ROLL NUMBER				

CODE NUMBER	044/1/1
SET NUMBER	1

INDIAN SCHOOL MUSCAT
FIRST PRE BOARD EXAMINATION 2023
BIOLOGY 044

CLASS : XII
DATE: 30-11-2023

TIME ALLOTED : 3 HRS.
MAXIMUM MARKS:70

GENERAL INSTRUCTIONS:

(i) All questions are compulsory.

(ii) The question paper has five sections and 33 questions. All questions are compulsory.

(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.

(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

Section - A

1. To overcome incompatible pollinations so as to get desired hybrids, a plant breeder must have the knowledge of 1

A. pollen-nucellar interaction
B. pollen-eggs cell interaction
C. pollen -pistil interaction
D. pollen - embryo sac interaction

2. Enclosed within the integuments of a typical anatropous ovule is a diploid mass of cellular tissue known as 1

A. Megaspore mother cell
B. Nucellus
C. Synergids
D. Embryo sac

3. The cause of Klinfelter's syndrome in human is 1

A. Absence of Y- Chromosome
B. Absence of X- Chromosome
C. Extra copy of autosome
D. Extra copy of an X-chromosome

4. How many types of gametes will be produced by individuals having genotype AaBbCc? 1

A. Two B. Four C. Six D. Eight

5. Select the important goals of Human Genome Project 1

I) Store the information for Data Analysis
II) Cloning and amplification of human DNA
III) Identify all the genes present in human DNA
IV) Use of DNA information to trace the human evolution'

A. (I) and (II) B. (II) and (III) C. (I) and (III) D. (II) and (IV)

6. A codon is a 'triplet of bases' was suggested by 1

A. Marshall Nirenberg
B. Har Gobind Khorana
C. George Gamov
D. Francis Crick

7. Adaptive radiation refers to 1

A. power of adaptation in an individual to a variety of environments.
B. adaptations due to Geographical isolation.
C. evolution of different species from a common ancestor.
D. migration of members of a species to different geographical areas.

8. The technique of raising large number of plantlets through tissue culture is 1

A. Plantlet culture B. Micropropagation C. Macropropagation D. Organ culture

9. Plasmids : 1

A. Are circular protein molecules
B. Are required by bacteria
C. Are tiny bacteria
D. Confer resistance to antibiotics

10. Which of the following options correctly represent the life cycle of Plasmodium? 1

A. sporozoites (human) —> RBCs —> liver cells gametocytes (RBCs) —> blood meal (female mosquito) —>multiply (mosquito) —» sporozoites (mosquito)

B. sporozoites (mosquito) —> bite —> RBC s (human) —> liver cells gametocytes (RBCs) —> sporozoites (human) —> blood meal (female mosquito)

C. sporozoites (human) —> liver cells —> RBCs. gametocytes (RBCs) —> blood meal (female mosquito) —> multiply (mosquito) —> sporozoites (mosquito).

D. blood meal (female mosquito) —> multiply (mosquito) —> sporozoites (mosquito) —> bite —> liver cells (human) —» RBCs —> gametocytes (RBCs)

A. A and B are correct B. C and D are correct C. All are correct D. None

11. mRNA silencing is called – 1

A. RNAi B. RNA activation

C. RNA without initiation codon D. RNA is not producing interferon

12. Which one of the following process help the water soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts? 1

A. Fragmentation B. Leaching C. Catabolism D. Humification

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true and R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

13. Assertion (A): Apomixis and parthenocarpy are both asexual modes of reproduction. 1
Reason (R): Seeds are not produced in both apomixis and parthenocarpy.

14. Assertion (A) : In humans, the gamete contributed by the male determines whether the child produced will be male or female. 1
Reason (R) : Sex in humans is a polygenic trait depending upon a cumulative effect of some genes on X-chromosome and some on Y-chromosome.

15. Assertion (A): Replication and transcription occur in the nucleus but translation takes place in the cytoplasm. 1

Reason (R) : mRNA is transferred from the nucleus into cytoplasm where ribosomes and amino acids are available for protein synthesis.

16. Assertion (A) : The GEAC (Genetic Engineering Approval Committee) has been set up by the Indian Government. 1

Reason(R) : Introduction of GMO could have unpredictable result in the ecosystem.

Section - B

17. The table shows endocrine glands, their secretions and functions. Fill up the missing components 2

Endocrine Gland	Hormone	Function
Sertoli cells	Testosterone	A
Placenta	B	Initiates secretion of milk
C	Androgen	Initiates the production of sperms
Ovary	D	Stimulates follicular development

18. 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. 2

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

(b) What is the phenomenon known as?

19. (a) A person suffering from AIDS dies of opportunistic infections (ARC) i.e., infections that could have been otherwise overcome. 2

(i) State one reason as one why an 'HIV' patients die of 'opportunistic infections'.

(ii) Give the scientific name of one bacterium and one parasite which mainly attack a person suffering from AIDS.

(iii) Write the full form of the name of the widely used diagnostic test for AIDS.

OR

(b) In spite of the statutory warning on cigarette packets against "smoking" and its injurious effect on health, smoking is still prevalent in the society. Enumerate four important health hazards to a smoker.

20. 'Insertional inactivation' is a method to detect recombinant DNA. Explain this method. 2

21. Explain the pollination mechanism involved in co-evolution of the two species, namely *Ophrys* (orchid) and its insect pollinator bees (& bumble bees). 2

Section - C

22. In Human male reproductive system 3

a) Which cells will undergo meiosis and mitosis respectively?

b) What will happen if sertoli cells are not maturing?

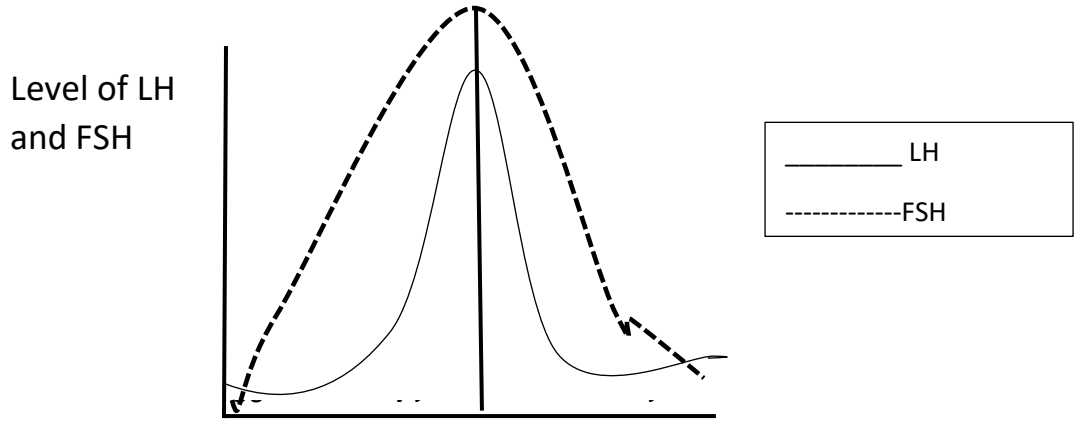
c) Name the process by which spermatids are developed into mature sperms.

23. Reproductive and Child Healthcare (RCH) programmes are currently in operation. One of the major tasks of these programmes is to create awareness amongst people about the wide range of reproduction related aspects. As this is important and essential for building a reproductively healthy society. 3

(a) "Providing sex education in schools is one of the ways to meet this goal." Give four points in support of your opinion regarding this statement.

(b) List any two 'indicators' that indicate a reproductively healthy society.

24. The graph shown below shows the levels of LH and FSH at various stages of the menstrual cycle 3



i) Mention the role of LH and FSH in females.

ii) Write the role of LH hormone in males.

