Series : OSR/1

कोड नं.
Code No. 57/1/3

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 **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 **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 जायेगा । 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 **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 घंटे] *[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** 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 Section **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 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 × 8 = 8)

1. उन परपोषी कोशिकाओं के प्ररूप का नाम लिखिए जो किसी विजातीय DNA को प्रवेश कराने के लिए जीन बंदूकों के रूप में उपयुक्त होती हैं । **1**

Mention the type of host cells suitable for the gene guns to introduce an alien DNA.

2. ऐसी किन्हीं दो प्रकार की कोशिकाओं के नाम लिखिए जो मानवों में सहज प्रतिरक्षा प्रदान करने के लिए 'कोशिकीय अवरोधों' के रूप में कार्य करती हैं । **1**

Name any two types of cells which act as 'Cellular barriers' to provide Innate Immunity in humans.

3. विभिन्न आनुवंशिकी प्रयोगों के लिए पुनरावर्ती / अनुषंगी DNA को स्थूल जीनोमी DNA से किस प्रकार पृथक किया जाता है ? **1**

How is repetitive / satellite DNA separated from bulk genomic DNA for various genetic experiments ?

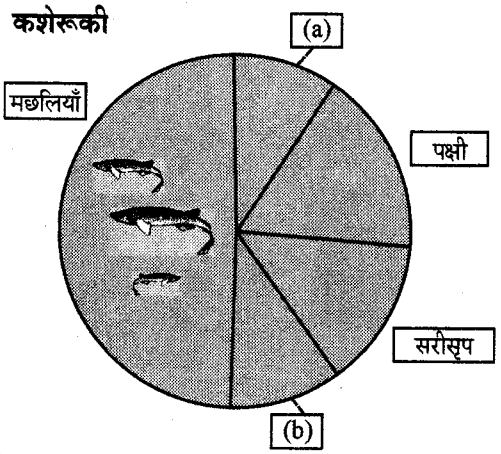
4. उस जीव का नाम लिखिए जिसे "बंगाल का आतंक" कहा जाता है । **1**

Write the name of the organism that is referred to as the 'Terror of Bengal'.

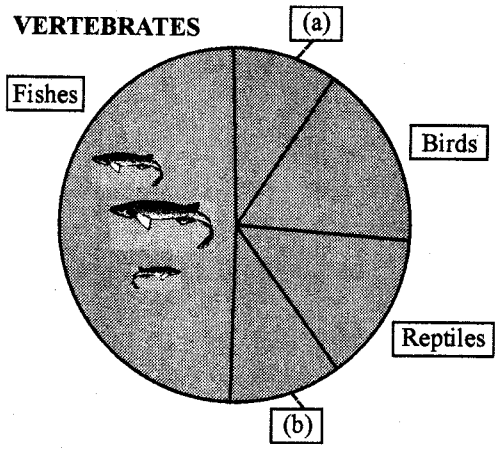
5. उन हरित गृह गैसों के नाम लिखिए जो सकल वैश्विक ऊष्मायन में योगदान करती हैं । **1**

Name the Green House gases that contribute to total global warming.

6. नीचे दिए जा रहे चित्र में जिसमें मुख्य कशेरूकी टैक्सॉनों की आनुपातिक संख्याएँ दर्शायी गयी हैं, "a" और "b" क्या हैं, पहचान कर बताइए । 1



Identify 'a' and 'b' in the figure given below representing proportionate number of major vertebrate taxa.



7. किसी एक ऐसे जीव का उदाहरण दीजिए जो उपरति (डायापौज़) अवस्था में चला जाया करता है, और बताइए वह ऐसा क्यों करता है । 1

Give an example of an organism that enters 'diapause' and why.

8. किसी वन पारितंत्र में स्तरण को किस प्रकार निरूपित किया जाता है ? 1

How is 'stratification' represented in a forest ecosystem ?

खण्ड – B

SECTION – B

(2 × 10 = 20)

9. (i) उस वैज्ञानिक का नाम लिखिए जिसने सुझाव दिया था कि आनुवंशिक कूट तीन न्यूक्लिओटाइडों के संयोजन से बना होना चाहिए ।

(ii) वह जिस आधार पर इस निष्कर्ष पर पहुँचा उसके विषय में समझाइए । 2

(i) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.

(ii) Explain the basis on which he arrived at this conclusion.

10. मवेशियों में अंत:प्रजनन से क्या अलाभ होता है, लिखिए । इसे किस प्रकार से होने नहीं दिया जा सकता है ? 2

State the disadvantage of inbreeding among cattle. How it can be overcome ?

