



# PRINCE ACADEMY

## OF HIGHER EDUCATION

[Co-edu. Sr. Sec. School, Affiliated to CBSE, Affiliation No. - 1730387]

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### CBSE SAMPLE PAPER (2024-25)

Time : 03 : 00 Hours

CLASS – XII BIOLOGY (044)

M.M. : 70

#### General Instructions:

- (1) All questions are compulsory.
- (2) The question paper has five sections and 33 questions. All questions are compulsory.
- (3) 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.
- (4) 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.
- (5) Wherever necessary, neat and properly labeled diagrams should be drawn.

#### SECTION - A

1. If a double stranded DNA has 20% of cytosine, what will be the percentage of adenine in it?  
(a) 20%                      (b) 40%                      (c) 30%                      (d) 60%
2. The given Punnett's square represents the pattern of inheritance in a dihybrid cross where yellow (Y) and round (R) seed condition is dominant over white (y) and wrinkled (r) seed condition.

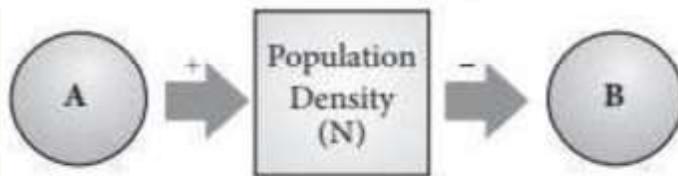
	YR	Yr	yR	yr
YR	F	J	N	R
Yr	G	K	O	S
yR	H	L	P	T
yr	I	M	Q	U

- A plant of type 'H' will produce seeds with the genotype identical to seeds produced by the plants of  
(a) type M                      (b) type J                      (c) type P                      (d) type N
3. Hardy-Weinberg equilibrium is known to be essentially affected by factors like, gene flow, genetic drift, mutation, genetic recombination and  
(a) evolution                      (b) limiting factors                      (c) saltation                      (d) natural selection.
  4. If most individuals in a population are young, why is the population likely to grow rapidly in the future?  
(a) Many individuals will begin to reproduce soon                      (b) Death rates will be low  
(c) Immigration and emigration can be ignored                      (d) All of these

5. Which of the following is a cause of transmission of HIV?  
 (a) Multiple sexual partners (b) Transfusion of contaminated blood  
 (c) Sharing infected needles (d) All of these
6. Plasmid used to construct the first recombinant DNA was isolated from which bacterium species?  
 (a) Escherichia coli (b) Salmonella typhimurium  
 (c) Agrobacterium tumefaciens (d) Thermus aquaticus
7. Match column I with column II and select the correct option from the given codes.

	Column I		Column II
A.	Recombinant DNA technology	(i)	Chilled ethanol
B.	Precipitation of DNA	(ii)	DNA staining
C.	PCR	(iii)	Gene amplification
D.	Ethidium bromide	(iv)	Genetic engineering

- (a) A-(iv), B-(i), C-(iii), D-(ii) (b) A-(i), B-(iii), C-(ii), D-(iv)  
 (c) A-(ii), B-(i), C-(iii), D-(iv) (d) A-(iv), B-(ii), C-(i), D-(iii)
8. The density of a population in a given habitat during a given period, fluctuates due to changes in certain basic processes. On this basis, fill up boxes A and B in the given flow chart with correct option.



- (a) A- Natality, B - Mortality (b) A- Immigration, B - Emigration  
 (c) A-Natality, B - Immigration (d) Both (a) and (b)
9. Microbes are used in  
 I. primary treatment of sewage II. secondary treatment of sewage  
 III. anaerobic sludge digesters IV. production of biogas.  
 Choose the correct option.  
 (a) I, II and III (b) I, III and IV (c) II, III and IV (d) I, II, III and IV
10. Which enzyme helps in removing oil stains from clothes?  
 (a) Streptokinase (b) Trypsin (c) Lipase (d) Amylase
11. The given table shows differences between spermatogenesis and spermiogenesis. Select the incorrect option.

Spermatogenesis	Spermiogenesis
Process of formation of spermatozoa.	Process of differentiation of spermatozoon from a spermatid.
It changes a haploid structure into another haploid structure	It involves conversion of a diploid structure into haploid structure.
Growth and divisions occur.	Divisions and growth are absent.
A spermatogonium forms four spermatozoa.	A spermatid forms a single spermatozoon.

12. Primary endosperm nucleus (PEN) is formed by the fusion of
- (a) 2 polar nuclei + 1 synergid cell nucleus
  - (b) 1 polar nucleus + 1 antipodal cell nucleus + 1 synergid cell nucleus
  - (c) 2 polar nuclei + 1 male gamete nucleus
  - (d) 2 antipodal cell nuclei + 1 male gamete nucleus.