25. (a) Darwin's Theory of Natural selection is widely accepted but some limitations have been identified by modern biologists. Mention the limitations identified. 3

(b) Name and state the most accepted theory of evolution in modern times.

(c) Mention any two ways of the evolution are explained in modern biology.

26. Enumerate the main sources of biofertilizers, giving one example of each. 3

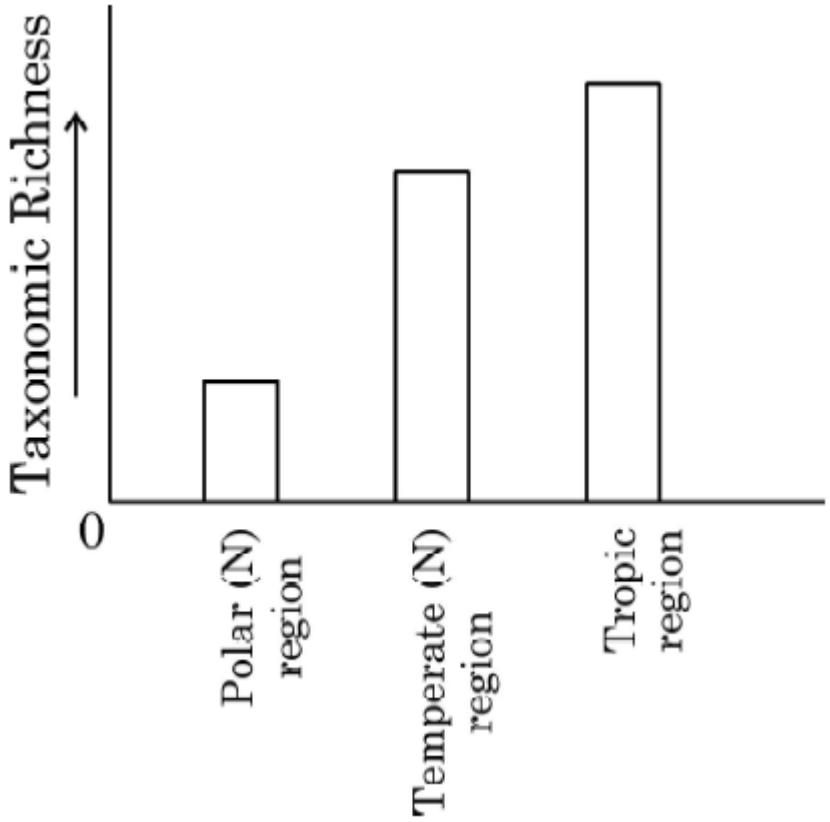
27. Name one Bt gene that encodes protein in corn plant to control corn borers. Explain how this protein controls corn borers. 3

OR

What is a GMO? List any five possible advantages of a GMO to a farmer.

28. The data collected based on the survey conducted for species richness of group of mammals, in three different climatic regions of the world is shown in the bar graph given below. 3

Panama has nearly 560 species of mammals, Canada baa nearly 301 species of mammals and Denmark has 67 species of mammals.

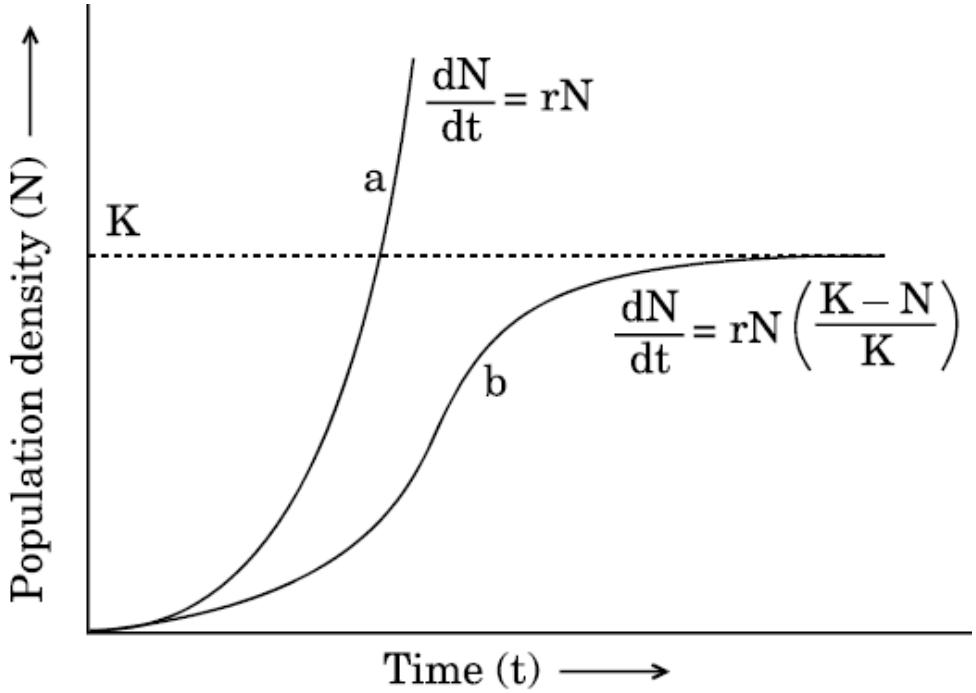


(i) Based on the species, richness, identify the location of these countries in the respective climatic regions given.

(ii) Plants and animals do not have a uniform diversity in the world. Write the term given to this pattern of diversity and why?

Section - D

29. Study the graph given below showing the different types of growth curves of different species. 4



Answer the questions :

(a) Name the type of growth curve 'a' shown in the graph.

(b) State one reason why the growth curve 'b' is said to be realistic.

(c) What is 'K' representing in the equation $\frac{dN}{dT}$ $rN\left[\frac{K-N}{K}\right]$ given along the logistic curve?

OR

(c) What is the other name of curve 'b'?

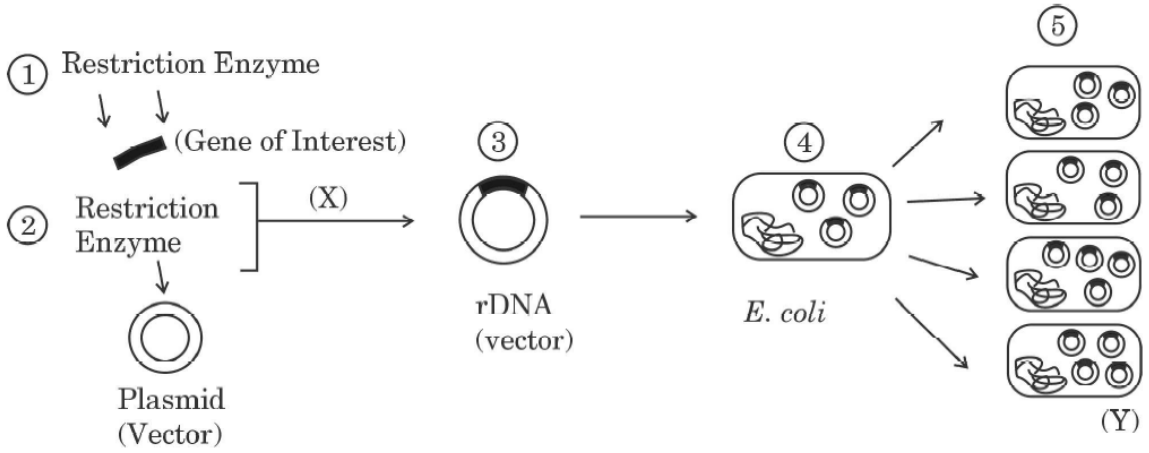
(d) of the two curves, which one will exemplify the following : Increasing rat population during the harvest.

OR

(d) What does 'r' stand for?

