12TH CBSE BIOLOGY SAMPLE PAPER 1

Time allowed : 3 hours **Maximum Marks : 70**

General Instructions:

Read the following instructions carefully and follow them:

(i) This question paper contains 33 questions. All questions are compulsory.

(ii) Question paper is divided into five sections - Sections A, B, C, D and E.

(iii) Section A - questions number 1 to 16 are multiple choice type questions. Each question carries 1 mark.

(iv) Section B-questions number 17 to 21 are very short answer type questions. Each question carries 2 marks.

(v) Section C-questions number 22 to 28 are short answer type questions. Each question carries 3 marks.

(vi) Section D - questions number 29 and 30 are case-based questions. Each question carries 4 marks. Each question has subparts with internal choice in one of the subparts.

(vii) Section E-questions number 31 to 33 are long answer type questions. Each question carries 5 marks.

(viii) There is no overall choice. However, an internal choice has been provided in Sections B, C and D of the question paper. A candidate has to write answer for only one of the alternatives in such questions.

(ix) Kindly note that there is a separate question paper for Visually Impaired candidates.

(x) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION A

Questions no. 1 to 16 are Multiple Choice Type Questions, carrying 1 mark each. 16× 1 = 16

1 An angiosperm embryo sac is located within the :

(A) Placenta

(B) Megasporangium

(C) Nucellus

(D) Ovary

2 Match the items in Column I with those in Column II and select the correctly matched option from those given below :

	Column I Cross	Column II Phenotypic Ratio
1	Mendelian monohybrid	(i) (i) 1: 2: 1(F_2)
2	Mendelian dihybrid	(ii) 1: 1
3	Incomplete dominance	(iii) 3: 1(F_2)
4	Test cross (monohybrid)	(iv) 9: 3: 3: 1(F_2)

Options :

(A) 1-(ii), 2-(iv), 3-(i), 4-(iii)

(B) 1-(iii), 2-(i), 3-(iv), 4-(ii)

(C) 1-(iii), 2-(iv), 3-(i), 4-(ii)

(D) 1-(ii), 2-(i), 3-(iv), 4-(iii)

3 In humans, the secondary oocyte completes meiotic division when :

(A) it gets implanted in the uterine endometrium.

(B) it is released from the matured Graafian follicle.

(C) it is penetrated by the sperm cell.

(D) acrosomal enzymes break down the zona pellucida.

4 Which one of the following statements is not true ?

(A) Flippers of whales and dolphins are homologous organs.

(B) Homologous organs have similar anatomical structure, but perform different functions.

(C) Homology indicates common ancestry.

(D) Homologous structures are a result of convergent evolution.

5 A population is in genetic equilibrium/Hardy-Weinberg equilibrium for a gene with 2 alleles (dominant allele is ' A ' and recessive allele ' a '). If the frequency of allele ' A ' is 0 · 6, then the frequency of genotype ' Aa ' is :

(A) 0.21

(B) 0.42

(C) 0.48

(D) 0.32

6 In the double helical structure of DNA molecule, the strands are :

(A) identical and complementary

(B) identical and non-complementary

(C) anti-parallel and complementary

(D) anti-parallel and non-complementary

7 In a 'transcription unit', the 'terminator' is located towards the :

(A) 3' end of the template strand

(B) 5' end of the template strand

(C) 5' end of the coding strand

(D) 3' end of the coding strand

8 A woman with normal vision has a colour blind father. She marries a man with normal vision. The percentage chance of their progeny being colour blind is :

(A) 25%

(B) 50%

(C) 75%

(D) 100%

9 The vector for dengue fever is :

(A) Female Aedes mosquito

(B) Female Anopheles mosquito

(C) Male Aedes mosquito

(D) Female Culex mosquito

10 Which one of the following pairs is not correctly matched?

(A) Clostridium butylicum – Butyric acid

(B) Trichoderma polysporum - Cyclosporin A

(C) Monascus purpureus - Citric Acid

(D) Streptococcus - Streptokinase

11 Which one of the following is not a feature of plasmids ?

(A) Circular

(B) Self-replicating

(C) Single stranded

(D) Extra-chromosomal

12 The pyramid of biomass in sea is generally inverted because in sea :

(A) Biomass of fishes exceeds that of phytoplankton.

(B) Number of phytoplanktons is more.

(C) Number of phytoplanktons is less.

(D) Large fishes feed on small fishes.

For Questions number 13 to 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 (A) : RNA is unstable and can mutate at a faster rate.