**For Questions number (13-16) , two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R) . Select the correct answer to these questions from the codes (a), (b), (c) , and (d) as given below.**

**(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).**

**(b) Both Assertion (A) and Reason (R) are true, but Reason(R) is not the correct explanation of the Assertion(A).**

**(c) Assertion (A) is true, but Reason (R) is false.**

**(d) Assertion (A) is false, but Reason (R) is true.**

13. Assertion: Tropical regions have got a long evolutionary time for species diversification as compared to temperate regions.

Reason: Temperate regions have undergone frequent glaciations in the past whereas tropical regions have remained relatively undisturbed for millions of years.

14. Assertion: Temperature and soil moisture are the important climatic factors that regulate the process of decomposition.

Reason: Warm and moist environment favours decomposition whereas low temperature and anaerobiosis inhibit decomposition.

15. Assertion: Emigration is outward movement of some individuals from local population.

Reason: Emigration is caused by occurrence of deficiencies and calamities.

16. Assertion: Vigorous contraction of the uterus at the end of pregnancy causes expulsion of the fetus.

Reason: The stimulatory reflex between the uterine contraction and oxytocin secretion results in weakening contractions.

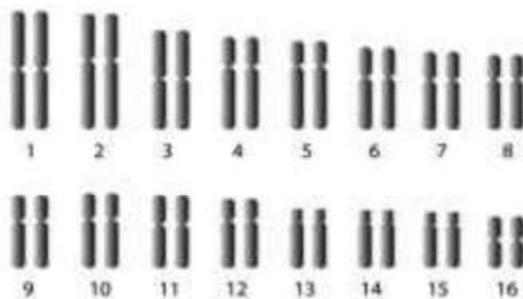
### **SECTION - B**

17. The given figure shows karyotype of a child who is suffering from a sex chromosomal abnormality which occurs during failure of segregation of chromatids during cell division cycle. This results in the gain or loss of a chromosome (s), called aneuploidy. Study the figure and answer the questions that follow :

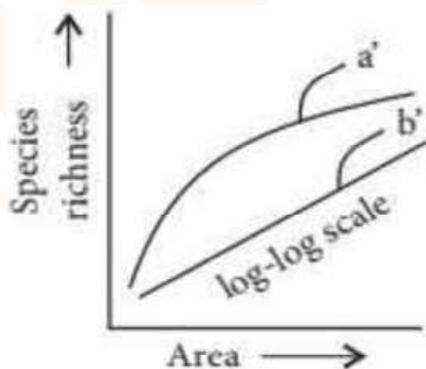
(a) Identify the disease from the given karyotype.

(b) Write the chromosomal complement of the child.

18. Name the stage of the human embryo that gets implanted in the uterus and draw its labelled diagram.
19. Why is Taq polymerase preferred in PCR? Mention the source of this enzyme?
20. Some of the microbes used as biofertilisers are prokaryotes. Name the taxonomic group they come under. With the help of an example, mention how they act as biofertilisers.
21. The given graph shows the species-area relationship. Answer the following questions as directed.



- (a) Name the naturalist who studied the kind of relationship shown in the graph. Write the observation made by him.
- (b) Write the situation as discovered by the ecologists when the value of 'Z' (slope of the line) lies between



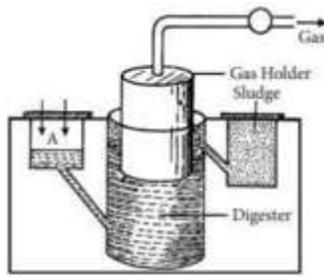
- (c) What does 'Z' stand for?

OR

Explain any three ways other than zoological parks, botanical gardens and wildlife sanctuaries by which threatened species of plants and animals are being conserved 'ex-situ'.

### SECTION-C

22. Explain mechanism of sex-determination in birds.
23. Differentiate between the genetic codes given below:
  - (a) Unambiguous and Universal
  - (b) Degenerate and Initiator
24. Study the given picture of biogas plant and answer the following questions:

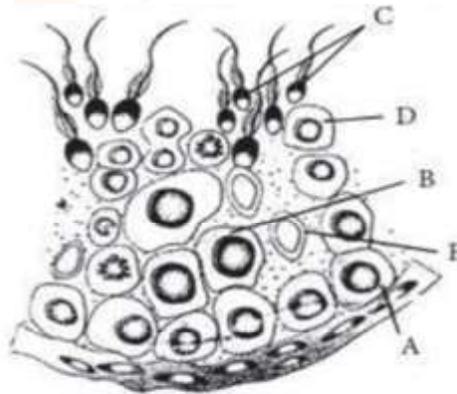


- (a) Name the components gaining entry from A into the chamber.
- (b) Mention the group of bacteria and the condition in which they act on the component that entered from A in the digester.
- (c) Name the components that get collected in gas holder.

25. (a) Why are transgenic animals so called?  
 (b) Explain the role of transgenic animals in (i) vaccine safety and (ii) biological products with the help of an example each.
26. "In a food chain, a trophic level represents a functional level, not a species". Explain.