30. (a) Development of recombinant DNA technology has opened gates to many breakthroughs in the fields of medicine and agriculture. This has enabled scientists to isolate, sequence and manipulate individual genes obtained from diverse living or dead cells. Given below is a 4

diagram showing the basic steps involved in genetically modifying an organism. Study the given diagram and answer the questions that follow :



(i) Are two different types of restriction endonucleases used, one to cut the vector DNA and another to cut the desired DNA to be cloned? Support your answer, giving reason.

(ii) Which enzyme is used at step (X) to integrate the foreign DNA with the vector DNA? Explain its action.

OR

(ii)What does rop code for in plasmid pBR322? And state the selective markers of this plasmid.

Section - E

31. (a) How are assisted reproductive technologies helpful to humans? How are ZIFT and GIFT different from intra uterine transfers? Explain. 5

OR

(b)

i) Medically it is advised to all young mothers that breastfeeding is the best for their newborn babies. Do you agree? Give reasons in support of your answer.

ii) If implementation of better techniques and new strategies are required to provide more efficient care and assistance to people, then why is there a statutory ban on amniocentesis? Write the use of this technique and give reason to justify the ban.

32. (a) "It is sometimes observed that the F1 progeny shows a phenotype that resembles both the parents". Explain this type of inheritance using the example of A, B, O blood groups in human. 5

OR

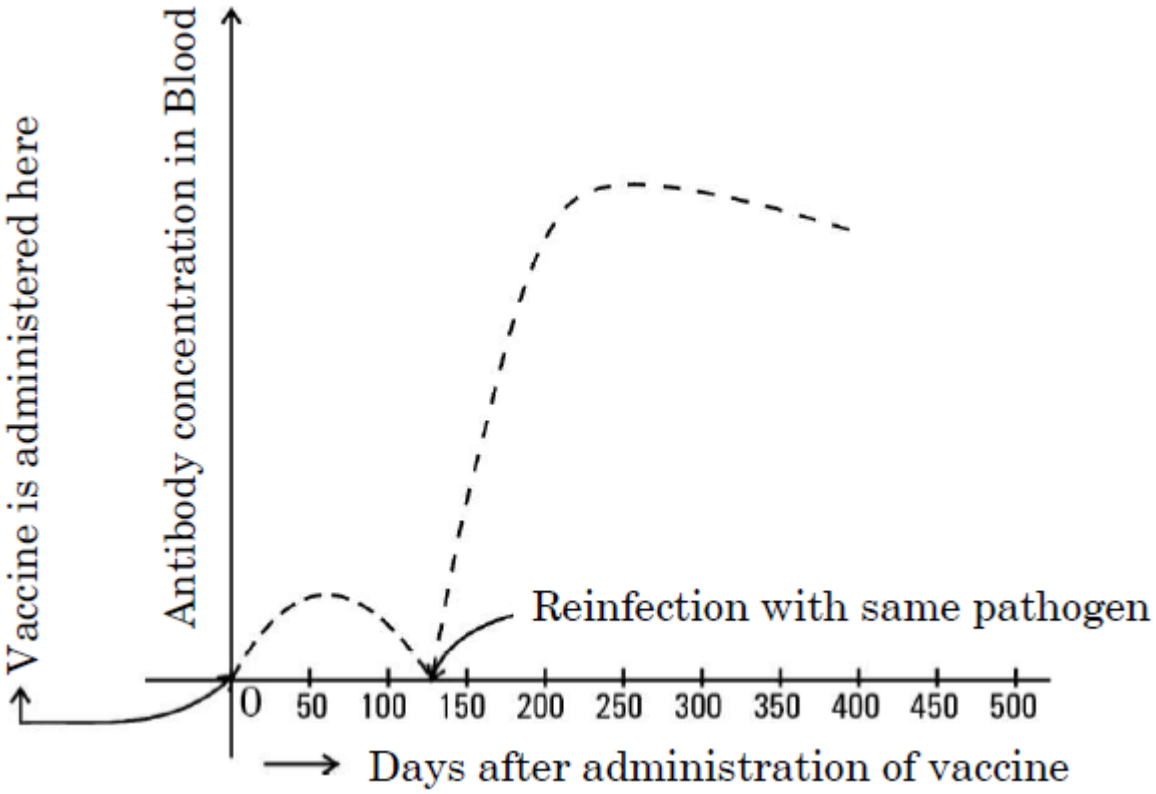
(b) (i) Explain the process of aminoacylation of tRNA and its role in the process of translation.

(ii) How does initiation of the translation process occur in prokaryotes? Explain.

(iii) Where are the untranslated regions located on mRNA and why?

33. 5

(a) A time-bound vaccination programme is followed for the children in our country from their birth up to ten years of age. A graph plotted below shows the effect of the vaccination followed by infection by the same pathogen, and the antibody concentration in the blood of the child.



(i) Explain why the administration of a vaccine causes an increase in the antibody concentration.

(ii) If the child is infected with the same pathogen almost four months later, the antibody concentration in his/her blood increases very fast. Explain why.

(iii) A table given below gives information about different types of immunity and how they are attained. Identify P , Q , R , S and T in the table.

	Type of immunity	Production of antibodies	Presence of memory cells	Mode attained
(1)	Natural, active	Yes	'P'	'Q'
(2)	Natural, passive	No	'R'	Across the placenta during pregnancy/breast feeding
(3)	Acquired, active	'S'	Yes	Getting a vaccine during breast feeding
(4)	Acquired, passive	'T'	No	Getting an injection of antibodies

OR

(b) (i) what is the chemical name of 'smack'? Why is the consumption of smack considered as an abuse?

(ii) Name the source plant and one effect of the following drugs on the human body :

(1) Marijuana

(2) Cocaine

(3) Morphine

******END OF THE QUESTION PAPER******

ROLL NUMBER					

CODE NUMBER	044/1/2
SET NUMBER	2

INDIAN SCHOOL MUSCAT
FIRST PRE BOARD EXAMINATION 2023
BIOLOGY 044

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(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

Section - A

1. How many types of gametes will be produced by individuals having genotype AaBbCc? 1

   A. Two B. Four C. Six D. Eight

2. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is: 3' – ATGAATG – 5', the sequence of bases in its RNA transcript would be 1

   A. 5' – AUGAAUG – 3' B. 5' – UACUUAC – 3'

   C. 5' – CAUUCAU – 3' D. 5' – GUAAGUA – 3'

3. In XO type of sex determination 1

   A. females produce two different types of gametes.

   B. males produce two different types of gametes.

C. females produce gametes with Y chromosomes.

D. males produce single type of gametes.

4. Match the column I with column II 1

Column I	Column II
A. Funicle	I. Mass of cells within ovule with more food
B. Hilum	II. Basal part of ovule
C. Integument	III. One or 2 protective layers of ovule
D. Chalaza	IV Region where body of ovule fuses with funicle
E. Nucellus	V. Stalk of ovule

A. A-i, B-II.C-III, D-IV,E-V B. A-V, B-IV, C-lll, D-ll, E-l

C. A-IV, B-II.C-I, D-lll, E-V D. A-I, B-III.C-V, D-ll, E-'IV

5. mRNA silencing is called – 1

A. RNAi B. RNA activation

C. RNA without initiation codon D. RNA is not producing interferon

6. Plasmids : 1

A. Are circular protein molecules B. Are required by bacteria

C. Are tiny bacteria Q Confer resistance to antibiotics

7. Read the following three statements (i - iii) and mark the right option. 1

(i) The thorns in Bougainvillea and tendrils in cucurbits represent divergent evolution.

(ii) The similarity in the eyes of Octopus and monkeys is the result of convergent evolution.

(iii) The potato and sweet potato are the examples of homology.