Reason (R) : The presence of $2' - OH$ group in every nucleotide of RNA makes it labile and easily degradable.

14 Assertion (A) : Virus-infected cells produce interferons.

Reason (R) : Interferons can cause inflammation of virus-infected cells.

15 Assertion (A) : Specific enzymes are used to degrade the cell wall in organisms to isolate the DNA from the cell.

Reason (R) : Fungal cell wall is degraded by the enzyme cellulase.

16 Assertion (A) : Loss of biodiversity can occur due to overexploitation of resources.

Reason (R): Introduction of Clarias gariepinus in Indian rivers has led to a decline in native Indian fishes.

SECTION : B

17 (a) Name any two copper releasing intra-uterine devices. State two reasons that make them effective contraceptives.

OR

(b) Name any two outbreeding devices that flowering plants have developed and explain how they help in encouraging cross-pollination.

18 Although Haemophilia and sickle cell anemia are two blood related Mendelian disorders, yet, they differ in their pattern of inheritance. State any two differences.

19 Identify A, B, C and D in the following table :

	Scientific name of the plant	Drug	Effect on the human body/human system
(a)	Papaver somniferum	A	Depressant/slows down body function
(b)	Cannabis sativa	Cannabinoids	B
(c)	Erythroxylum coca	C	D

20 Write the role of 'ori' and restriction site in the cloning vector pBR 322 .

21 How is the rate of decomposition affected by the nature of detritus and temperature?

SECTION : C

22 (a) Why is "in vitro fertilization (IVF)" so named ? State its importance.

(b) Distinguish between GIFT and ZIFT.

23 (a) (i) Write the karyotype and the genetic disorder of an individual who has developed from a zygote formed from an 'XX' egg fertilised by a ' T ' sperm.

(ii) Mention any two symptoms of this genetic disorder.

(iii) Write the possible reason that leads to the formation of this 'XX' egg.

OR

(b) In case of any dispute, a very small sample of tissue or even a drop of blood can help us to determine the paternity of a child. Provide a scientific explanation to substantiate the statement.

24 (a) Explain the process by which amino acid gets attached to the tRNA molecule during translation process.

(b) How does the translation process get terminated?

(c) Expand 'UTR'. Where are they located?

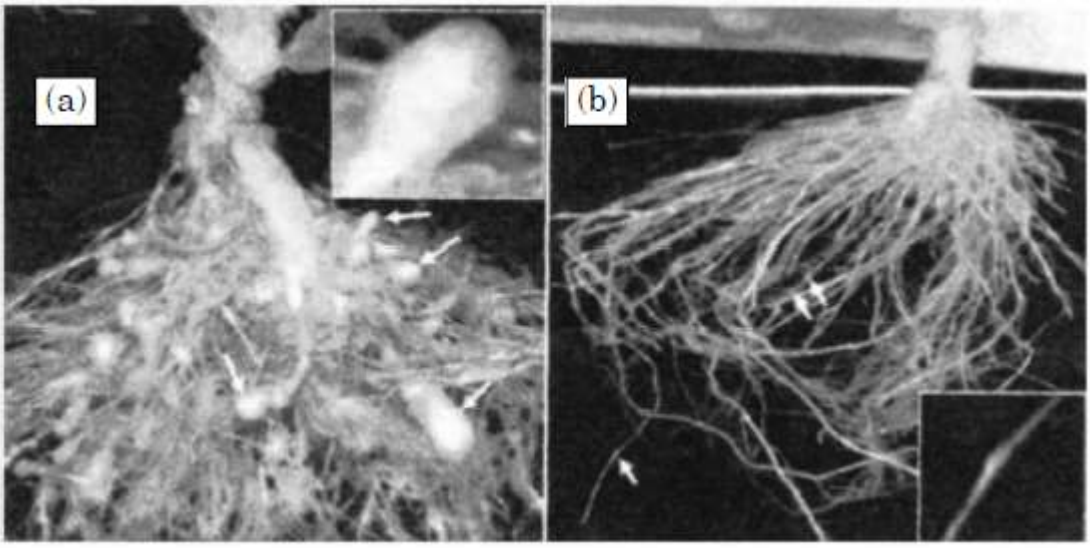
25 (a) Differentiate between humoral immune response and cell-mediated immune response.

(b) Draw a schematic diagram of an antibody molecule and label any four parts.

