Series OSR

कोड नं. **57/2**
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 **12** 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 **12** 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. क्या कारण है कि *गैम्बूज़िया* को नालियों और तालाबों में प्रवेश कराया जाता है ? *1*

Why is *Gambusia* introduced into drains and ponds ?

2. गॉसे का प्रतिस्पर्धात्मक अपवर्जन सिद्धांत बताइए । *1*

State Gause's Competitive Exclusion Principle.

3. पुनर्योगज DNA प्रौद्योगिकी के लिए जीवाण्वीय (बैक्टीरियल) तथा कवकीय कोशिकाओं में DNA के पृथक्करण में इस्तेमाल किए जाने वाले एंज़ाइमों के नाम लिखिए । *1*

Name the enzymes that are used for the isolation of DNA from bacterial and fungal cells for recombinant DNA technology.

4. मानव इन्सुलिन में C पेप्टाइड की भूमिका बताइए । *1*

State the role of C peptide in human insulin.

5. किसी विजातीय DNA के लिए ऐसा क्यों संभव नहीं है कि वह क्रोमोसोम की लंबाई में किसी भी जगह पर उसका ही अंश बन जाए और सामान्य रूप से प्रतिकृतियन करता रहे ? *1*

Why is it not possible for an alien DNA to become part of a chromosome anywhere along its length and replicate normally ?

6. मानवों में प्राथमिक प्रतिरक्षा अनुक्रिया की अपेक्षा द्वितीयक प्रतिरक्षा अनुक्रिया अधिक तीव्र क्यों होती है ? *1*

Why is secondary immune response more intense than the primary immune response in humans ?

7. ऐसा क्यों है कि समवृत्ति संरचनाएँ अभिसारी विकास का परिणाम होती हैं ? *1*

Why are analogous structures a result of convergent evolution ?

8. निम्नलिखित में कायिक प्रवर्धकों के नाम लिखिए : *1*

(a) *अगेव*

(b) *ब्रायोफिलम*

Name the vegetative propagules in the following :

(a) *Agave*

(b) *Bryophyllum*

खण्ड B

SECTION B

9. ऐस्केरिसता (ऐस्केरिएसिस) के रोगलक्षणों की सूची बनाइए । किसी स्वस्थ व्यक्ति में यह संक्रमण किस प्रकार पहुँचता है ? *2*

List the symptoms of Ascariasis. How does a healthy person acquire this infection ?

10. फल-मक्खी का वैज्ञानिक नाम लिखिए । मॉर्गन ने अपने प्रयोगों में फल-मक्खियों का ही क्यों उपयोग किया ? कोई तीन कारण लिखिए । *2*

अथवा

जीनों की सहलग्नता एवं उनका विनिमय एक-दूसरे के विकल्पी हैं । एक उदाहरण की सहायता से इस कथन को न्यायसंगत कीजिए ।

Write the scientific name of the fruit-fly. Why did Morgan prefer to work with fruit-flies for his experiments ? State any three reasons.

OR

Linkage and crossing-over of genes are alternatives of each other. Justify with the help of an example.

11. प्रोकैरियोटों तथा यूकैरियोटों की ट्रांसक्रिप्शन इकाई में पाए जाने वाले संरचनात्मक जीनों में अंतर बताइए । *2*

State the difference between the structural genes in a Transcription Unit of Prokaryotes and Eukaryotes.

12. स्नैपड्रैगन में, जब यथार्थ प्रजननकारी लाल फूल (RR) वाले पौधों का यथार्थ प्रजननकारी सफ़ेद फूल (rr) वाले पौधों के साथ संकरण कराया गया तो उनकी संतानें ऐसे पौधे बने जिनमें सभी फूल गुलाबी रंग के थे । *2*

(a) गुलाबी फूलों का प्रकट होना सम्मिश्रण नहीं कहलाता । ऐसा क्यों ?

(b) इस परिघटना को किस नाम से जाना जाता है ?

In Snapdragon, a cross between true-breeding red flowered (RR) plants and true-breeding white flowered (rr) plants showed a progeny of plants with all pink flowers.

(a) The appearance of pink flowers is not known as blending. Why ?

(b) What is this phenomenon known as ?

13. मानव वृषणों में निम्नलिखित के पाए जाने के स्थान तथा उनके कार्यों के विषय में लिखिए : *2*

(a) सर्टोली कोशिकाएँ

(b) लीडिग कोशिकाएँ

Write the location and functions of the following in human testes :

(a) Sertoli cells

(b) Leydig cells

14. एक ऐसा आयु पिरैमिड बनाइए जिसमें मानव जनसंख्या की प्रसरणशील वृद्धि की स्थिति प्रदर्शित होती हो । *2*

Construct an age pyramid which reflects an expanding growth status of human population.

15. अंजीर के वृक्ष और ततैये के बीच परस्पर संबंध का वर्णन कीजिए और उस परिघटना पर टिप्पणी कीजिए जो उनके संबंध में कार्य करती है । *2*

Describe the mutual relationship between fig tree and wasp and comment on the phenomenon that operates in their relationship.

