखिए और कारण बताते हुए उसके विषय में समझाइए ।

(b) निम्नलिखित में पाए जाने वाले ऐंटीबॉडी (प्रतिपिंड) के प्ररूप का नाम लिखिए : *3*

(i) कोलोस्ट्रम में पाए जाने वाले

(ii) मानव शरीर में एलर्जनों की अनुक्रिया से बनने वाले

Name the form of *Plasmodium* that gains entry into the human body. Explain the different stages of its life-cycle in the human body.

OR

(a) Name and explain giving reasons, the type of immunity provided to the newborn by the colostrum and vaccinations.

(b) Name the type of antibody

(i) present in colostrum

(ii) produced in response to allergens in human body.

23. (a) उस वैज्ञानिक का नाम लिखिए जिसने एक ऐसे अनुकूलक अणु की अभिधारणा की थी जो प्रोटीन संश्लेषण में सहायता कर सकता है ।

(b) एक आरेख की सहायता से इस अणु की संरचना का वर्णन कीजिए । प्रोटीन संश्लेषण में इसकी भूमिका का उल्लेख कीजिए । *3*

(a) Name the scientist who postulated the presence of an adapter molecule that can assist in protein synthesis.

(b) Describe its structure with the help of a diagram. Mention its role in protein synthesis.

24. मानव शुक्राणु का आरेख बनाइए । इसमें केवल उन भागों का नामांकन कीजिए एवं उन्हीं के कार्यों का वर्णन भी कीजिए, जो मादा युग्मक तक पहुँचने और उसमें प्रवेश करने में शुक्राणु की सहायता करते हैं । *3*

Draw a diagram of a human sperm. Label only those parts along with their functions, that assist the sperm to reach and gain entry into the female gamete.

25. उस शल्य-चिकित्सा विधि का नाम लिखिए और समझाइए जिसके द्वारा मानव नरों और मादाओं में जनन नियंत्रण किया जा सकता है । इसका एक लाभ और एक अलाभ बताइए । *3*

Name and explain the surgical method advised to human males and females as a means of birth control. Mention its one advantage and one disadvantage.

26. वायु-परागित तथा कीट-परागित फूलों में क्या-क्या भिन्नताएँ होती हैं, लिखिए । प्रत्येक प्रकार का एक-एक उदाहरण दीजिए । *3*

Write the differences between wind-pollinated and insect-pollinated flowers. Give an example of each type.

27. इस समय दिल्ली की वायु की गुणवत्ता उससे कहीं ज़्यादा उन्नत हो गयी है जितनी कि 1997 से पहले हुआ करती थी । ऐसा होना बहुत ज़्यादा सचेतन मानव प्रयासों का परिणाम है । आपसे कहा जा रहा है कि आप अपनी बस्ती में एक जागरूकता कार्यक्रम चलाएँ जिसमें आप उन चरणों पर टिप्पणी करेंगे जो दिल्ली सरकार ने वायु गुणवत्ता को सुधारने के लिए उठाए थे । *3*

(a) अपनी कोई दो टिप्पणियाँ लिखिए ।

(b) ऐसी कोई दो विधियों की सूची बनाइए जिन्हें आप अपने कार्यक्रम मे शामिल करना चाहेंगे ताकि वायु की अच्छी गुणवत्ता बनाए रखना सुनिश्चित किया जा सके ।

(c) ऐसे कोई दो मूल्य बताइए जिन्हें आपका कार्यक्रम आपकी बस्ती में रहने वाले लोगों में पैदा करेगा ।

Presently, air quality of Delhi has significantly improved in comparison to what existed before 1997. This is the result of a lot of conscious human efforts. You are being asked to conduct an awareness programme in your locality wherein you will comment on the steps taken by Delhi Government to improve the air quality.

(a) Write any two of your comments.

(b) List any two ways that you would include in your programme so as to ensure the maintenance of good quality of air.

(c) State any two values your programme will inculcate in the people of your locality.

खण्ड D

SECTION D

28. (a) प्राथमिक तथा द्वितीयक पारिस्थितिक अनुक्रमणों में विभेद कीजिए ।

(b) प्रकृति में होते रहने वाले शुष्कतारंभी अनुक्रमण के विभिन्न चरण समझाइए । *5*

अथवा

(a) जैवविविधता के संरक्षण की क्यों आवश्यकता है ?