A. (i) and (ii) are correct B. (ii) and (iii) correct

C. (i) and (iii) D. All are correct

8. Select the important goals of Human Genome Project 1

I) Store the information for Data Analysis

II) Cloning and amplification of human DNA

III) Identify all the genes present in human DNA

IV) Use of DNA information to trace the human evolution'

A. (I) and (II) B. (II) and (III) C. (I) and (III) D. (II) and (IV)

9. To overcome incompatible pollinations so as to get desired hybrids, a plant breeder must have the knowledge of 1

A. pollen-nucellar interaction B. pollen-eggs cell interaction

C. pollen -pistil interaction D. pollen - embryo sac interaction

10. Which of the following is used as clot-buster for removing clots from blood vessels of patients who have undergone myocardial infarction? 1

A. Cyclosporin B. Statins C. Streptokinase D. Lipase

11. Which of the following options correctly represent the life cycle of Plasmodium? 1

A. sporozoites (human) —> RBCs —> liver cells gametocytes (RBCs) —> blood meal (female mosquito) —>multiply (mosquito) —» sporozoites (mosquito)

B. sporozoites (mosquito) —> bite —> RBC s (human) —> liver cells gametocytes (RBCs) —> sporozoites (human) —> blood meal (female mosquito).

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A. A and B are correct B. C and D are correct C. All are correct D. None

12. Which one of the following process help the water soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts? 1

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13. Assertion(A) : Chasmogamous flowers require pollinating agents. 1

Reason(R) : Cleistogamous flowers do not expose their sex organs.

14. Assertion (A) : In humans, the gamete contributed by the male determines whether the child produced will be male or female. 1

Reason (R) : Sex in humans is a polygenic trait depending upon a cumulative effect of some genes on X-chromosome and some on Y-chromosome.

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Reason(R) : Introduction of GMO could have unpredictable result in the ecosystem.

Section - B

17. (a) A person suffering from AIDS dies of opportunistic infections (ARC) i.e., infections that could have been otherwise overcome. 2

(i) State one reason as one why an 'HIV' patients die of 'opportunistic infections'.

(ii) Give the scientific name of one bacterium and one parasite which mainly attack a person suffering from AIDS.

(iii) Write the full form of the name of the widely used diagnostic test for AIDS.

OR

(b) In spite of the statutory warning on cigarette packets against "smoking" and its injurious effect on health, smoking is still prevalent in the society. Enumerate four important health hazards to a smoker.

18. Explain how recombinant DNA technology is used to detect a disease even before any clinical symptom appears. 2

19. Explain the pollination mechanism involved in co-evolution of the two species, namely *Ophrys* (orchid) and its insect pollinator bees (& bumble bees). 2

20. The table shows endocrine glands, their secretions and functions. Fill up the missing components 2

Endocrine Gland	Hormone	Function
Sertoli cells	Testosterone	A
Placenta	B	Initiates secretion of milk
C	Androgen	Initiates the production of sperms
Ovary	D	Stimulates follicular development

21. Write the scientific name of the fruit-fly. Why did Morgan prefer to work with fruit-flies for his experiments? State any three reasons. 2

Section - C

22. Bio-diversification of life started to occur almost 3 billion years ago. Since then new species have been evolving and then disappearing en masse from earth. 3

(a) How many episodes of mass extinctions of species have already taken place and which one is in progress in the current era?

(b) How is current episode in progress different from the previous episodes and why? Explain.

23. (a) Darwin's Theory of Natural selection is widely accepted but some limitations have been identified by modern biologists. Mention the limitations identified. 3

(b) Name and state the most accepted theory of evolution in modern times.

(c) Mention any two ways of the evolution are explained in modern biology.

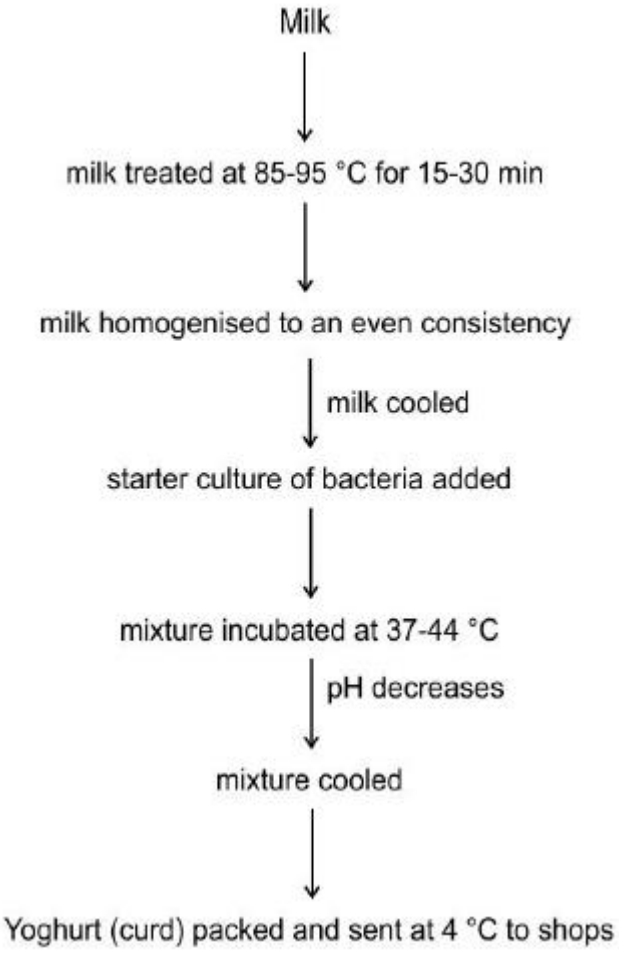
24. In Human male reproductive system 3

a) Which cells will undergo meiosis and mitosis respectively?

b) What will happen if sertoli cells are not maturing?

Name the process by which spermatids are developed into mature sperms.

25. Given below is the step-by-step process in the formation of yoghurt (curd) in a bioreactor. 3



(a) Why does the pH start decreasing a while after the mixture is incubated at 37-44 °C?

(b) From the flowchart, identify two systems that the bioreactor would have. Give a reason to support your answer.

26. Name one Bt gene that encodes protein in corn plant to control corn borers. Explain how this protein controls corn borers. 3

OR

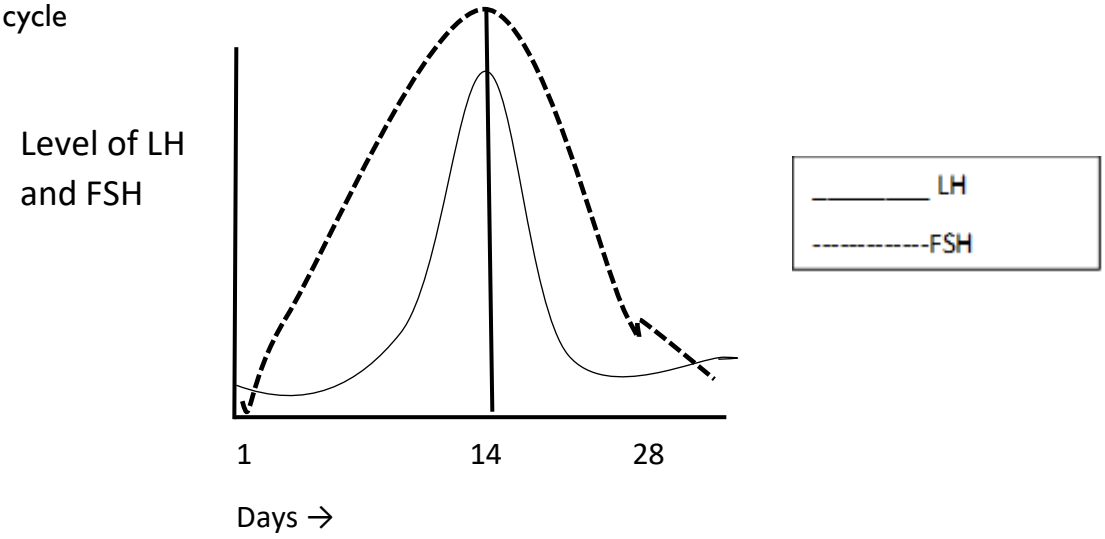
What is a GMO? List any five possible advantages of a GMO to a farmer.