16. पारजीनी प्राणी निम्नलिखित के विषय में किस प्रकार लाभकारी सिद्ध हुए हैं : *2*

(a) जैविकीय उत्पादों के उत्पादन

(b) रासायनिक सुरक्षा परीक्षण

How have transgenic animals proved to be beneficial in :

(a) Production of biological products

(b) Chemical safety testing

17. रेस्ट्रिक्शन (प्रतिबंधन) न्यूक्लिएज़ किस प्रकार कार्य करता है ? समझाइए । *2*

How does a restriction nuclease function ? Explain.

18. किसी पारिस्थितिकी संवेदनशील क्षेत्र में जीनस *न्यूक्लिओपॉलिहेड्रोवाइरस* की महत्त्वपूर्ण भूमिका समझाइए । *2*

Explain the significant role of the genus *Nucleopolyhedrovirus* in an ecological sensitive area.

खण्ड C

SECTION C

19. नीचे दी जा रही सारणी में 'a', 'b', 'c', 'd', 'e' तथा 'f' क्या हैं, पहचानिए : *3*

संख्या	सिंड्रोम	कारण	प्रभावित व्यष्टियों की विशिष्टताएँ	लिंग नर/मादा/दोनों
1.	डाऊन	21 की त्रिसूत्रता	'a' (i) (ii)	'b'
2.	'c'	XXY	कुल मिलाकर पुंजातीय परिवर्धन	'd'
3.	टर्नर	45 और XO	'e' (i) (ii)	'f'

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

No.	Syndrome	Cause	Characteristics of affected individuals	Sex Male/Female/Both
1.	Down's	Trisomy of 21	'a' (i) (ii)	'b'
2.	'c'	XXY	Overall masculine development	'd'
3.	Turner's	45 with XO	'e' (i) (ii)	'f'

20. मानव आनुवंशिकी के अध्ययन में वंशावली विश्लेषण क्यों किया जाता है ? इससे निकाले जा सकने वाले निष्कर्ष लिखिए । *3*

Why is pedigree analysis done in the study of human genetics ? State the conclusions that can be drawn from it.

21. गर्भनिरोधक गोलियाँ लेना आरंभ करने से पूर्व एक महिला नीचे दी गई विशिष्ट जानकारियाँ हासिल करना चाहती है । उनका उत्तर दीजिए । *3*

(a) गर्भनिरोधक गोलियों में क्या पदार्थ होता है और वे गर्भनिरोधक के रूप में किस प्रकार कार्य करती हैं ?

(b) इन गोलियों को लेने की क्या समय-सारणी अपनानी चाहिए ?

A woman has certain queries as listed below, before starting with contraceptive pills. Answer them.

(a) What do contraceptive pills contain and how do they act as contraceptives ?

(b) What schedule should be followed for taking these pills ?

22. ऐसी किन्हीं तीन बहि:प्रजनन युक्तियों की सूची बनाइए जो पुष्पी पौधों में विकसित हुई हैं और समझाइए कि वे पर-परागण को किस प्रकार प्रोत्साहित करने में मदद करती हैं । *3*

अथवा

आवृतबीजी के परागकोशों को द्विकोष्ठी क्यों कहा जाता है ? इसकी लघुबीजाणुधानी की संरचना का वर्णन कीजिए ।

Make a list of any three outbreeding devices that flowering plants have developed and explain how they help to encourage cross-pollination.

OR

Why are angiosperm anthers called dithecous ? Describe the structure of its microsporangium.

23. पृथ्वी पर जीवन के उद्‌भव से आरंभ करके प्रजातियों की सामूहिक विलोप घटनाएँ पाँच बार हुई हैं । *3*

(i) हाल में प्रगतिशील 'छठा विलोप', पिछली घटनाओं से किस प्रकार भिन्न है ?

(ii) 'छठे विलोप' के लिए मुख्यत: कौन उत्तरदायी है ?

(iii) इस आपदा से निपटने में सहायक हो सकने वाले किन्हीं चार बिन्दुओं की सूची बनाइए ।

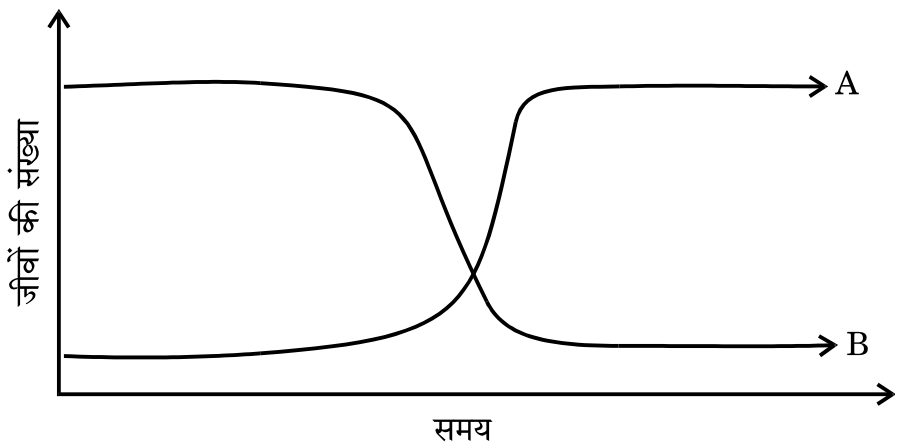
Since the origin of life on Earth, there were five episodes of mass extinction of species.

(i) How is the 'Sixth Extinction', presently in progress, different from the previous episodes ?