(b) जैवविविधता के ह्रास के लिए उत्तरदायी किन्हीं दो विधियों के नाम लिखिए और उनके विषय में समझाइए । *5*

(a) Differentiate between primary and secondary ecological successions.

(b) Explain the different steps of xerarch succession occurring in nature.

OR

(a) Why is there a need to conserve biodiversity ?

(b) Name and explain any two ways that are responsible for the loss of biodiversity.

29. मानवों में थैलेसीमिया पैदा करने वाले जीन का प्ररूप और उसके पाए जाने का स्थान लिखिए । इस रोग के होने का कारण और इसके रोगलक्षण लिखिए । इस रोग की तुलना में दात्र कोशिका अरक्तता किस प्रकार भिन्न होती है ? *5*

अथवा

(a) हार्डी-वीनबर्ग सिद्धांत का वर्णन कीजिए ।

(b) आनुवंशिक साम्य को प्रभावित करने वाले किन्हीं चार कारकों की सूची बनाइए ।

(c) संस्थापक प्रभाव का वर्णन कीजिए । *5*

Write the type and location of the gene causing thalassemia in humans. State the cause and symptoms of the disease. How is sickle cell anaemia different from this disease ?

OR

(a) Describe Hardy-Weinberg Principle.

(b) List any four factors which affect genetic equilibrium.

(c) Describe founder effect.

30. (a) उन सूक्ष्मजीवों की श्रेणी का नाम लिखिए जो वाहित मल में प्राकृतिक रूप में हुआ करते हैं और मल-उपचार के दौरान उसे कम प्रदूषित बना देते हैं ।

(b) वाहित मल के द्वितीयक उपचार के दौरान होने वाले विभिन्न चरणों के विषय में समझाइए । *5*

अथवा

(a) मानवों में पाए जाने वाले किन्हीं चार लसीकाभ अंगों के नाम लिखिए एवं उनके विषय में समझाइए ।

(b) नाम लिखे गए लसीकाभ अंगों को कारण बताते हुए प्राथमिक अथवा द्वितीयक लसीकाभ अंगों में वर्गीकृत कीजिए । *5*

(a) Name the category of microbes occurring naturally in sewage and making it less polluted during the treatment.

(b) Explain the different steps involved in the secondary treatment of sewage.

OR

(a) Name and explain any four lymphoid organs present in humans.

(b) Categorise the named lymphoid organs as primary or secondary lymphoid organs, giving reasons.

Question Paper Code 57/2/3

SECTION A

Q.Nos.1-8 are of one mark each

1. Write the two components of the first artificial recombinant DNA molecule constructed by Cohen and Boyer.

Ans. Restriction enzyme , Vector = ½ +½

[1 mark]

2. Give the scientific name of the source organism from which the fist antibiotic was produced.

Ans. *Penicillium notatum*

[1 mark]

3. Why do normal red blood cells become elongated sickle shaped structures in a person suffering from sickle cell anaemia?

Ans. The mutant haemoglobin molecule (substitution of Glutamic acid by valine) undergoes polymerization, under low oxygen tension causing the change. = ½ +½

[1 mark]

4. State the function of filiform apparatus found in mature embryo sac of an angiosperm.

Ans. Filiform apparatus helps to guide pollen tubes into synergid

[1 mark]

5. In spite of being non- polluting why are there great apprehensions in using nuclear energy for generating electricity?

Ans. Accidental leakages , safe disposal of radioactive waste = ½ +½

[1 mark]

6 State the purpose of signing the Montreal Protocol.

Ans. To control the emission of ozone depleting substances.

[1 mark]

7. Write the names of the enzymes that are used for isolation of DNA form bacterial and fungal cells respectively for Recombinant DNA Technology.

Ans. Lysozyme for bacterial cells , chitinase for fungal cells = ½ + ½

[1 mark]

8. Name the host cells in which micro –injection technique is used to introduce an alien DNA.

Ans. Animal cell

[1 mark]

Section B

9. One of the salient features of the genetic code is that it is nearly universal from bacteria to humans. Mention two exceptions to this rule . Why are some codes said to be degenerate?