11. एक उपयुक्त उदाहरण देते हुए समझाइए कि किसी रेस्ट्रिक्शन एंडोन्यूक्लिएज़ को यह नाम क्यों दिया गया । 2

Explain with the help of a suitable example the naming of a restriction endonuclease.

12. जीन चिकित्सा किसे कहते हैं ? उस सबसे पहले चिकित्सा प्रकरण का नाम लिखिए जिसमें इसका उपयोग किया गया था । 2

What is gene therapy ? Name the first clinical case where it was used.

13. आहार शृंखला का भाग होने के अतिरिक्त, परभक्षियों की और भी महत्त्वपूर्ण भूमिकाएँ होती हैं । उदाहरण देते हुए ऐसी कोई दो भूमिकाएँ बताइए । 2

Apart from being part of the food chain, predators play other important roles. Mention any two such roles supported by examples.

14. एक ऐसा आयु पिरामिड बनाइए जिसमें मानव जनसंख्या की एक स्थायी स्थिति बनी हुई दिखायी गयी हो । 2

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

15. ऐसा क्यों है कि Bt टॉक्सिन उस जीवाणु को तो नहीं मारता जिससे यह बनता है, पर इसे अंत:ग्रहण करने वाले कीट को मार देता है ? 2

Why does the Bt toxin not kill the bacterium that produces it but kills the insect that ingests it ?

16. मानवों में जीन I द्वारा ABO रक्त समूहों का किस प्रकार नियंत्रण होता है ? लाल रक्त कोशिकाओं की संरचना पर जीन का क्या प्रभाव होता है, लिखिए । 2

अथवा

निम्नलिखित संकरणों में पायी जाने वाली लिंग-निर्धारण क्रियाविधि के प्ररूपों के नाम लिखिए । प्रत्येक का एक-एक उदाहरण भी दीजिए ।

(i) मादा XX का नर XO के साथ

(ii) मादा ZW का नर ZZ के साथ

How does the gene 'I' control ABO blood groups in humans ? Write the effect the gene has on the structure of red blood cells.

OR

Write the types of sex-determination mechanisms the following crosses show. Give an example of each type.

(i) Female XX with Male XO

(ii) Female ZW with Male ZZ

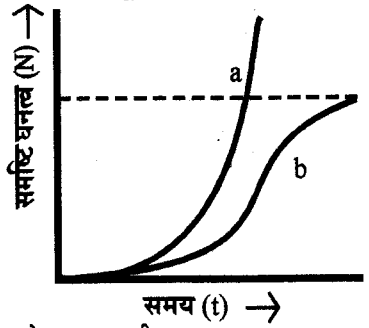
17. पहचान कर बताइए कि निम्नलिखित जोड़े किस प्रकार के हैं – समजात अथवा समवृत्ति :
(i) शकरकंद तथा आलू
(ii) ऑक्टोपस की आँख तथा स्तनियों की आँख
(iii) बोगेनविलिया के काँटे तथा कुकुरबिटों के प्रतान
(iv) चमगादड़ तथा व्हेल के अग्रपाद **2**

Identify the following pairs as Homologous or Analogous organs :
(i) Sweet potato and potato
(ii) Eye of octopus and eye of mammals
(iii) Thorns of Bougainvillea and tendrils of Cucurbits.
(iv) Fore limbs of Bat and Whale.

18. आवृतबीजियों में निषेचन-उपरांत घटनाओं की सूची बनाइए । **2**
List the post-fertilization events in angiosperms.

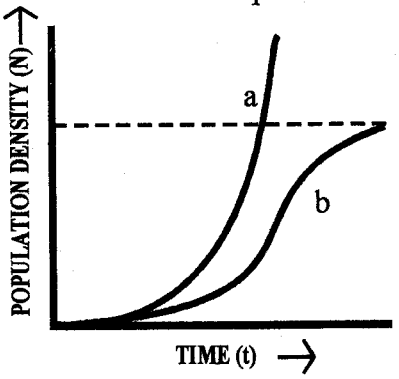
खण्ड – C
SECTION – C **(3 × 9 = 27)**

19. नीचे दिये गये ग्राफ का अध्ययन कीजिए और पूछे जा रहे प्रश्नों के उत्तर दीजिए : **3**



(i) वक्र (a) एवं (b) में आहार और स्थान की दशा बताइए ।
(ii) परभक्षियों की अनुपस्थिति की दशा में, इन दो में से कौन सा एक वक्र शिकार समष्टि को सही प्रकार से दर्शाएगा ?
(iii) समय को X-अक्ष पर दिखाया गया है और उसके ऊपर एक समांतर बिंदु रेखा दर्शायी गयी है । इस बिंदु रेखा का महत्त्व बताइए ।

Study the graph given below and answer the questions that follow :



(i) Write the status of food and space in the curves (a) and (b).
(ii) In the absence of predators, which one of the two curves would appropriately depict the prey population ?
(iii) Time has been shown on X-axis and there is a parallel dotted line above it. Give the significance of this dotted line.