27. Reproductive and Child Healthcare (RCH) programmes are currently in operation. One of the major tasks of these programmes is to create awareness amongst people about the wide range of reproduction related aspects. As this is important and essential for building a reproductively healthy society. 3

(a) "Providing sex education in schools is one of the ways to meet this goal." Give four points in support of your opinion regarding this statement.

(b) List any two 'indicators' that indicate a reproductively healthy society.

28. The graph shown below shows the levels of LH and FSH at various stages of the menstrual cycle 3

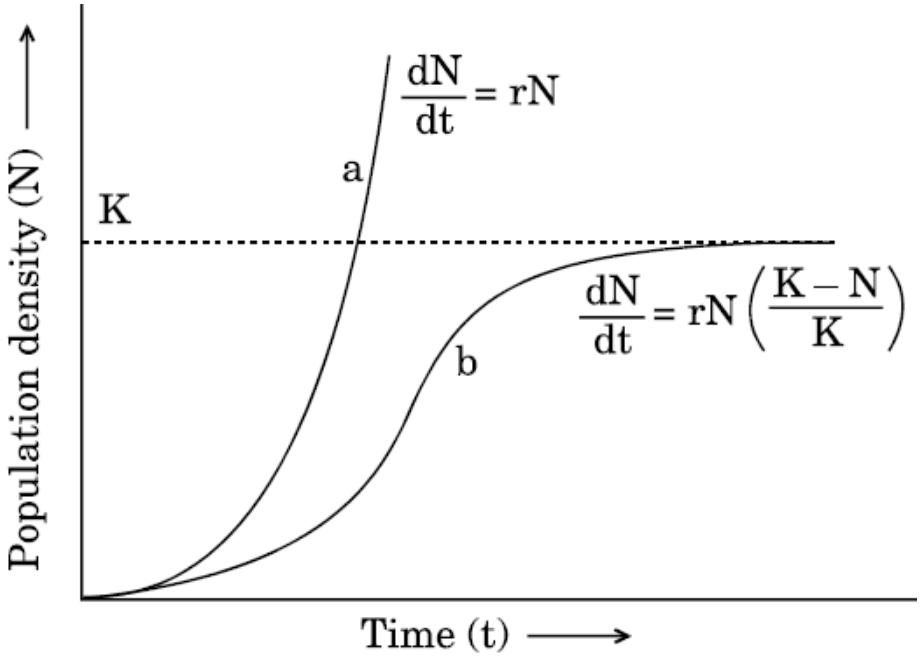


i) Mention the role of LH and FSH in females.

ii) Write the role of LH hormone in males.

Section - D

29. Study the graph given below showing the different types of growth curves of different species. 4



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(c) What is 'K' representing in the equation $\frac{dN}{dT}$ $rN\left[\frac{K-N}{K}\right]$ given along the logistic curve?

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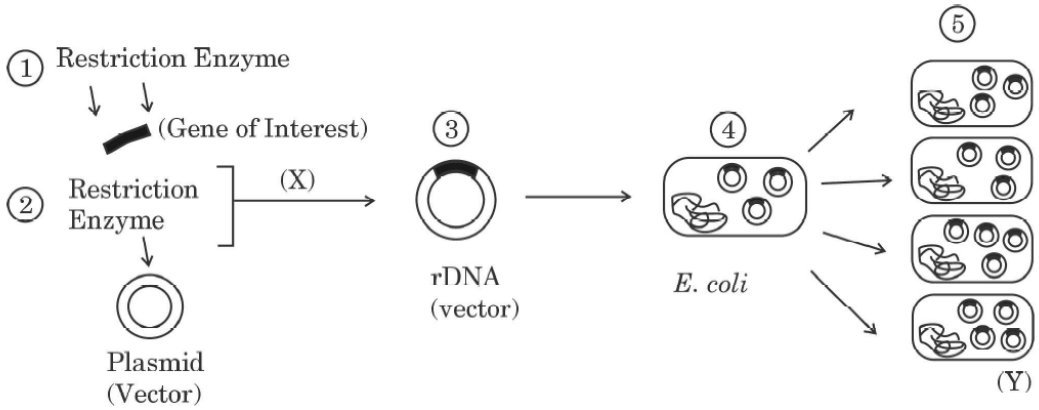

(i) Are two different types of restriction endonucleases used, one to cut the vector DNA and another to cut the desired DNA to be cloned? Support your answer, giving reason.

(ii) Which enzyme is used at step (X) to integrate the foreign DNA with the vector DNA? Explain its action.

OR

(ii)What does rop code for in plasmid pBR322? And state the selective markers of this plasmid.

Section - E

31. (a) "It is sometimes observed that the F1 progeny shows a phenotype that resembles both the parents". Explain this type of inheritance using the example of A, B, O blood groups in human. 5

OR

(b) (i) Explain the process of aminoacylation of tRNA and its role in the process of translation.

(ii) How does initiation of the translation process occur in prokaryotes? Explain.

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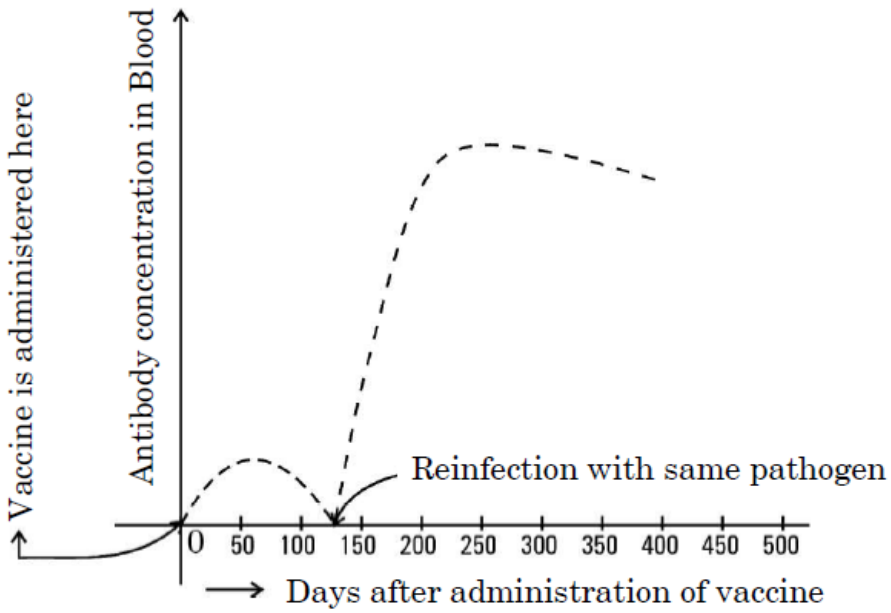
32. 5

(a) A time-bound vaccination programme is followed for the children in our country from their birth up to ten years of age. A graph plotted below shows the effect of the vaccination followed by infection by the same pathogen, and the antibody concentration in the blood of the child.



(i) Explain why the administration of a vaccine causes an increase in the antibody concentration.

(ii) If the child is infected with the same pathogen almost four months later, the antibody concentration in his/her blood increases very fast. Explain why.