Ans. (i) Mitochondrial codons , = ½

(ii) Some protozoans = ½

Since some amino acids are coded by more than one codon hence it is called as degenerate = 1

[2 marks]

10. What is "withdrawal syndrome"? List any two symptoms it is characterized by.

Ans. Manifestation of unpleasant characteristic when a regular dose of drugs / alcohol is abruptly discontinued = 1

Unpleasant feeling , Anxiety , shakiness , nausea , sweating = 1+½ +½

(Any two)

[2 marks]

11. Explain palindromic nucleotide sequence with the help of a suitable example.

Ans. Palindrome in DNA is a sequence of base pairs that reads the same on two strands when orientation of reading is the same = 1

example : 5' —— GAATTC —— 3'

3' —— CTTAAG —— 5' = 1

[2 marks]

12. List the two steps that are essential for carrying out artificial hybridization in crop plants and why.

Ans. Hybridization of pure lines , artificial selection = ½ + ½

to produce plants with desirable traits. (high yield , nutrition and resistance to diseases) = 1

[1 + 1 = 2 marks]

13. Differentiate between commensalism and mutualism by taking one example each from plants only.

Ans. Commensalism - In this interaction one species is benefited and the other species is neither benefited nor harmed. = ½

e.g. an orchid growing as an epiphyte on the branch of a mango. = ½

Mutualism- In this interaction both the interacting species are benefited. = ½

e.g. Lichens exhibit mutualistic relationship between a fungus that absorbs water and nutrients from soil and photosynthesizing algae / cyanobacteria. = ½

[½ ×4 = 2 marks]

14. (a) State the cause of depletion of ozone layer.

(b) Specify any two ill – effects that it can cause in the human body.

Ans. (a) (i) UV radiations acts upon CFCs (chlorofluorocarbons) , releasing Cl atoms (in the stratosphere) the Cl atoms degrade ozone. = ½ + ½

(ii) Ageing of skin / skin cancer , inflammation of cornea / snowblindness / cataract / permanently damaged cornea. ***(Any two)*** = ½ + ½

[2 marks]

15. Explain how Eli Lilly an American company produced insulin by recombinant DNA technology.

Ans. Prepared two DNA sequences corresponding to A and B chains of human insulin , introduced them in plasmid of E. coli to produce insulin chains , separately produced chains A and B extracted , combined by creating disulfide bonds = ½ × 4

[2 marks]

16. A template strand is given below .Write down the corresponding coding strand and the mRNA strand that can be formed along with their polarity

3'ATGCATGCATGCATGCATGCATGC5'

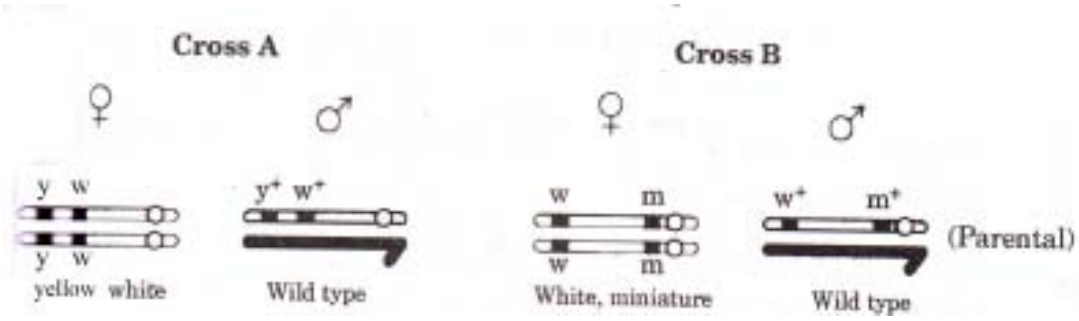
Ans. Coding strand-5' TACGTACGTACGTACGTACGTACG 3'

mRNA strand- 5' UACGUACGUACGUACGUACGUACG 3' = 1+1

[2 marks]

OR

Study the figures given below and answer the question.



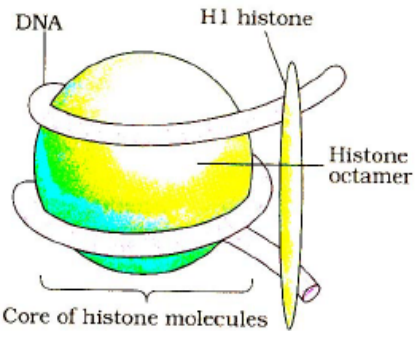
Identify in which of the crosses is the strength of Linkage between the genes higher .Give reasons in support of your answer.