20. RNA व्यतिकरण की प्रक्रिया के द्वारा तम्बाकू के पौधों की जड़ों में नीमैटोड के संक्रमण में बाधा डालने में किस प्रकार सहायता मिली ? समझाइए । 3

How did the process of RNA interference help to control the nematode from infecting roots of tobacco plants ? Explain.

21. मीथैनोजेन क्या होते हैं ? उन जानवरों के नाम लिखिए जिनमें ये पाये जाते हैं और बताइए वहाँ उनकी क्या भूमिका होती है । 3

What are Methanogens ? Name the animals they are present in and the role they play there.

22. (a) दक्षिण भारत में उगाये जाने वाले उष्णकटिबंधीय गन्ने की किस्म का नाम लिखिए । इसके द्वारा उस गन्ने की गुणवत्ता कैसे सुधारी गयी जो उत्तर भारत में उगाया जाता है ?

(b) निम्नलिखित तालिका में "a", "b" तथा "c" को पहचान कर बताइए वे क्या हैं :

संख्या	फसल	किस्म	कीट पीड़क
1.	ब्रैसिका	पूसा गौरव	(a)
2.	चपटी सेम	पूसा सेम 2 पूसा सेम 3	(b)
3.	(c)	पूसा सावनी पूसा A-4	प्रतान तथा फल छेदक

3

(a) Name the tropical sugar cane variety grown in South India. How has it helped in improving the sugar cane quality grown in North India ?

(b) Identify 'a', 'b' and 'c' in the following table :

No.	Crop	Variety	Insect Pests
1.	Brassica	Pusa Gaurav	(a)
2.	Flat bean	Pusa Sem 2 Pusa Sem 3	(b)
3.	(c)	Pusa Sawani Pusa A-4	Shoot and fruit borer

23. अकसर औरतों को ही दोष दिया जाता रहा है कि उनके मादा बच्चे ही क्यों पैदा होते हैं । परिणामस्वरूप उनके साथ अभद्र व्यवहार तथा उनका बहिष्कार किया जाता रहा है । अगर आपको वैज्ञानिक तौर पर ऐसे मामलों में निहित मूल्यों के बारे में सजगता कार्यक्रम करने हों तो वे आप कैसे करेंगे ? 3

Women are often blamed for producing female children. Consequently, they are ill treated and ostracized. How will you address this issue scientifically if you were to conduct an awareness programme to highlight the values involved ?

24. एक सामान्य युगल दम्पत्ति के यहाँ एक वर्णांध (रंगांध) बच्चा पैदा हुआ । एक संकरण द्वारा दर्शाइए कि ऐसा कैसे संभव हुआ । इस बच्चे का लिंग क्या था ? 3

अथवा

मेंडल ने लक्षणों की वंशागति पर किये गए अपने काम का प्रकाशन 1865 में किया था, परंतु सन् 1900 तक यह बिना पहचान बना रहा । उसके काम को स्वीकारे जाने में देरी क्यों हुई, तीन कारण बताइए ।

A colourblind child is born to a normal couple. Work out a cross to show how it is possible. Mention the sex of this child.

OR

Mendel published his work on inheritance of characters in 1865, but it remained unrecognized till 1900. Give three reasons for the delay in accepting his work.

25. मानव गर्भाशय की भीतरी तथा बीच की दीवारों के नाम बताइए एवं उनकी भूमिकाएँ समझाइए । 3

Name and explain the role of inner and middle walls of the human uterus.

26. आवृतबीजियों को बीजों से प्राप्त होने वाले कोई तीन लाभ समझाइए । 3

Explain any three advantages the seeds offer to angiosperms.

27. ऐसे अनेक प्राणी हैं जो वनों में से तो लुप्त हो चुके हैं, परंतु चिड़ियाघरों में कायम रखे जा रहे हैं ।

(i) इस मामले में किस प्रकार का जैवविविधता-संरक्षण होता देखा जाता है ?

(ii) ऐसे कोई दो अन्य तरीके समझाइए जो इस प्रकार के संरक्षण में सहायता करते हैं । 3

There are many animals that have become extinct in the wild but continue to be maintained in Zoological parks.

(i) What type of biodiversity conservation is observed in this case ?

(ii) Explain any other two ways which help in this type of conservation.