26 The picture given below shows :

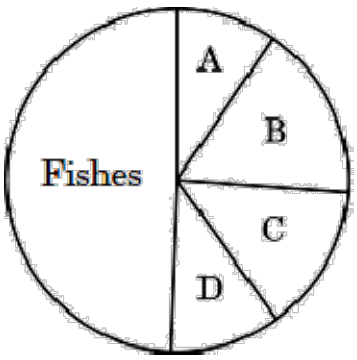
(a) Roots of a typical control tobacco crop plant (infected).

(b) Transgenic tobacco plant showing healthy roots even after deliberate infection by nematode.



Explain how this transformation was achieved in the tobacco plant.

27 Given below is a pie chart representing global diversity of vertebrates.



(a) Redraw the pie chart identifying the groups ' A ', ' B ', ' C ' and ' D ' in their respective positions.

(b) Mention two examples of recently extinct animals.

28 Predation is referred to as a detrimental interaction. Explain any three positive roles, supported by an example each, that a predator plays in an ecosystem.

SECTION D

Questions No. 29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.

29 Read the following passage and answer the questions that follow. Spermatogenesis is an important primary sex characteristic in humans and all other vertebrates. The process is coordinated and controlled under the influence of hormones. It starts with the onset of puberty in humans and thereafter continues. The primordial cells within the embryonic testis which differentiate into

spermatogonia are the precursors of the sperms. These are located at the outer walls of the seminiferous tubules where the process of spermatogenesis proceeds.

(a) State the site of action of FSH in the testes and describe its action thereafter.

OR

(a) Describe the role of LH in the process of spermatogenesis.

(b) Name the cells and their products which undergo:

(i) Mitosis and Differentiation

(ii) Meiosis I and Meiosis II

during the process of spermatogenesis.

(c) Name the accessory ducts that the sperms travel through from seminiferous tubules to reach the epididymis.

30 Read the following passage and answer the questions that follow.

In 1981, the health workers of United States of America had become aware of the increased frequency of Kaposi's sarcoma, cancer of the skin and blood vessels and another disease pneumocystis pneumonia, a respiratory infection caused by a protozoan. Both these diseases were very rare in the general population, but occurred frequently in more severely "immunosuppressed" individuals. This led to the recognition of the immune system disorder that was named Acquired Immune Deficiency Syndrome (AIDS).

In 1983, virologists working in the USA and France had identified a causative agent for 'AIDS', now known as Human Immunodeficiency Virus (HIV). 'HIV' follows a set path to attack the human body to cause the disease.

(a) Name the group of cells the HIV attacks after gaining entry into the human body and write the various events that occur within this cell.

(b) Write the expanded form of the diagnostic test used for detecting AIDS. Write the possible treatment available for the disease at present.

(c) Mention any two steps suggested by WHO for preventing the spread of this disease.

OR

(c) "A patient suffering from AIDS does not die of this disease but from some other infection." Justify the statement.

SECTION : E

31 (a) (i) Explain the process of double fertilization in an angiosperm starting from the germination of pollen grains on the stigma, mentioning the ploidy of the end products formed at the end. State the role of synergids during the course of the process.

(ii) Why does the development of endosperm precede that of the embryo?

OR

(b) (i) Mention the site where fertilisation of the ovum occurs in a human female. Explain the process of fertilization and mention how polyspermy is prevented.

(ii) Name the embryonic stage that gets implanted in the uterus. Explain the process of implantation in a human female.

32 (a) (i) Compare the pattern of inheritance of flower colour in garden pea plant (violet/white) with snapdragon plant (red/white) on the basis of the following :

(1) F_1 phenotypic expression;

(2) expected phenotypic and genotypic expression of F_2 generation;

(3) the conclusion you reached at the end of the comparison made.

(ii) List any two characteristics of pattern of inheritance of human blood group ABO .

OR

(b) (i) Draw a schematic, self-explanatory labelled diagram of lac operon in a 'switched on condition'.

(ii) Why is regulation of lac operon referred to as negative regulation?

33 (a) (i) Why should a cell be made competent to take up an alien DNA? How can a bacterial cell be made competent using calcium ions ? Explain.

(ii) (1) State the importance of gel electrophoresis in biotechnology.

(2) Explain the principle on which this technique works.

(3) Mention why ethidium bromide is used in this technique.

OR

(b) 'Bt cotton', the genetically modified crop, has greatly helped the cotton farmers to increase their crop yield.

(i) How was Bt cotton plant made resistant to bollworm ? Explain.

(ii) Describe the mechanism that leads to the death of bollworms feeding on Bt cotton plants.