Ans. Cross A, because they are tightly linked / due to close physical association / they are closely located = 1+1

[2 marks]

17. Draw a labeled diagram of nucleosome. Where is it found in a cell?

Ans.



Label any three parts = ½ × 3 = 1½

Location : chromatin of nucleus = ½

[2 marks]

18. Name any two organisms and the phenomenon involved where the female gamete undergoes development to form new organisms without fertilization .

Ans. Rotifers / honeybees / some lizards / turkey

(Any two) = ½ + ½

Parthenogenesis = 1

[2 marks]

SECTION C

19. What is "biofortification" ? Write its importance. Mention the contribution of Indian Agricultural Research Institute towards it with the help of two examples.

Ans. Breeding crops with higher level of vitamins and minerals , higher proteins , healthier fats, to improve public health , = ½ × 4

I ARI has released several vegetable crops that are rich in vitamins and minerals e.g. Vitamin A enriched carrots , spinach , pumpkin,vitamin C enriched bitter gourd , bathua, mustard , tomato,iron and calcium enriched spinach and bathua , protein enriched beans , lablab , French and garden pea

(Any two) = ½ + ½

[2 + 1 = 3 marks]

20. (a) List the three steps involved in Polymerase Chain reaction (PCR).

(b) Name the source organism of Taq polymerase. Explain the specific role of this enzyme in PCR.

Ans. (a) (i) Denaturation (ii) annealing (iii) Extension = ½ × 3

(b) *Thermus aquaticus* , it remains active during the high temperature , (induced to denature double stranded DNA) and catalyses polymerisation of DNA = ½ × 3

[1½ + 1½ =3 marks]

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

Scientific Name of the organism	**Product produced**	**Use in human welfare**
Streptococcus	**Streptokinase that was later modified**	**a**
b	**Cyclosporin A**	**c**
Monascus purpureus	***d***	***e***
Lactobacillus	**f**	**Sets milk into curd**

Ans. a - clot buster for removing clots from blood vessels

b - *Trichoderma polysporum*

c - Immunosuppressive agent in organ transplant

d - Statins

e - Blood cholesterol lowering agent

f - Lactic acid = ½ × 6

[3 marks]

22. Name the form of *Plasmodium* that gains entry into the human body .Explain the different stages of its life –cycle in the human body.

Ans. Sporozoites , Sporozoites reach the liver through blood, the parasite reproduces asexually in liver cells , the parasite reproduces asexually in red blood cells , bursting the RBCs and releasing into the blood, Gametocytes develop in RBCs = ½ × 6 = 3

[3 marks]

OR

(a) Name and explain giving reasons the type of immunity provided to the newborn by colostrum and vaccinations.

(b) Name the type of antibody

I. Present in colostrum

II. Produced in response to allergens in human body .

Ans. (a) passive immunity , when readymade antibodies are directly given to protect the body against foreign agents = ½ + ½

Active immunity , when a host is exposed to antigens which may be forms of living or dead microbes or other proteins antibodies are produced in the host body. = ½ + ½

(b) (i) IgA = ½

(ii) IgE = ½

[3 marks]

23. (a) Name the scientist who postulated the presence of an adapter molecule that can assist in protein synthesis.

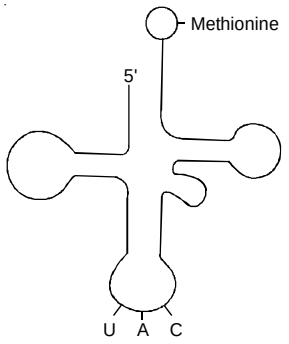
(b) Describe its structure with the help of a diagram. Mention its role in protein synthesis.