खण्ड – D

SECTION – D

(5 × 3 = 15)

28. (a) उस प्रौद्योगिकी का नाम लिखिए जिसने वैज्ञानिकों की इस काम में मदद की कि वे थोड़ी सी ही कालावधि में वांछित फ़सलों का बड़े पैमाने पर प्रवर्धन कर सकें । उस तकनीक के द्वारा फ़सलों के प्रवर्धन में किये जाने वाले चरणों की सूची बनाइए ।

(b) कायिक संकर किस प्रकार प्राप्त किये जाते हैं ? 5

अथवा

(a) मानवों के रोगों में कैंसर एक सर्वाधिक भयानक रोग है । इस रोग के संबंध में "स्पर्श संदमन" तथा "मेटास्टैसिस" क्या होते हैं, समझाइए ।

(b) सामान्य कोशिकाओं में पहचाने गए उन जीनों के समूह का नाम लिखिए जिनसे कैंसर पैदा हो सकता है और ऐसा उनके द्वारा कैसे होता है, लिखिए ।

(c) ऐसी किन्हीं दो तकनीकों के नाम लिखिए जो भीतरी अंगों के कैंसरों की पहचान में उपयोगी होती हैं ।

(d) कैंसर रोगियों को उपचार के अंश के रूप में अक्सर α-इंटरफ़ेरॉन क्यों दिया जाता है ?

(a) Name the technology that has helped the scientists to propagate on large scale the desired crops in short duration. List the steps carried out to propagate the crops by the said technique.

(b) How are somatic hybrids obtained ?

OR

(a) Cancer is one of the most dreaded diseases of humans. Explain 'Contact inhibition' and 'Metastasis' with respect to the disease.

(b) Name the group of genes which have been identified in normal cells that could lead to cancer and how they do so ?

(c) Name any two techniques which are useful to detect cancers of internal organs.

(d) Why are cancer patients often given α-interferon as part of the treatment ?

29. (a) मानव नर जनन तंत्र के आरेखीय दृश्य का नामांकित आरेख बनाइए ।

(b) निम्नलिखित में विभेद कीजिए :

(i) शुक्रवाहिका तथा शुक्रअपवाहिका

(ii) शुक्राणुजनन तथा शुक्राकृतिजनन **5**

अथवा

(a) दोहरे निषेचन की परिघटना समझाइए ।

(b) एक प्ररूपी प्रतीप बीजाण्ड का नामांकित आरेख बनाइए ।

(a) Draw a labelled diagrammatic view of human male reproductive system.

(b) Differentiate between :

(i) Vas deferens and vasa efferentia

(ii) Spermatogenesis and spermeogenesis

OR

(a) Explain the phenomenon of double fertilization.

(b) Draw a labelled diagram of a typical anatropous ovule.

30. (a) एक योजना आरेख की सहायता से DNA प्रतिकृति की प्रक्रिया समझाइए ।

(b) सुकेंद्रकियों में कोशिका-चक्र की किस प्रावस्था में प्रतिकृति होती है ? यदि DNA प्रतिकृति के बाद कोशिका विभाजन नहीं होता तो क्या होगा ? **5**

अथवा

(a) एक उपयुक्त उदाहरण देते हुए डार्विन का जीव-विकास संबंधी सिद्धांत समझाइए । सिद्धान्त की दो कुंजी अवधारणा (two key concepts) बताइए ।

(b) उस नीएंडरथल मानव की कोई तीन विशिष्टताएँ लिखिए जो पूर्वी एवं केंद्रीय एशिया के पास रहा करता था ।

(a) Explain the process of DNA replication with the help of a schematic diagram.

(b) In which phase of the cell cycle does replication occur in Eukaryotes ? What would happen if cell-division is not followed after DNA replication ?

OR

(a) Explain Darwinian theory of evolution with the help of one suitable example. State the two key concepts of the theory.

(b) Mention any three characteristics of Neanderthal man that lived in near east and central Asia.

Question Paper Code 57/1/3

SECTION - A (1 × 8 = 8)

1. Mention the type of host cells suitable for the gene guns to introduce an alien DNA.

Ans. Plant cells

[1 mark]

2. Name any two types of cells which act as 'Cellular barriers' to provide Innate Immunity in humans.

Ans. Polymorpho-nuclear Leukocytes / Neutrophils / Monocyte , Natural Killer (type of lymphocyte), macrophages

(Any two) = ½ + ½

[1 mark]

3. How is repetitive / satellite DNA separated from bulk genomic DNA for various genetic experiments?

Ans. Density gradient centrifugation = 1

[1 mark]

4, Write the name of the organism that is referred to as the 'Terror of Bengal'.