(ii) Who is mainly responsible for the 'Sixth Extinction' ?

(iii) List any four points that can help to overcome this disaster.

24. किसी झील के अंदर दो प्रकार के जलीय जीव एक छोटी-सी कालावधि में विशिष्ट वृद्धि प्रतिरूप दर्शाते हैं, जैसे कि नीचे दर्शाए गए हैं । यह झील एक कृषि भूमि के सन्निकट है जिसमें भरपूर उर्वरक लगाए गए हैं ।



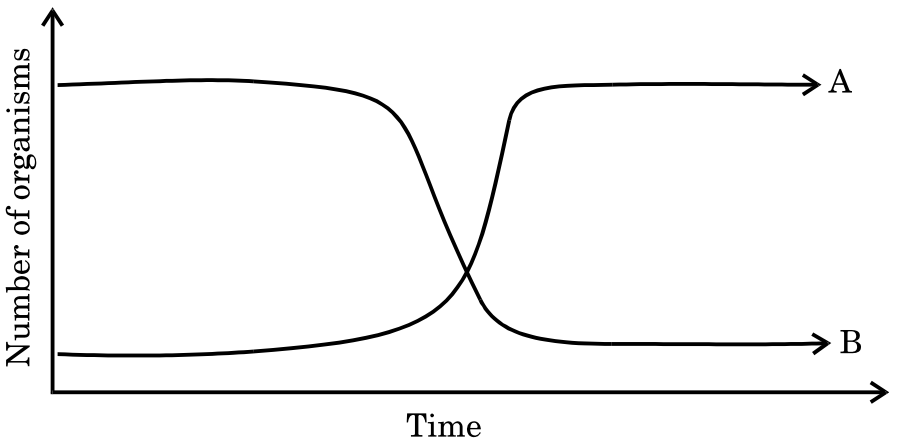
ऊपर दिए गए तथ्यों के आधार पर प्रश्नों के उत्तर दीजिए : *3*

(i) A और B प्रतिरूपों को दर्शाने वाले जीवों के नाम लिखिए ।

(ii) A में देखे जा रहे वृद्धि प्रतिरूप का कारण बताइए ।

(iii) ऊपर देखे गए वृद्धि प्रतिरूपों के प्रभाव लिखिए ।

Two types of aquatic organisms in a lake show specific growth patterns as shown below, in a brief period of time. The lake is adjacent to an agricultural land extensively supplied with fertilisers.



Answer the questions based on the facts given above :

(i) Name the organisms depicting the patterns A and B.

(ii) State the reason for the growth pattern seen in A.

(iii) Write the effects of the growth patterns seen above.

25. उस तकनीक का नाम लिखिए एवं उसका वर्णन कीजिए जिसके द्वारा उन DNA खण्डों को पृथक् करने में सहायता मिलती है जो रेस्ट्रिक्शन (प्रतिबंधन) एंडोन्यूक्लिएज़ का उपयोग करके बनते हैं । *3*

Name and describe the technique that helps in separating the DNA fragments formed by the use of restriction endonuclease.

26. तीन कारण बताते हुए समझाइए कि ऐसा क्यों है कि उष्णकटिबंधीय क्षेत्र में सर्वाधिक प्रजाति विविधता होती पायी जाती है । *3*

Explain, giving three reasons, why tropics show greatest levels of species diversity.

27. आपके स्कूल के सामुदायिक सेवा विभाग ने स्कूल के पास वाले एक गंदी बस्ती क्षेत्र के निरीक्षण की योजना बनाई जिसका उद्देश्य था वहाँ के निवासियों को स्वास्थ्य एवं स्वास्थ्य-रक्षा के विषय में प्रशिक्षित करना । *3*

(a) ऐसी मुलाक़ातों के गठन करने की क्यों आवश्यकता है ?

(b) उन कदमों के विषय में लिखिए जो आप इस विभाग के एक सदस्य के रूप में उनके साथ बातचीत में उठाएँगें ताकि वे एक स्वस्थ जीवन चला सकें ।

Community Service department of your school plans a visit to a slum area near the school with an objective to educate the slum dwellers with respect to health and hygiene.

(a) Why is there a need to organise such visits ?

(b) Write the steps you will highlight, as a member of this department, in your interaction with them to enable them to lead a healthy life.

खण्ड D

SECTION D

28. हर्शे तथा चेज़ द्वारा किए गए प्रयोग का वर्णन कीजिए । अपना प्रयोग कर चुकने के बाद इन वैज्ञानिकों ने क्या निष्कर्ष निकाला, लिखिए । *5*

अथवा

एक प्रतिरूपी मेन्डेलीय द्विसंकर संकरण का हिसाब लगाइए और उसके द्वारा इससे प्राप्त किया जाने वाला नियम लिखिए ।

Describe the Hershey and Chase experiment. Write the conclusion drawn by the scientists after their experiment.

OR

Work out a typical Mendelian dihybrid cross and state the law that he derived from it.