(iii) A table given below gives information about different types of immunity and how they are attained. Identify P , Q , R , S and T in the table.

	Type of immunity	Production of antibodies	Presence of memory cells	Mode attained
(1)	Natural, active	Yes	'P'	'Q'
(2)	Natural, passive	No	'R'	Across the placenta during pregnancy/breast feeding
(3)	Acquired, active	'S'	Yes	Getting a vaccine during breast feeding
(4)	Acquired, passive	'T'	No	Getting an injection of antibodies

OR

(b) (i) what is the chemical name of 'smack' ? Why is the consumption of smack considered as an abuse?

(ii) Name the source plant and one effect of the following drugs on the human body :

(1) Marijuana

(2) Cocaine

(3) Morphine

33. (a) 5

(i) On what principle the following natural methods of contraception work

a) Periodic abstinence b) coitus interuptus c) lactational amenorrhea

(ii) Reason out why is condom preferred other than its contraceptive value.

OR

(b)

i) Differentiate intra uterine transfer and intra uterine insemination.

ii) Write down the steps of Test tube baby program in sequence.

iii) How do you call the fusion of male and female gametes if occurs outside the body in a lab condition?

******END OF THE QUESTION PAPER******

ROLL NUMBER					

CODE NUMBER	044/1/3
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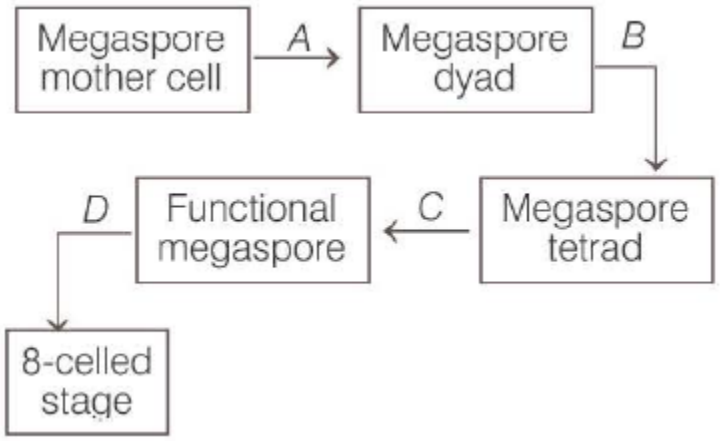
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.

(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

Section - A

1. Identify the type of cell division A to D in the following flowchart. 1



A. A-Meiosis-I, 8-Mitosis, C-Mitosis, D-Meiosis

B. A-Meiosis- I, 8- Meiosis- 11, C-No division, D-Mitosis

C. A-Mitosis, 8-No division, C-Meiosis-1, D-Meiosis-1

D. A-Mitosis, 8-Mitosis, C-Meiosis-1, D-Meiosis-1

2. Match the column I with column II 1

Column I	Column II
A. Funicle	I. Mass of cells within ovule with more food
B. Hilum	II. Basal part of ovule
C. Integument	III. One or 2 protective layers of ovule
D. Chalaza	IV Region where body of ovule fuses with funicle
E. Nucellus	V. Stalk of ovule

A. A-i, B-II.C-III, D-IV,E-V

B. A-V, B-IV, C-III, D-II, E-I

C. A-IV, B-II.C-I, D-III, E-V

D. A-I, B-III.C-V, D-II, E-'IV

3. In XO type of sex determination 1

(a) females produce two different types of gametes.

(b) males produce two different types of gametes.

(c) females produce gametes with Y chromosomes.

(d) males produce single type of gametes.

4. The term, ... A .... describes the physical association of genes on a chromosome and the term, ... B ... describes the generation of non-parental gene combinations. 1

A. A-association, B-recombination

B. A-linkage, B-recombination

C. A- recombination, B-linkage

D. A-association, B-dissociation

5. Select the important goals of Human Genome Project 1

I) Store the information for Data Analysis

II) Cloning and amplification of human DNA

III) Identify all the genes present in human DNA

IV) Use of DNA information to trace the human evolution'

A. (I) and (II)

B. (II) and (III)

C. (I) and (III)

D. (II) and (IV)

6. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is: 3' – ATGAATG – 5', the sequence of bases in its RNA transcript would be 1

A. 5' – AUGAAUG – 3'
B. 5' – UACUUAC – 3'
C. 5' – CAUUCAU – 3'
D. 5' – GUAAGUA – 3'

7. Read the following three statements (i - iii) and mark the right option. 1

(i) The thorns in Bougainvillea and tendrils in cucurbits represent divergent evolution.

(ii) The similarity in the eyes of Octopus and monkeys is the result of convergent evolution.

(iii) The potato and sweet potato are the examples of homology.

A. (i) and (ii) are correct
B. (ii) and (iii) correct
C. (i) and (iii)
D. All are correct

8. Which of the following options correctly represent the life cycle of Plasmodium? 1

A. sporozoites (human) —> RBCs —> liver cells gametocytes (RBCs) —> blood meal (female mosquito) —>multiply (mosquito) —» sporozoites (mosquito)

B. sporozoites (mosquito) —> bite —> RBC s (human) —> liver cells gametocytes (RBCs) —> sporozoites (human) —> blood meal (female mosquito).

C. sporozoites (human) —> liver cells —> RBCs. gametocytes (RBCs) —> blood meal (female mosquito) —> multiply (mosquito) —> sporozoites (mosquito).

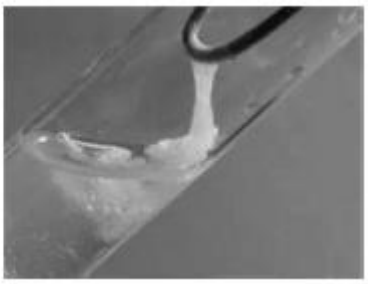
D. blood meal (female mosquito) —> multiply (mosquito) —> sporozoites (mosquito) —> bite —> liver cells (human) —» RBCs —> gametocytes (RBCs)

A. A and B are correct
B. C and D are correct
C. All are correct
D. None

9. Which of the following is used as clot-buster for removing clots from blood vessels of patients who have undergone myocardial infarction? 1

A. Cyclosporin
B. Statins
C. Streptokinase
D. Lipase

10. Precipitates of purified DNA after the addition of chilled ethanol are seen as a collection of fine threads in suspension. This process is referred as 1

A. DNA transformation
B. DNA ligation
C. DNA spooling
D. DNA duplication

11. A doctor while operating on an HIV (+ve) patient accidently cuts himself with a scalpel. Suspecting himself to have contracted the virus. Which of the following test will be taking to confirm his suspicion? 1

A. Routine urine examination
B. TLC
C. DLC
D. PCR

12. Which one of the following process help the water soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts? 1

A. Fragmentation B. Leaching C. Catabolism D. Humification

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true and R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

13. Assertion(A) : Chasmogamous flowers require pollinating agents. 1
Reason(R) : Cleistogamous flowers do not expose their sex organs.

14. Assertion (A) : Alfred Sturtevant , used the frequency of recombination, to measure the distance between genes. 1
Reason (R) : more frequency of recombination means , genes are located farther , low frequency of recombination means genes are located nearer.

15. Assertion (A): DNA and histone proteins are both charged materials 1

Reason (R) : DNA is negatively charged and HISTONE proteins are positively charged.

16. Assertion (A) : The GEAC (Genetic Engineering Approval Committee) has been set up by the Indian Government. 1

Reason(R) : Introduction of GMO could have unpredictable result in the ecosystem.