Ans. *Eicchornia crassipes* / Water Hyacinth

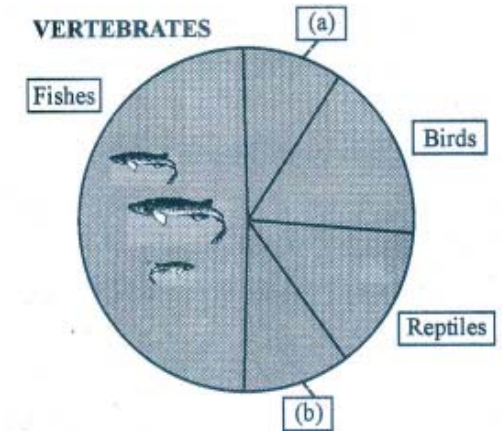
[1 mark]

5. Name the Green House gases that contribute to total global warming.

Ans. All four gases - N_2O, CFC, CH_4, CO_2 (if less than four mentioned = ½)

[1 mark]

6. Identify 'a' and 'b' in the figure given below representing proportionate number of major vertebrate taxa.



Ans. (a) Mammals

(b) Amphibians = ½ + ½

[1 mark]

7. Give an example of an organism that enters 'diapause' and why.

Ans. (Many species of) Zooplankton, unfavourable condition = ½ + ½

[1 mark]

8. How is 'stratification' represented in a forest ecosystem ?

Ans. Trees occupy vertical stratra , shrubs the second layer and herbs / grasses occupy the bottom layers // vertical distribution of species , at different levels = ½ + ½

[1 mark]

SECTION - B (2×10=20)

9. i) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.

ii) Explain the basis on which he arrived at this conclusion.

Ans. (i) George Gamow = ½

(ii) There are four bases and 20 amino acids = ½

(There should be atleast 20 different genetic codes for these 20 amino acids)

Only possible combinations that would meet the requirement is combinations of 3 bases that will give 64 codons = 1

[2 marks]

10. State the disadvantage of inbreeding among cattle. How it can be overcome ?

Ans. - Inbreeding depression / reduce fertility and productivity = 1

- Selected animals should be mated with unrelated superior animals of the same breed / outbreeding =1

[2 marks]

11. Explain with the help of a suitable example the naming of a restriction endonuclease.

Ans. EcoRI = ½

Eco stands for the genus and species of the prokaryotic cell from which the enzyme was isolated i.e *E.coli* = ½

R stands for strain = ½

'I' follows order in which enzyme was isolated = ½

[2 marks]

12. What is gene therapy ? Name the first clinical case where it was used.

Ans. – (Collection of methods that allows) correction of a gene defect that has been diagnosed in a child / embryo = 1

– Adenosine deaminase (ADA) deficiency = 1

[2 marks]

13. Apart from being part of the food chain , predators play other important roles. Mention any two such roles supported by examples.

Ans. - Keeps prey population under control

- Biological control methods
- Maintains species diversity
- Reduces intensity of competition among prey species

(***Any two roles and relevant examples each***)

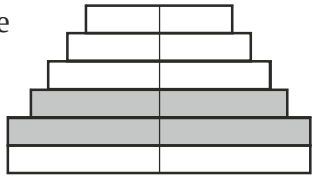
[2 marks]

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

Ans. (½) Post-reproductive

(½) Reproductive

(½) Pre-reproductive



Construction of pyramid = ½

NOTE : Proceed marking only when pyramid is correctly drawn.

[2 marks]

15. Why does the Bt toxin not kill the bacterium that produces it but kills the insect that ingests it ?

Ans. Exists as inactive protoxins = 1

Becomes active in the gut of insect due to alkaline pH = 1

[2 marks]

16. How does the gene 'I' control ABO blood groups in humans ? Write the effect the gene has on the structure of red blood cells.

Ans. – Gene 'I' has three different alleles I^A , I^B , i = ½

– I^A produces A type of sugar / Antigen ⟶ A group

I^B produces B type of sugar / Antigen ⟶ B group } = ½

– i - No sugar - O group = ½

– Structure - sugar polymers protrude from the surface of plasma membrane of RBCs = ½

[2 marks]

OR

Write the types of sex-determination mechanisms the following crosses show. Give an example of each type.

(i) Female XX with Male XO

(ii) Female ZW with Male ZZ

Ans. (i) Male heterogamety , Grasshopper = ½ + ½

(ii) Female heterogamety , Birds = ½ + ½

[2 marks]

17. Identify the following pairs as Homologous or Analogous organs :

(i) Sweet potato and potato

(ii) Eye of octopus and eye of mammals

(iii) Thorns of Bougainvillea and tendrils of Cucurbits.

(iv) Fore limbs of Bat and Whale.