Ans. (a) Francis Crick = ½

(b) Clover leaf / inverted L ,

Anticodon loop (complementary to codon of mRNA) , acceptor end (to bind amino acid) = ½ × 3 = 1½

//



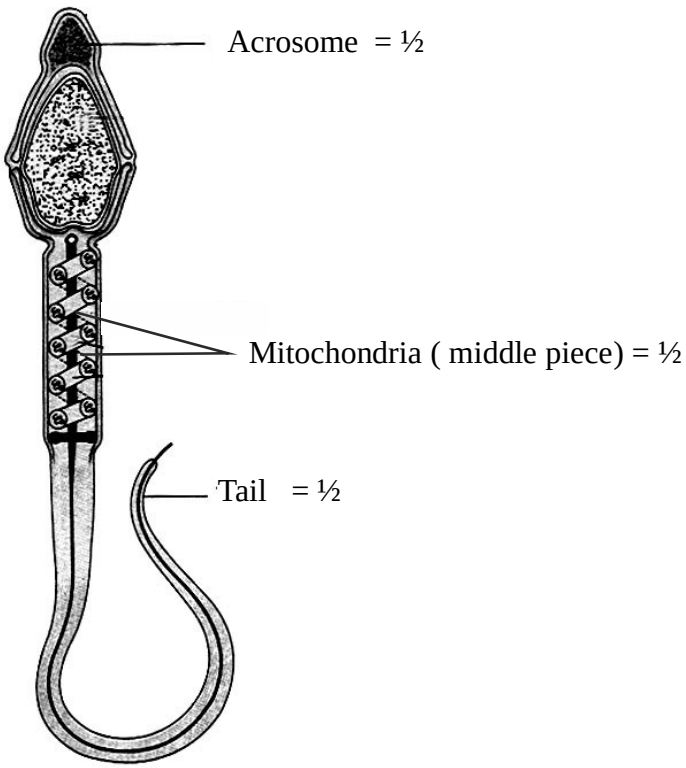
= 1½

It reads the codons on mRNA with the help of anticodon loop , brings the corresponding amino acid for the formation of polypeptide chain = ½ + ½

[3 marks]

24. Draw a diagram of a human sperm. Label only those parts along with their functions that assist the sperm to reach and gain entry into the female gamete.

Ans.



Functions :

- Acrosome : filled with enzymes that help enter the ovum = ½
- Mitochondria (middle piece) : energy source for movement of tail to reach ovum = ½
- Tail : for motility = ½

[3 marks]

25. Name and explain the surgical method advised to human males and females as a means of birth control. Mention its one advantage and one disadvantage.

Ans. Vasectomy & Tubectomy = ½ + ½

Devoid of ill effects of contraceptive (like nausea , abdominal pain , breakthrough bleeding , irregular menstruation or breast cancer) ,

Reversibility is very poor = 1 + 1

[3 marks]

26. Write the differences between wind – pollinated and insect – pollinated flowers. Give an example of each type.

Ans. **Wind pollinated** – light and non sticky pollen grains / possess well exposed stamens / large and feathery stigma / not very colourful / do not produce nectar ,

eg.- Maize / wheat (Any other suitable example) = ½

Insect pollinated- large colorful fragrant flowers / rich in nectar / clustered into inflorescence when flowers are small / secrete foul odour.

(Any two corresponding differences) = 1 + 1

eg.Pansy = ½

(Any other suitable example)

[3 marks]

27. Presently , air quality of Delhi has significantly improved in comparison to what existed before 1997.This is result of conscious human efforts .You are being asked to conduct an awareness programme in your locality wherein you will comment on the steps taken by Delhi Government to improve the air quality.

(a) Write any two of your comments.

(b) List any two ways that you would include in your programme so as to ensure the maintenance of good quality of air.

(c) State any two values your programme will inculcate in the people of your locality.

Ans. (a) (i) Use of CNG as fuel encouraged in vehicles

(ii) Improved public transport system like new fleet of DTC buses , Introduced Metro

(iii) Pollution check of vehicles was made mandatory

(iv) Availability of sulphur free fuel (Euro II norms)

(Any other suitable value) (***Any two)*** = ½ + ½

(b) (i) Car pool essential

(ii) Use of bicycle

(iii) Get your car pollution checked regularly

(Any other suitable example) (***Any two)*** = ½ + ½

(c) (i) Consciousness about the environment

(ii) Concern for others

(iii) Improving social skills

(iv) Leadership quality

(Any other suitable example) (***Any two)*** = ½ + ½

[3 marks]

SECTION D

28. (a) Differentiate between primary and secondary ecological succession .

(b) Explain the different steps of xerarch succession occurring in nature.