29. आनुवंशिकी, आण्विक जैविकी तथा ऊतक संवर्धन में उन्नतियाँ होने से फ़सली पौधों में नए-नए विशेषक जोड़े जा चुके हैं ।

किसी फ़सल की नई आनुवंशिक किस्म के प्रजनन में प्रमुख चरणों के विषय में समझाइए । *5*

अथवा

(a) पशु-प्रजनन का उद्देश्य बताइए ।

(b) अंत:प्रजनन का महत्त्व और उसकी परिसीमाओं की सूची बनाइए । इन परिसीमाओं से कैसे पार पाया जा सकता है ?

(c) मवेशियों तथा मुर्गा-मुर्गियों की एक-एक नई नस्ल का उदाहरण दीजिए ।

With advancements in genetics, molecular biology and tissue culture, new traits have been incorporated into crop plants.

Explain the main steps in breeding a new genetic variety of a crop.

OR

(a) State the objective of animal breeding.

(b) List the importance and limitations of inbreeding. How can the limitations be overcome ?

(c) Give an example of a new breed each of cattle and poultry.

30. (a) मानवों में निषेचन कहाँ होता है ? इस प्रक्रिया में होने वाली घटनाएँ समझाइए ।

(b) एक ऐसा युगल जिसमें पति और पत्नी दोनों में ही कार्यशील युग्मक बन रहे हैं, फिर भी पत्नी गर्भवती नहीं हो रही, चिकित्सीय सहायता तलाश रहा है । किसी एक ऐसी विधि का वर्णन कीजिए जिसे आप उस युगल को सुझा सकते हैं, ताकि वे सुखी माता-पिता बन सकें । *5*

अथवा

(a) असंगजननिक बीजों के विकसित होने के विभिन्न तरीके समझाइए । प्रत्येक का एक-एक उदाहरण दीजिए ।

(b) असंगजननिक बीजों से किसानों को मिलने वाला एक लाभ बताइए ।

(c) किसी एक द्विबीजपत्री भ्रूण की परिपक्व अवस्था का नामांकित आरेख बनाइए ।

(a) Where does fertilization occur in humans ? Explain the events that occur during this process.

(b) A couple where both husband and wife are producing functional gametes, but the wife is still unable to conceive, is seeking medical aid. Describe any one method that you can suggest to this couple to become happy parents.

OR

(a) Explain the different ways apomictic seeds can develop. Give an example of each.

(b) Mention one advantage of apomictic seeds to farmers.

(c) Draw a labelled mature stage of a dicotyledonous embryo.

Question Paper Code 57/2

BIOLOGY (THEORY)

SECTION A

1. Why is Gambusia introduced into drains and ponds?

Ans. To feed on Mosquitoe larvae / to eliminate the vectors responsible for causing malaria.

[1 mark]

2. State Gause's Competitive Exclusion Principle.

Ans. Two closely related species competing for same resources, cannot coexist indefinitely (the inferior will be eliminated).

[1 mark]

3. Name the enzymes that are used for the isolation of DNA from bacterial and fungal cells for recombinant DNA technology.

Ans. Bacteria: lysozyme = ½, fungi: chitinase = ½

[1 mark]

4. State the role of C peptide in human insulin.

Ans. C-peptide (extra stretch of polypeptide) which makes the insulin inactive / proinsulin is inactive because it contain C-peptide.

[1 mark]

5. Why is it not possible for an alien DNA to become part of a chromosome anywhere along its length and replicate normally?

Ans. Alien DNA must be linked to ori / origin of replication / site to start replication.

[1 mark]

6. Why is secondary immune response more intense than the primary immune response in humans?

Ans. Body will have memory of the First Encounter / Presence of antibodies developed during primary immune response.

[1 mark]

7. Why are analogous structures a result of convergent evolution?

Ans. Analogous structures are not anatomically similar / do not have common ancestors and evolving for similar function in the same habitat = ½ + ½

[1 mark]

8. Name the vegetative propagules in the following:

(a) Agave

(b) Bryophyllum

Ans. Agave - Bulbil = ½

Bryophyllum - leaf buds / adventitous buds = ½

[1 mark]

SECTION B

9. List the symptoms of Ascariasis. How does a healthy person acquire this infection?

Ans. Internal bleeding, muscular pain, anaemia, blockage of intestinal passage.

(any three) = 1½

Intake of water, vegetables / fruits / foods contaminated with eggs of the parasite. = ½

[2 marks]

10. Write the scientific name of the fruit-fly. Why did morgan prefer to work with fruit-flies for his experiments? State any three reasons.

Ans. *Drosophila melanogaster* = ½

Grown in simple synthetic medium, complete the life cycle in two weeks / short life cycle, single mating produce more progeny , dimorphism, many heritable variations / easy to handle.

(any three) = 1½

[2 marks]

OR

Linkage or crossing-over of genes are alternatives of each other. Justify with the help of an example.

Ans. In Drosophila a yellow bodied white eyed female was crossed with brown bodied red eyed male, F_1 progeny produced and intercrossed the F_2 phenotypic ratio of Drosophila deviated significantly from Mendel's 9:3:3:1, the genes for eye colour & body colour are closely located on the 'X' chromosome showing linkage & therefore inherited together, recombinants were formed due to crossing over but at low percentage. = ½×4

[2 marks]

11. State the difference between the structural genes in a Transcription Unit of Prokaryotes and Eukaryotes.

Ans.