Ans. (i) & (ii) Analogous

(iii) & (iv) Homologous = ½ × 4

[2 marks]

18. List the post-fertilization events in angiosperms.

Ans. – Development of endosperm

– Embryogeny / development of embryo

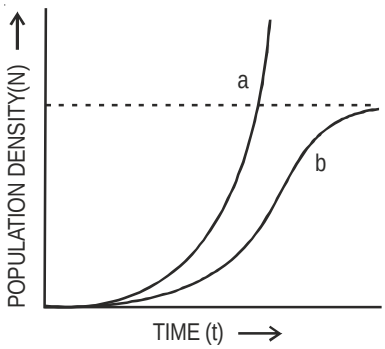
– Seed formation

– Fruit formation = ½ × 4

[2 marks]

SECTION-C (3 ×9 = 27)

19. Study the graph given below and answer the question that follow :



(i) Write the status of food and space in the curves (a) and (b).

(ii) In the absence of predators, which one of the two curves would appropriately depict the prey population ?

(iii) Time has been shown on X-axis and there is a parallel dotted line above it. Give the significance of this dotted line.

Ans. (i) a - unlimited food and space = ½

b - limited food and space = ½

(ii) Curve a = 1

(iii) Carrying capacity / a given habitat has enough resources to support maximum possible number - beyond which no further growth is possible = 1

[3 marks]

20. How did the process of RNA interference help to control the nematode from infecting roots of tobacco plants? Explain.

Ans. Using *Agrobacterium* vectors , nematode specific genes introduced into host plant , produced sense - antisense RNA in host cells , ds RNA - initiated RNAi , silenced specific mRNA of nematode , parasite could not survive in transgenic host = ½ × 6

[3 marks]

21. What are Methanogens ? Name the animals they are present in and the role they play there.

Ans. – Bacteria which grow anaerobically on cellulosic material = 1

– Present in cattle (rumen) = 1

– Breakdown of cellulose , helps in nutrition of animal // digestion of cellulose = 1

[3 marks]

22. (a) Name the tropical sugar cane variety grown in South India. How has it helped in improving the sugar cane quality grown in North India ?

(b) Identify 'a', 'b' and 'c' in the following table :

No.	Crop	Variety	Insect Pests
1.	*Brassica*	Pusa Gaurav	(a)
2.	Flat bean	Pusa Sem 2 Pusa Sem 3	(b)
3.	(c)	Pusa Sawani Pusa A-4	Shoot and fruit borer

Ans. (a) *Saccharum officinarum* , crossed with , North Indian variety (*Saccharum barberi*) to increase quality = ½ × 3

(b) (a) Aphids

(b) Jassids / aphids / fruit borer

(c) Okra (Bhindi) = ½ × 3

[1½ + 1½ = marks]

23. Women are often blamed for producing female children. Consequently, they are ill treated and ostracized. How will you address this issue scientifically if you were to conduct an awareness programme to highlight the values involved?

Ans. – Male produces two types of sperms (X & Y type in the ratio 1 : 1) , Female produces only one type of ovum (X type) , hence the sex of baby is determined by the type of sperm fertilising the ovum therefore women should not be blamed // A genetic cross showing sex determination in human beings covering above value points can be considered in lieu of the above explanation = ½ × 3

– Sensitivity towards community / Social awareness / Self discipline / Responsible behaviour / Leadership quality / Caring attitude / Responsible attitude towards society / Concern for others

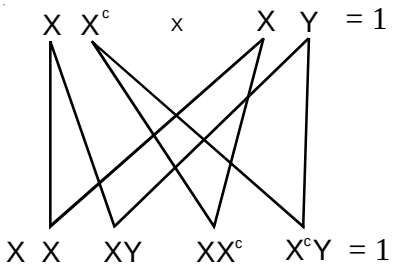
/ Sharing of knowledge or information / Presence of mind /Being proactive / any other relevant value.

(Any three values) = ½ × 3

[3 marks]

24. A colourblind child is born to a normal couple. Work out a cross to show how it is possible. Mention the sex of this child.

Ans.



Male = 1

[3 marks]

OR

Mendel published his work on inheritance of characters in 1865, but it remained unrecognized till 1900. Give three reasons for the delay in accepting his work.

Ans. - The communication was not easy in those days and his work could not be widely publicised.

- His concept of genes as stable and discrete units that controlled the expression of traits and of the pair of alleles which did not 'blend' with each other was not accepted by contemporaries as an explanation for the apparently continuous variation seen in nature.
- Mendel's approach of using mathematics to explain biological phenomena was totally new and unacceptable to many of the biologists of his time.
- Though Mendel's work suggested that factors (genes) were discrete units , he could not provide any physical proof for the existence of factors and what they were made of.

(Any three points) = 1 + 1 + 1

[3 marks]

25. Name and explain the role of inner and middle walls of the human uterus.

Ans. Inner - Endometrium = ½ ,

supports foetal growth , helps in placenta formation after implantation = ½ + ½,

Middle - Myometrium = ½,

Exhibits strong contraction during delivery of baby = 1

[3 marks]

26. Explain any three advantages the seeds offer to angiosperms.

Ans. - Since reproductive process such as pollination and fertilisation are independent of water , seed formation is more dependable.