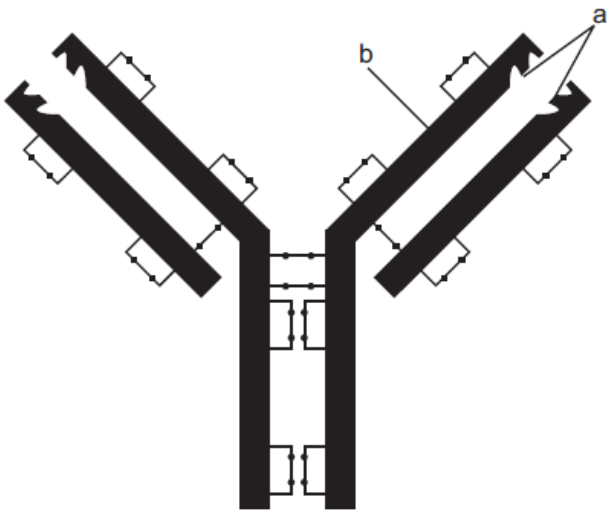
Section - B

17. The table shows the parts of human reproductive system and their functions. Fill up the missing components 2

Part	Function
A	Helps in Lubrication of Penis
Fimbriae	B
Corpus Luteum in ovary	C
D	Fertilization

18. Write the scientific name of the fruit-fly. Why did Morgan prefer to work with fruit-flies for his experiments? State any three reasons. 2

19. a) 2



The above diagram shows the structure of antibody. Name the type of cells that produce it. Also label the parts 'a' and 'b'.

OR

(b) List the specific symptoms of amoebiasis. Name the causative organism.

20. Explain how recombinant DNA technology is used to detect a disease even before any clinical symptom appears. 2

21. Explain the pollination mechanism involved in co-evolution of the two species, namely *Ophrys* (orchid) and its insect pollinator bees (& bumble bees). 2

Section - C

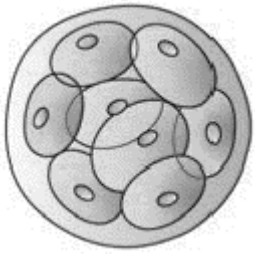
22. Reproductive and Child Healthcare (RCH) programmes are currently in operation. One of the major tasks of these programmes is to create awareness amongst people about the wide range of reproduction related aspects. As this is important and essential for building a reproductively healthy society. 3

(a) "Providing sex education in schools is one of the ways to meet this goal." Give four points in support of your opinion regarding this statement.

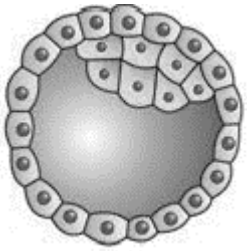
(b) List any two 'indicators' that indicate a reproductively healthy society.

23. Label the structures A and B of human embryo. How do they differ from each other? From which cell are they formed? 3

A



B



24. In Human male reproductive system 3

a) Which cells will undergo meiosis and mitosis respectively?

b) What will happen if sertoli cells are not maturing?

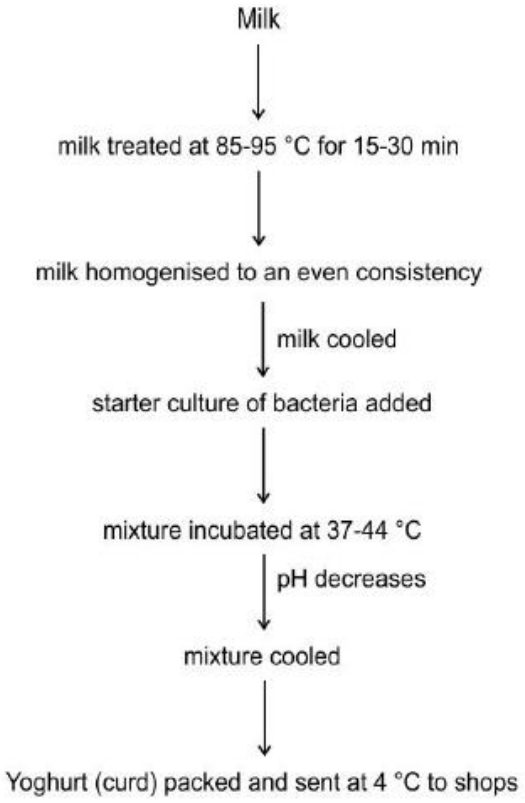
c) Name the process by which spermatids are developed into mature sperms.

25. (a) Darwin's Theory of Natural selection is widely accepted but some limitations have been identified by modern biologists. Mention the limitations identified. 3

(b) Name and state the most accepted theory of evolution in modern times.

(c) Mention any two ways of the evolution are explained in modern biology.

26. Given below is the step-by-step process in the formation of yoghurt (curd) in a bioreactor. 3



(a) Why does the pH start decreasing a while after the mixture is incubated at 37-44 °C?

(b) From the flowchart, identify two systems that the bioreactor would have. Give a reason to support your answer.

27. (A) Recombinant DNA-technology is of great importance in the field of medicine. With the help of a flow chart, show how this technology has been used in preparing genetically engineered human insulin. 3

OR

(B) One of the potential uses of genetic engineering is in correction of a gene defect that has been diagnosed in a child/embryo. Explain how gene therapy is of help in ADA deficiency.

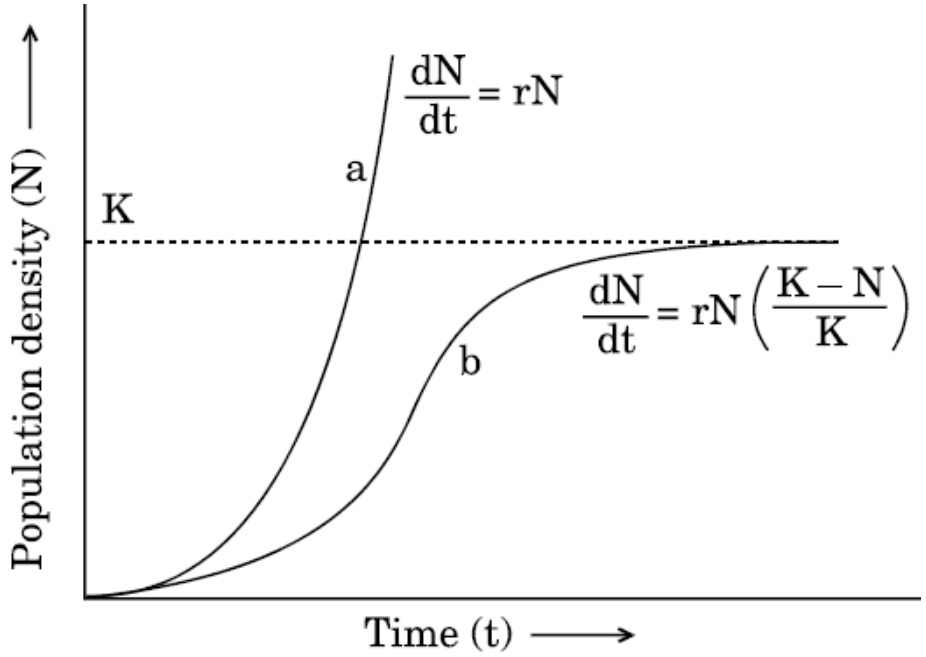
28. Bio-diversification of life started to occur almost 3 billion years ago. Since then new species have been evolving and then disappearing en masse from earth. 3

(a) How many episodes of mass extinctions of species have already taken place and which one is in progress in the current era?

(b) How is current episode in progress different from the previous episodes and why? Explain.

Section - D

29. Study the graph given below showing the different types of growth curves of different species. 4



Answer the questions :

(a) Name the type of growth curve 'a' shown in the graph.

(b) State one reason why the growth curve 'b' is said to be realistic.

(c) What is 'K' representing in the equation $\frac{dN}{dT}$ $rN\left[\frac{K-N}{K}\right]$ given along the logistic curve?