Ans. (a)

Primary Succession	**Secondary Succession**
- starts where no living organism existed previously	- starts where life existed earlier and got lost

- new biotic communities are formed on bare rock / lava and so it is slow	- some soil sediments with propagules present and so it is faster

1 mark each difference = 2

(b)
- Takes place in dry area hence progress from xeric to mesic condition = ½
- Pioneer species such as lichens secrete acids to break rocks , initiate rock formation = ½ + ½
- lichens pave way to bryophytes = ½
- which are succeeded by bigger plants ultimately , stable meric community is formed = ½ + ½

[2 + 3 = 5 marks]

OR

(a) Why is there a need to conserve biodiversity?

(b) Name and explain any two ways that are responsible for the loss of biodiversity.

Ans. (a)
1. to continue to get the products of human consumption
2. plays a major role in many eco system services that nature provides and that is invaluable
3. moral duty to pass on biological legacy in good order to future generations

(Any two) = (1×2 = 2)

(b)
1. Habitat loss and fragmentation- large habitats when broken lead to loss of habitat for animals needing large territories (are badly affected) – population decline
2. Overexploitation- leading to extinction of many, especially commercially important species
3. Alien species invasion - alien species when introduced may turn invasive causing decline and extinction of indigenous species // explain with an example.
4. Coextinction- when one species become extinct , any other organism intimately associated also becomes extinct.

(any two) (1½ × 2) [2 + 3 = 5 marks]

29. Write the type and location of the gene causing thalassemia in humans .State the cause and symptoms of the disease. How is sickle cell anaemia different from this disease?

Ans. i. Autosomal, recessive gene, gene for alpha thalassemia is on chromosome 16 , for Beta thalassemia it is on chromosome 11 = ½ × 4

ii. Cause of symptoms – Mutation or deletion of the gene / genes, resulting in reduced rate of synthesis of one of the globin chains / alpha or beta chains) = ½ + ½

iii. Thalassemia is a quantitative problem / of too few globin molecules of haemoglobin, while sickle-cell is a qualitative problem of synthesising an incorrectly functioning globin = 1 + 1

OR

(a) Describe Hardy –Weinberg Principle.

(b) List any four factors which affect genetic equilibrium.

(c) Describe founder effect.

Ans. (a) Allele frequencies in a population are stable and constant / gene pool remain constant from generation to generation = 1

(b)
- Gene migration / gene flow
- Genetic drift
- Mutation.
- Genetic recombination
- Natural selection

(Any four) =½ × 4 = 2

(c)
- Change in allele frequency
- New genes develop old genes lost
- Migration
- Drift
- New species

(Any four) =½×4=2

when section of population gets separated due to migration or genetic drift , gene frequencies changed ; sometimes this changed in allele frequency is different in the new population that they become new species , this is called founder effect

= ½ × 4

[5 marks]

30. (a) Name the category of microbes occurring naturally in sewage and making it less polluted during the treatment.

(b) Explain the different steps involved in the secondary treatment of sewage.

Ans. (a) Aerobic microbes = ½

(b) Primary effluent passed into large aeretion tank with air pumped into it allowing useful aerobic microbes to form flocs , these microbes consume major part of organic matter , and reduce BOD , once BOD reduced effluent is passed into settling tank , to allow flocs to sediment and form activated sludge , some of the activated sludge is sent to aeration tank as inoculum , and remaining is pumped to anaerobic sludge digesters , where bio gas is produced as a result of anaerobic digestion , the effluents from secondary treatment are released into natural water bodies. = ½ × 9

[½ + 4½ = 5 marks]

OR

(a) Name and explain any four lymphoid organs present in humans.

(b) Categorise the named lymphoid organs as primary or secondary lymphoid ,giving reasons

Ans. Bone marrow - blood cells - lymphocytes are produced and mature

Thymus - large at the time of birth but keep reducing in size with age. Lymphocytes are produced and mature

Spleen - Acts as a filter for microorganisms in blood and reservoir for RBCs

Lymph nodes - trap micro organisms or other antigens and activate lymphocytes and initiate immune system

(Name and explanation together = ½)

(***Any two)*** **=** 4×½ = 2

(b) Primary lymphoid organs - bone marrow and thymus = ½

Immature lymphocytes differentiate into antigen sensitive lymphocytes = 1

Secondary lymphoid organ - spleen and lymph nodes = ½

Provide the site for interaction of lymphocytes with antigen , which proliferate to become effector cell = ½ + ½

[2 + 3 = 5 marks]