- Seeds have better adaptive strategies for dispersal to new habitats and help the species to colonise in other areas.
- As they have sufficient food reserves young seedlings are nourished until they are capable of photosynthesis on their own.
- The hard seed coat provides protection to the young embryo.
- Being products of sexual reproduction , they generate new genetic combinations / variations.
- Dehydration and dormancy of mature seeds are crucial for survival under adverse conditions.

(Any three points) = 1 + 1 + 1

[3 marks]

27. There are many animals that have become extinct in the wild but continue to be maintained in Zoological parks.

(i) What type of biodiversity conservation is observed in this case ?

(ii) Explain any other two ways which help in this type of conservation.

Ans. (i) Ex - situ conservation = 1

(ii) Botanical garden , Wild life safaries , Cryopreservation , In-vitro , Seed bank , Tissue culture propagation

(Any two method explained) 1 × 2 = 2

[1 + 2 = 3 marks]

SECTION-D (5×3 = 15)

28. (a) Name the technology that has helped the scientists to propagate on large scale the desired crops in short duration. List the steps carried out to propagate the crops by the said technique.

(b) How are somatic hybrids obtained ?

Ans. (a) Tissue culture / micro propagation = 1

Explants, grown in a test tube , under sterile condition , in special nutrient medium / culture medium ½ × 4 = 2

(b) Isolated single cells , digests cell walls , to obtain protoplast from two different varieties , fusion of protoplast. ½ × 4 = 2

[5 marks]

OR

(a) Cancer is one of the most dreaded diseases of humans. Explain 'Contact inhibition' and 'Metastasis' with respect to the disease.

(b) Name the group of genes which have been identified in normal cells that could lead to cancer and how they do so ?

(c) Name any two techniques which are useful to detect cancers of internal organs.

(d) Why are cancer patients often given α-interferon as part of the treatment ?

Ans. (a) Conact with other cells inhibits their uncontrolled growth = 1

tumour cells reach distant sites, through blood. = ½ + ½

(b) Proto oncogenes = ½

when activated under certain condition could lead to oncogenic transformation of the cells. = ½

(c) Biopsy / radiography / CT / MRI

(Any 2) = ½+½

(d) It activates immune system, destroys tumour = ½+½

[5 marks]

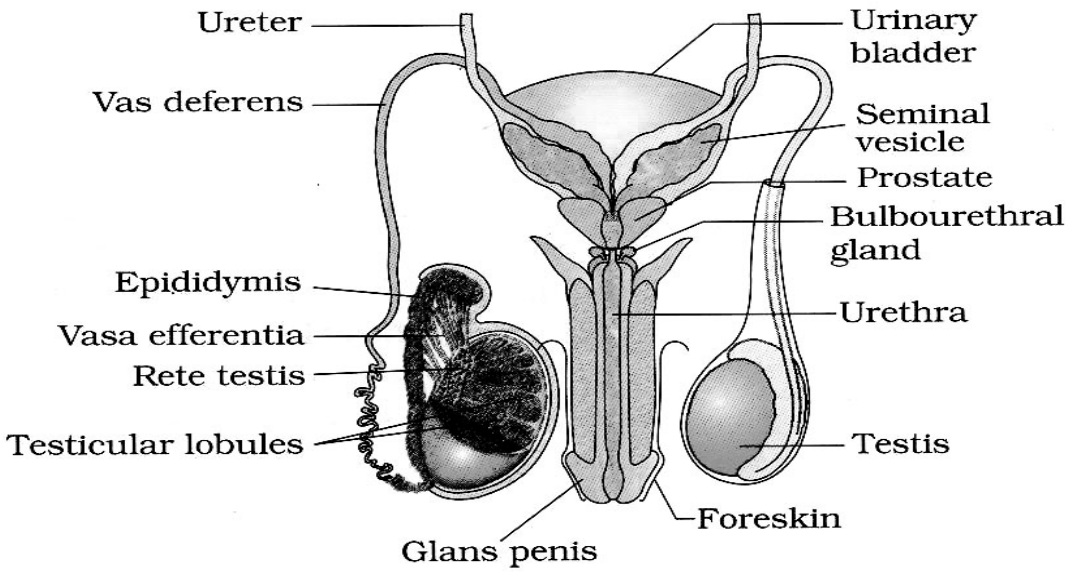
29. (a) Draw a labelled diagrammatic view of human male reproductive system.