	Prokaryotes	**Eukaryotes**
1.	Polycistronic = ½	Monocistronic = ½
2.	No split genes / Not interrupted coding sequence = ½	Split genes / interrupted coding sequences / exon and intron =½

[2 marks]

12. In Snapdragon, A cross between true breeding red flower (RR) plants and true breeding white flower (rr) plants showed a Progeny of plants with all pink flowers.

(a) The appearance of pink flowers is not known as blending. Why?

(b) What is the phenomenon known as?

Ans. (a) R (dominant allele red colour) is not completely dominant over r (recessive allele white colour) / r maintains its originality and reappear in F_2 generation. = 1

(b) Incomplete dominance = 1

[2 marks]

13. Write the location and functions of the following in human testes :

(a) Sertoli cells

(b) Leydig cells

Ans. 13. a) Location : Lined inside the Seminiferous tubules =½

Functions - provide nutrition to the germ cells / sperms =½

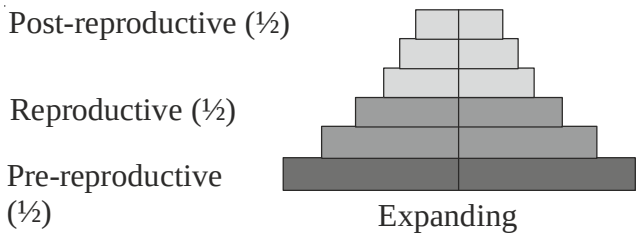
b) Location - Outside Seminiferous tubules / Intrerstitial space = ½

Functions - Synthesize or secrete male hormones / Testicular hormones / Androgens = ½

[2 marks]

14. Construct an age pyramid which reflects an expending growth status of human population.

Ans.



Construction of Pyramid = ½

[2 marks]

15. Describe the mutual relationship between fig tree and wasp and comment on the phenomenon that operates in their relationship.

Ans. Wasp - helps in pollination / pollinator (specific)

Oviposition / seeds and ovules used for nourishing larva.

(any two) = ½+½

Co evolution exists between their close specific tight relationship. = 1

[2 marks]

16. How have transgenic animals proved to be beneficial in:

(a) Production of biological products

(b) Chemical safety testing

Ans. a) (Rosie - transgenic cow) produced human protein / alpha lactalbumin enriched milk, alpha-1 antitrypsin used to treat emphysema. = ½+½

b) (Toxicity Testing) - more sensitive to toxic substances, results obtained in less time. =½+½

[2 marks]

17. How does a restriction nuclease function? Explain.

Ans. Restriction nuclease cut DNA at specific sites = 1

exonuclease cuts DNA at the ends, endonuclease cuts at specific position within DNA. / Restriction endonuclease cuts the DNA at specific pallindromic sequence. = ½+½

[2 marks]

18. Explain the significant role of the genus Nucleopolyhedrovirus in an ecologicalsensitive area.

Ans. Species specific, narrow spectrum , insecticidal application (IPM), no negative impact on plants / mammals / birds / fish / even non target insects. = ½×4

[2 marks]

SECTION C

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

No.	Syndrome	Cause	Characreristics of affected individual	Sex Male/Female/Both
1	Down's	Trisomy of 21	'a' (i) (ii)	'b'
2	'c'	XXY	Overall masculine development	'd'
3	Turner's	45 with OX	'e' (i) (ii)	'f'

Ans. a. short statured / small round head / furrowed tongue / partially open mouth / palm is broad / physical development retarded / psychomotor development retarded / mental development retarded .

(any two) = ½

b. both / male and female = ½

c. klinefelter's syndrome = ½

d. male = ½

e. sterile ovaries / rudimentary ovaries, lack of secondary sexual characters. = ½

f. female= ½

[½×6= 3 marks]

20. Why is pedigree analysis done in the study of human genetics? State the conclusions that can be drawn from it.

Ans. (i) Control crosses are not possible in case of humans beings. = 1

(ii) Analysis of traits in several generations of a family / To trace pattern of inheritance / Whether the trait is dominant or recessive / sex linked or not.

(any two) = 1+1

[3 marks]

21. A woman has certain queries as listed below, before starting with contraceptives pills. Answer them.

(a) What do contraceptive pills contain and how do they act as contraceptives?

(b) What schedule should be followed for taking these pills?

Ans. a) progesterone / progesterone-estrogen combination ;

inhibit ovulation, inhibit implantation, alter quality of cervical mucus to prevent or retard entry of sperms.

(any two) = 1+1

b) Taken daily for a period of 21 days starting within first five days of menstrual cycle (to be repeated after a gap of 7 days) = 1

[3 marks]

22. Make a list of any three out breeding devices that flowering plants have developed and explain how they help to encourage cross-pollination.

Ans. (i) Time of pollen release and stigma receptivity are different (not synchronized), self pollination prevented.

(ii) Anther & stigma are placed at different positions, so the pollen can not come in contact with the stigma of the same flower.

(iii) Self incompatibility, genetic mechanism (prevent the pollen germination on the stigma of the same flower)

(iv) Production of unisexual flowers / dioecious plants, cross pollination ensured.

(any three) = (½ x 6)

[3 marks]

OR

Why are angiosperm anthers called dithecous? Describe the structure of its microsporangium.