OR

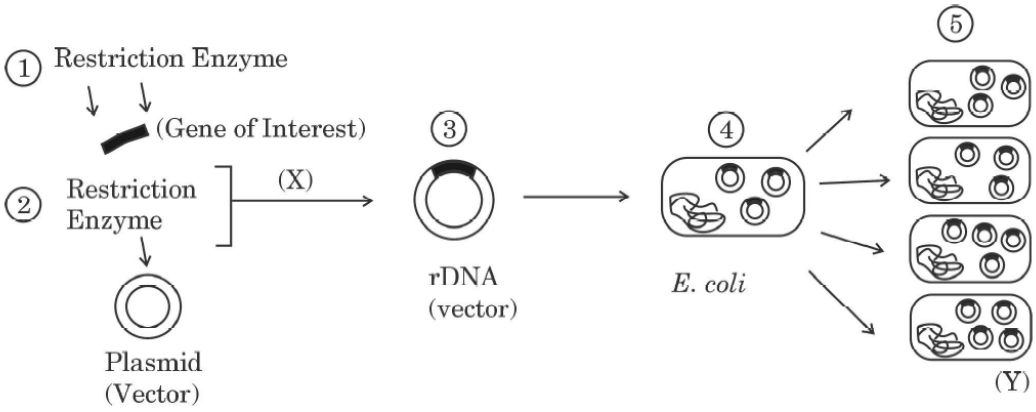
(c) What is the other name of curve 'b'?

(d) of the two curves, which one will exemplify the following : Increasing rat population during the harvest.

OR

(d) What does 'r' stand for?

30. (a) Development of recombinant DNA technology has opened gates to many breakthroughs in the fields of medicine and agriculture. This has enabled scientists to isolate, sequence and manipulate individual genes obtained from diverse living or dead cells. Given below is a diagram showing the basic steps involved in genetically modifying an organism. Study the given diagram and answer the questions that follow : 4



(i) Are two different types of restriction endonucleases used, one to cut the vector DNA and another to cut the desired DNA to be cloned? Support your answer, giving reason.

(ii) Which enzyme is used at step (X) to integrate the foreign DNA with the vector DNA? Explain its action.

OR

(ii)What does rop code for in plasmid pBR322? And state the selective markers of this plasmid.

Section - E

31. (i) On what principle the following natural methods of contraception work 5

a) Periodic abstinence b) coitus interuptus c) lactational amenorrhea

(ii) Reason out why is condom preferred other than its contraceptive value.

OR

i) Differentiate intra uterine transfer and intra uterine insemination.

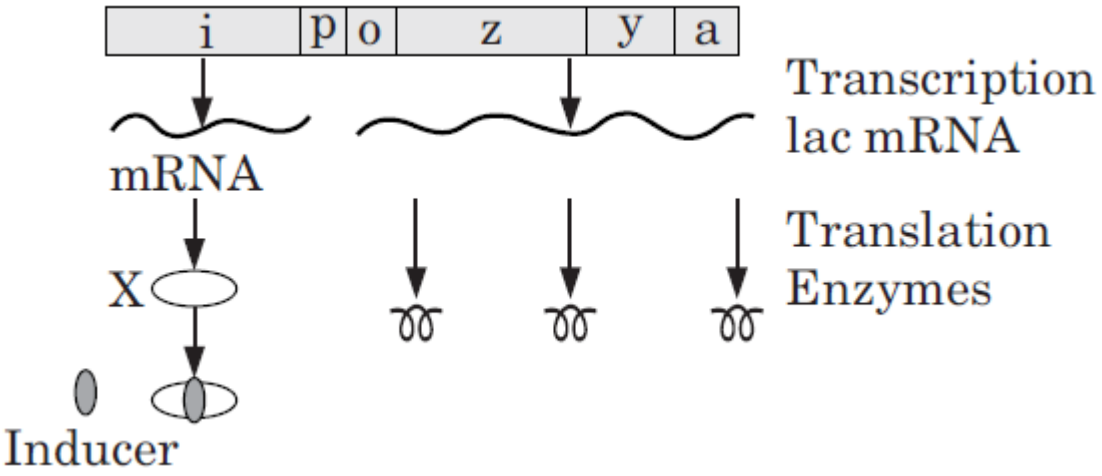
ii) Write down the steps of Test tube baby program in sequence.

iii) How do you call the fusion of male and female gametes if occurs outside the body in a lab condition?

32. (a) Both Haemophilia and Thalassemia are blood related disorders in humans. Write their causes and the difference between the two. Name the category of genetic disorder they both come under. 5

OR

(b)



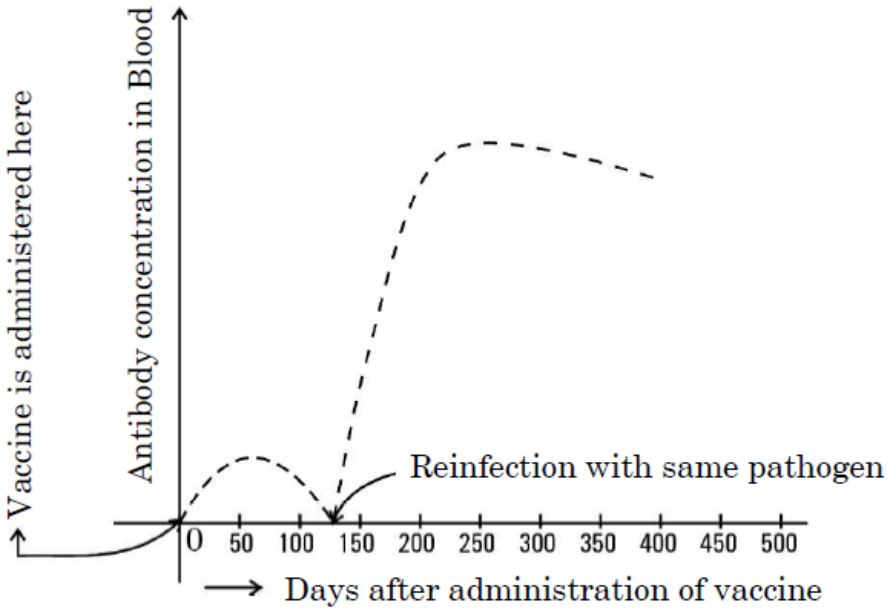
(a) Name the molecule 'X' synthesized by 'i' gene. How does this molecule get inactivated?

(b) Which one of the structural genes codes for b-galactosidase?

(c) When will the transcription of this gene stop?

33. 5

(a) A time-bound vaccination programme is followed for the children in our country from their birth up to ten years of age. A graph plotted below shows the effect of the vaccination followed by infection by the same pathogen, and the antibody concentration in the blood of the child.



(i) Explain why the administration of a vaccine causes an increase in the antibody concentration.

(ii) If the child is infected with the same pathogen almost four months later, the antibody concentration in his/her blood increases very fast. Explain why.

(iii) A table given below gives information about different types of immunity and how they are attained. Identify P , Q , R , S and T in the table.

	Type of immunity	Production of antibodies	Presence of memory cells	Mode attained
(1)	Natural, active	Yes	'P'	'Q'
(2)	Natural, passive	No	'R'	Across the placenta during pregnancy/breast feeding
(3)	Acquired, active	'S'	Yes	Getting a vaccine during breast feeding
(4)	Acquired, passive	'T'	No	Getting an injection of antibodies

OR

(b) (i) what is the chemical name of 'smack' ? Why is the consumption of smack considered as an abuse?

(ii) Name the source plant and one effect of the following drugs on the human body :

(1) Marijuana

(2) Cocaine

(3) Morphine

******END OF THE QUESTION PAPER******