OR

- (a) What is primary productivity? Why does it vary in different types of ecosystems?
  - (b) State the relationship between gross and net primary productivity.
27. (a) Name the labels A, B, C, D and E in the given diagram of seminiferous tubule.

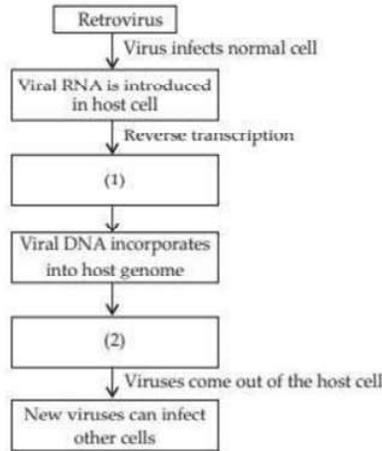


- (b) Give one function of 'E'
28. Medically it is advised to all young mothers that breast feeding is the best for their newborn babies. Do you agree? Give reasons in support of your answer.

## SECTION-D

**Q.no. 29 and 30 are case based questions. Each question has sub-parts with internal choice in one sub-part.**

29. In the given flow chart, the replication of retrovirus in a host is shown. Observe and answer the following questions.



- (a) What can be placed in blanks (1) and (2)?

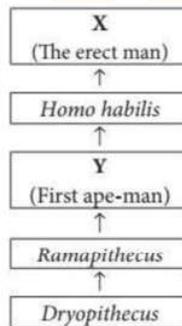
OR

Can the infected cell survive while viruses are being replicated and released?

- (b) Why is the virus called retrovirus? Give one example.

- (c) Name the disease which is caused by a retrovirus. How this virus gets transmitted?

30. Human evolution is a lengthy evolutionary process within the history of primates. The stages given here show the order of evolutionary history of man.



- (a) Identify 'X' and 'Y'

- (b) What was the brain capacity of 'X'?

- (c) Give some important features of 'Y'.

OR

When was 'X' discovered?

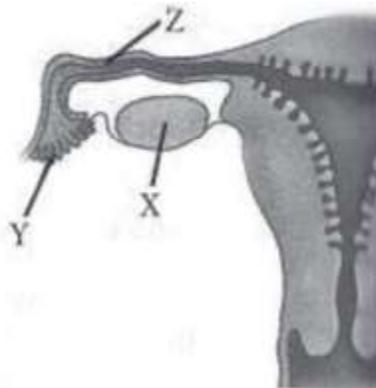
## SECTION-E

31. Describe the various stages involved in the commercial production of human insulin.

OR

Explain the application of biotechnology in producing Bt cotton.

32. (a) The given diagram shows a part of the human female reproductive system.



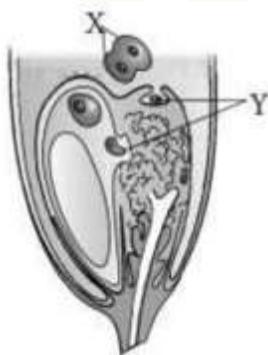
(i) Identify the labelled part X, Y and Z. Also name the gamete cells that would be present in 'X' if taken from a newborn baby.

(ii) What is the function of Y?

(iii) Write the events that take place in Z.

(b) Name the muscular and the glandular layers of human uterus. Which one of these layers undergoes cyclic changes during menstrual cycle? Name the hormone essential for the maintenance of this layer.

OR



(a) Refer to the given figure and answer the following questions :

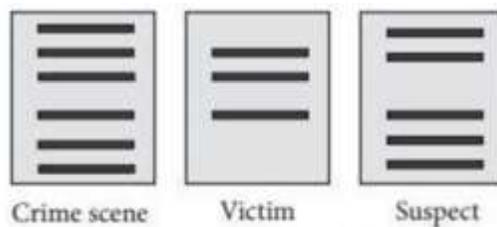
(i) Identify the labelled parts X and Y.

(ii) Write the role of X and Y.

(iii) Draw labelled prior stage of the given figure.

(b) Why is fertilisation in an angiosperm referred to as double fertilisation? Mention the ploidy of the cells involved.

33. Blood samples from a crime scene was collected and DNA analysis for the same was done. Given below are the marker profiles collected at the crime scene of the victim and a suspect.



- (a) What will you conclude on the basis of above observation?  
(b) Discuss how this technique helps in determining that the blood samples picked up from the crime scene belong to a single person or two different persons.  
(c) How can be the maternal and paternal identity disputes sorted out using the technique used above?

OR

- (a) Select the homologous structures from the combinations given below :  
(i) Forelimbs of whales and bats  
(ii) Tuber of potato and sweet potato  
(iii) Eyes of octopus and mammals  
(iv) Thorns of Bougainvillea and tendrils of Cucurbita.  
(b) State the kind of evolution represent by the homologous structures.  
(c) What are analogous structures? How are they different from homologous structures? Provide one example for each.

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