Ans.
- Anther bilobed, each lobe of anther has two theca. = ½+½
- Microsporangium surrounded by four wall layers / epidermis, endothecium, middle layer and tapetum. = 1
- In young anther a group of compactly arranged homogenous cells called sporogenous tissue occupies the centre of each microsporangium which produce microspores / pollen grains. = 1

[3 marks]

23. Since the origin of life on the earth, there were five episodes of mass extinction of species.

(i) How is the 'Sixth Extinction', presently in progress, different from the previous episodes?

(ii) Who is mainly responsible for the 'Sixth Extinction''?

(iii) List any four points that can help to overcome this disaster.

Ans. (i) The rates are faster / accelerated / current species extinction rate are estimated to be 100-1000 times faster than in the pre-human times. = ½

(ii) Human activities. = ½

(iii) a. Preventing habitat loss and fragmentation

b. Checking overexploitation

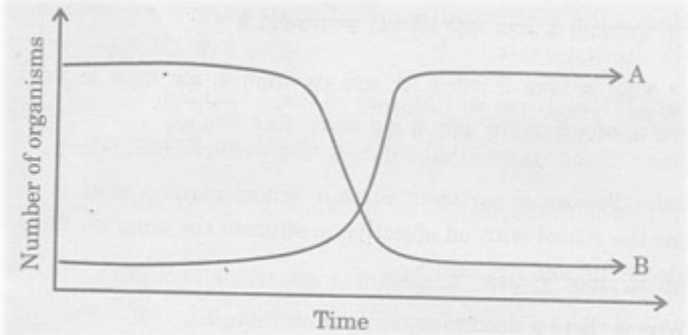
c. Preventing alien species invasion

d. Preventing co-extinction

e. Conservation / Preservation of species.

(any four) = ½×4 = 2 [1+2= 3 marks]

24. Two types of aquatic organisms in a lake show specific growth patterns as shaown below, in a brief period of time. The lake is adjacent to an agricultural land extensively supplied with fertilizers.



Answer the questions based on the facts given above:

(i) Name the organisms depicting the patterns A and B.

(ii) State the reason for the growth patter seen in A.

(iii) Write the effects of the growth patterns seen above.

Ans. (i) A - algae / planktonic (free floating) algae = ½

B - fish / aquatic animals = ½

(ii) Due to excessive loading of nutrients / fertilizers from adjacent agriculture land resulting in increase in nutrients. =1

(iii) Decrease in dissolved oxygen (DO), increase in BOD, fish mortality, unpleasant odour / eutrophication.

(any two) = ½+½ [3 marks]

25. Name and describe the technique that helps in separating the DNA fragments formed by the use of restriction endonuclease.

Ans. Gel electrophoresis = ½,

DNA are -vely charged, forced to move towards anode, electric field in agarose gel matrix, separate according to their size / sieving effect, smaller fragments moves faster and further than the larger. = ½×5

[3 marks]

26. Explain, giving three reasons, why tropics show greatest lavels of species diversity.

Ans. i. Tropical latitude have remained relatively undisturbed, have a long evolutionary time for species diversification. = ½+½

ii. Less seasonal variations, constant and predictable environmental condition, promote niche specialization for greater species diversity. = ½+½

iii. More availability of solar energy, contributes to higher productivity. =½+½

[3 marks]

27. Community Service department of your school plans a visit to a slum area near the school with an objective to educate the slum dwellers with respect to health and hygiene.

(a) Why is there a need to organize such visits?

(b) Write the steps you will highlight, as a member of this department, in your interaction with them to enable them to lead a healthy life.

Ans. (i) To create awareness about disease and their effects on the body / about immunization / health and hygiene. = 1