(b) Differentiate between:

(i) Vas deferens and vasa efferentia

(ii) Spermatogenesis and spermeogenesis

Ans. (a)



(Label any six) = ½ × 6 = 3

(b) (i)

Vas deferens	**Vas efferentia**
- Carries sperm from epididymis to urethra	- Carries sperm from testis to epididymis

-	One in number from each testis	-	Many in number

(Any one difference) = 1

(ii)	**Spermatogenesis**	**Spermiogenesis**
-	Production of sperms (by meiosis)	- Spermatids are transformed to spermatozoa = 1

[3 + 2 = 5 marks]

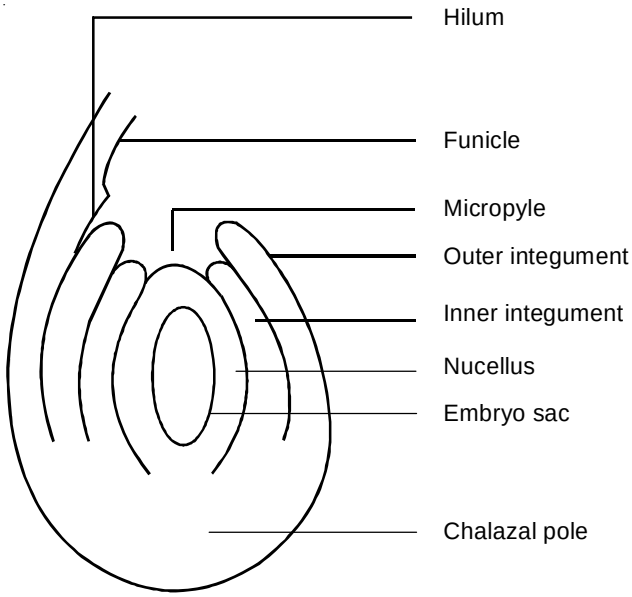
OR

(a) Explain the phenomenon of double fertilization.

(b) Draw a labelled diagram of a typical anatropous ovule.

Ans. (a) It includes syngamy where one of the male gametes fuses with egg cell to form zygote , triple fusion which includes fusion of second male gamete with two polar nuclei to form primary endospermic nucleus = 1 + 1

(b)



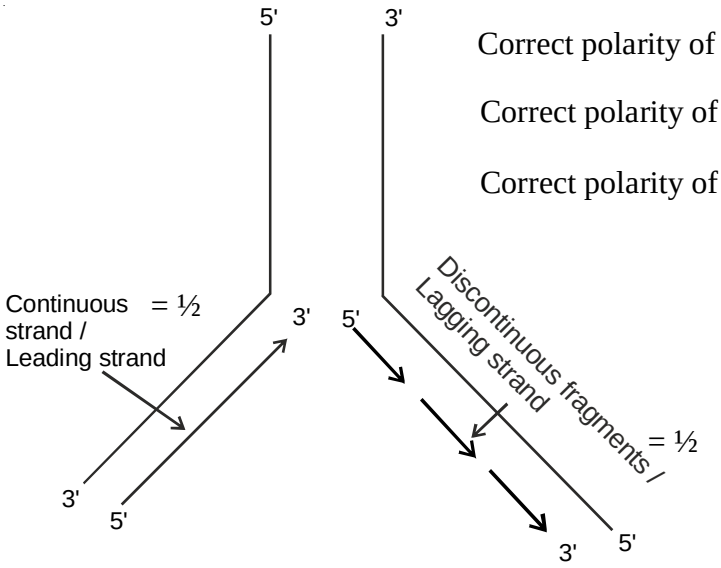
(Any six) = ½ × 6

[2 + 3 = 5 marks]

30. (a) Explain the process of DNA replication with the help of a schematic diagram.

(b) In which phase of the cell cycle does replication occur in Eukaryotes ? What would happen if cell-division is not followed after DNA replication?

Ans. (a)
- Replication of DNA begins at ori, to form a replication fork = ½ + ½
- DNA dependant DNA polymerase forms a new strand in 5' ⟶ 3' direction = ½
- Role of DNA ligase is to join discontinuously synthesised fragments = ½



b. S phase = ½

Polyploidy = ½

[5 marks]

OR

(a) Explain Darwinian theory of evolution with the help of one suitable example. State the two key concepts of the theory.

(b) Mention any three characteristics of Neanderthal man that lived in near east and central Asia.

Ans : (a)
- Competition
- Useful variations
- Survival of the fittest
- Natural selection
- Relevant example
- Explanation of the above points ½×5=2½

Key concepts
- Branching descent ½
- Natural Selection ½

(b) Neanderthal man
- Brain size 1400 cc
- They used hides to protect their bodies
- They buried their dead ½ × 3 = 1 ½ [3½ + 1½ = 5 marks]