(ii) Disposal of waste

Control of Vectors

Hygienic food and water / fresh drinking water /

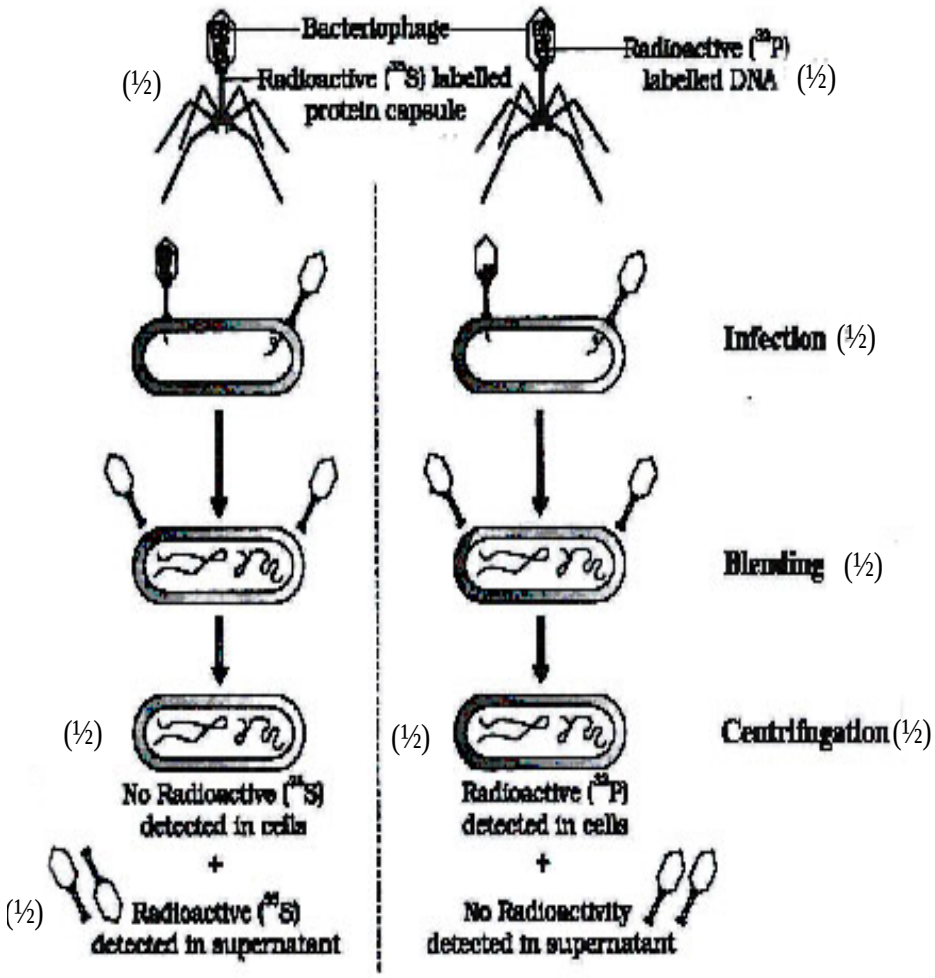
Balanced diet / Regular exercise / Yoga

(any four) = ½ × 4 = 2 [1+2=3 marks]

SECTION D

28. Describe the Hershey and Chase experiment. Write the conclusion drawn by the scientists after their experiment.

Ans. The Hershey - Chase experiment



//

Virus / phage labelled with S-35, virus / phase labelled with P-32, seperately infected *E.coli* / bacteria growing in two different culture media culture media infection proceeds / for few generations, virual coats removed from the bacteria by agitating / blending, Virus particles separated from bacteria by centrifugation / spinning, radioactive S-35 of the viral coat was detected in the supernatant, as coat did not enter the cell, radioactive P-32 was detected in the bacterial cell. = ½×8

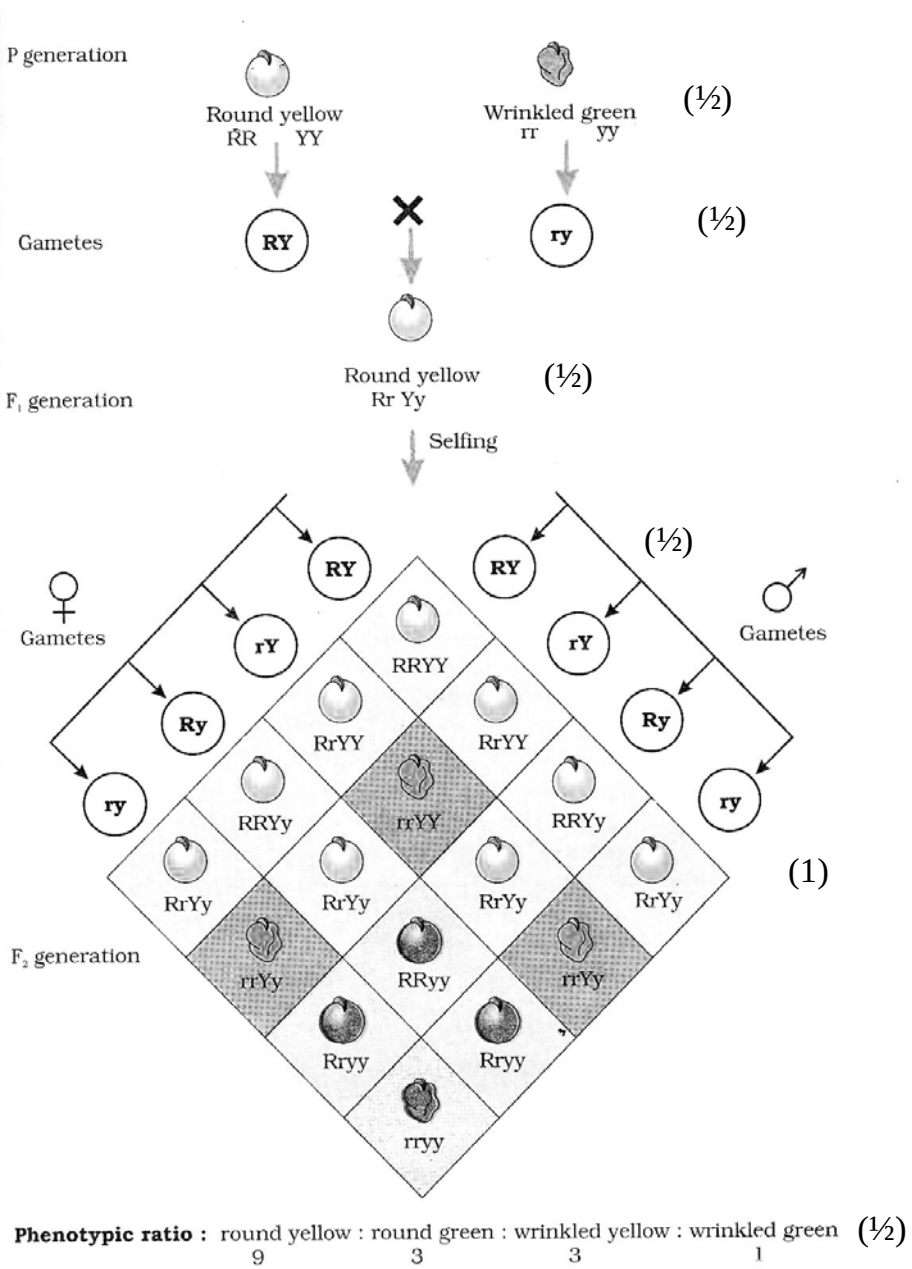
Conclusion : DNA passes from virus to bacteria not the protein, DNA is the genetic material. =½+½

[5 marks]

OR

Work out a typical Mendelian dihybrid cross and state the law that he derived from it.

Ans.



(1)

Phenotypic ratio : round yellow : round green : wrinkled yellow : wrinkled green (½)
9 3 3 1

Law of Independent Assortment = ½, it states that when two pairs of traits are combgined in a hybrid, seggregation of one pair of character is independent of the other pair of characters. =1

[5 marks]

29. With advancement in genetics, molecular biology and tissue culture, new traits have been incorporated into crop plants.

Explain the main steps in breeding a new genetic variety of crop.

Ans. i. Collection of variability / germplasm collection, collection and preservation of all different wild varieties, species, and relatives of cultivated species / entire collection of plants. = ½+½

ii. Evaluation and selection of parents, to identify plant with desirable combination of character / purelines are created. = ½ + ½

iii. Cross hydridization among selected parents, cross hybridizing the two parents to produce hybrids. = ½+½

iv. Selection and testing of superior recombinants, selection among the progeny of the hybrids that have desired character combinations, superior to both the parents / self pollinated for several generations. = ½+½

v. Testing, release and commercialisation of new cultivars, newly selected lines are evaluated for yield / other agronomic traits of quality / disease resistance in research feels followed by testing the material in farmers fields. = ½+½

[1×5 = 5 marks]

OR

(a) State the objective of a animal breeding.

(b) List the importance and limitation of inbreeding. How can the limitations can be overcome.

(c) Give an example of new breed each of cattle and poultry.

Ans. a) Increase the yield of animal and improving the desirable qualities of the produce=1

b) **Importance :**

Increases homozygosity / to evolve pureline / expose harmful recessive genes / help in accumulation of superior genes / elimination of less desirable genes.

(any four) = ½×4

Limitation:

Reduces fertility and productivity / inbreeding depression. = ½

It can be overcomed by out breeding / cross breeding / out cross / interspecific hybridization / selected animals is to be bred with unrelated superior animals of the same breed. = ½

c) Jersey / Hisardale - a new breed by crossing Bikaneri ewes and Mirano rams (cattle) and Leghorn (poultry) = ½+ ½

[5 marks]

30. (a) Where does fertilization occur in humans? Explain the events that occur during this process

(b) A couple where both husband and wife are producing functional gametes, but the wife is still unable to conceive, is seeking medical aid. Describe any one method that you can suggest to this couple to become happy parents.

Ans. a) i. Ampullary Isthmic junction in fallopian tube / fallopian tube = ½

ii. The sperms come in contact with zona pellucida = ½

iii. Induces change in the membrane = ½

iv. Blocks entry of other sperms / ensures only one sperm fertilizes the ovum / prevents polyspermy. = ½

v. The secretion of acrosome helps the sperm to enter the cytoplasm = ½

vi. Entry of sperm induces completion of second meiotic division forming ovum and 2nd polar body = ½

vii. The haploid nucleus of Sperm and that of ovum fuses = ½

viii. Formation of diploid Zygote, fertilisation completed. = ½ (½×8=4)

b) Methods IVF / ZIFT / AI = ½

IVF : Ova from wife and sperm from the husband is collected

It is induced to formed zygote under laboratory conditions = ½

//

ZIFT : Zygote or early embryo are then transferred to the fallopian tube (ZIFT) or into uterus (IUT) to complete further development = ½

//

AI : Semen collected from the husband is artificially introduced either into the vagina or into the uterus (IUI) of the wife = ½

[5 marks]

OR

(a) Explain the different ways apomictic seeds can develop. Give an example of each.

(b) Mention one advantage of apomictic seeds to farmers.

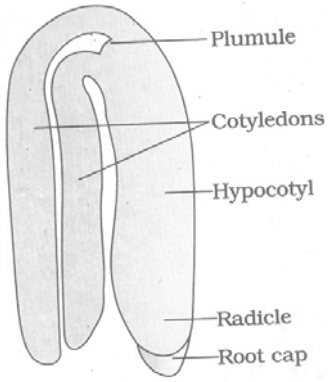
(c) Draw a labeled mature stage of a dicotyledonous embryo.

Ans. (a) (i) Diploid egg cell is formed without reduction division and develops into embryo without fertilisation, eg. *Asteraceae* / grasses. = ½+½

(ii) In citrus / mango, some of the diploid nucellar cells surrounding the embryo sac start dividing, protrude into embryo sac & develop into a embryo = ½+½.

(b) No segregation of character in hybrid seeds, economically beneficial / desired varieties are cultivated. =1

(c)



(any four labelling) = ½×4=2

[5 marks]