

CBSE Sample Paper 1

(Issued by Central Board of Secondary Education)

Time : 3 Hours

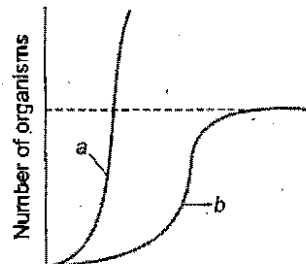
Max. Marks : 70

General Instructions

- (i) All questions are compulsory.
- (ii) This question paper consists four Sections A, B, C and D. Section A contains 8 questions of 1 mark each, Section B is of 10 questions of 2 marks each, Section C is of 9 questions of 3 marks each and Section D is of 3 questions of 5-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 3 question 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.

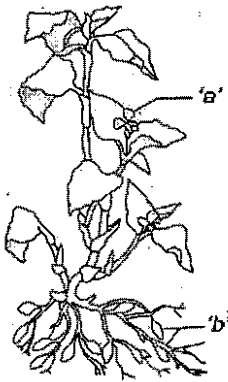
Section A

1. The turkey usually produces females for several generations. How is this possible?
2. The meiocyte of an onion plant contains 32 chromosomes. Work out the number of chromosomes found in its endosperm.
3. The gene I that controls the ABO blood grouping in human beings has three alleles I^A , I^B , I and i .
 - (a) How many different genotypes are likely to be present in the human population?
 - (b) Also, how many phenotypes are possible present?
4. Pick out the ancestral line of Cycads from the list given below.
Ferns, herbaceous lycopods, seed ferns, and horsetails.
5. Name the source of smack. Mention one way in which it affects the human body.
6. In plants, how is alien DNA introduced into the host cell?
7. Mr Galgotia eats curd/yoghurt. In this case, which trophic level will he occupy?
8. In the absence of the predators, which curve, a or b would appropriately depict the prey population.



Section B

9. Identify the type of flower shown in 'a' and 'b'. Which out of the two will produce an assured seed set.



10. Fed up of a large family, a couple wanted to adopt a terminal method of contraception. Describe the process conducted by the doctor in either of the cases (male/female partner).

OR

A mother of a one year old daughter wanted to space her second child. Her doctor suggested Cu-T. Explain its contraceptive actions.

11. Male humans and female birds are heterogametic; while the female humans and male birds are homogametic. Why are they called so?
12. What are interferons. Explain its role in providing immunity. Also name the kind of immunity provided by it.

13. What is allergy? Name the antibody responsible for it. Also mention two chemicals released from the mast cells during an allergic reaction.

14. Give reasons

- (a) Bottled fruit juices bought from the market are clearer as compared to those made at home.
- (b) Large holes are found in 'Swiss cheese'.

15. In which parts of the body of the hosts do the following events in the life cycle of *Plasmodium* take place. Along with the body parts name the hosts too

- (a) Fertilization
- (b) Development of gametocytes
- (c) Release of sporozoites
- (d) Asexual reproduction.

16. What are the latest methods of detection of cancer?

17. State two important defense mechanisms in plants against herbivory, with an example each.

18. (a) Compare the grazing food chain and detritus food chain in terms of their origin.

- (b) Which among the two is the major contributor to energy flow in aquatic ecosystem?

Section C

19. Draw a labelled diagram of the sectional view of a mature pollen grain of angiosperms. Explain the function of any two of its parts.

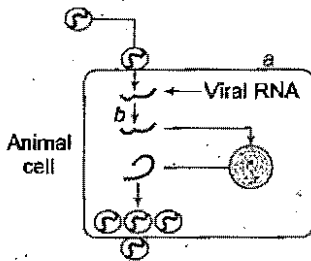
20. In a pea smooth seed coat is dominant / wrinkled seed coat. What will be the expected ratio of

phenotypes of the offspring in a cross between?

- (a) Heterozygous smooth × Heterozygous smooth
- (b) Heterozygous smooth × Homozygous wrinkled
- (c) Heterozygous smooth × Homozygous smooth

21. A tRNA is charged with amino acid methionine
 (a) Name the process involved in the attachment.
 (b) Point out the mRNA codon and anticodon on tRNA for this amino acid.
 (c) What is heterochromatin?
22. (a) State Hardy-Weinberg principle. Name any two factors which affect it.
 (b) Draw a graph to show that natural selection leads to directional change.

23.



- (a) What does this diagrammatic sketch depict?
 (b) Identity 'a' and 'b'.
 (c) Name the widely used diagnostic test when a person gets this disease.

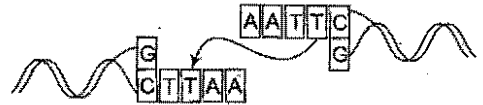
OR

Fill in the blanks in the different column of the table given below.

Disease	Causal Organisms	Medium of Transfer	Symptoms
Amoebiasis	<i>Entamoeba histolytica</i>	'a'	Diarrhoea
Typhoid	'b'	Contaminated food	Sustained high fever
'c'	<i>Plasmodium</i>	Bite of infected female <i>Anopheles</i> mosquito	Chill and high fever

24. A crane had DDT level as 5 ppm in its body. What would happen to the population of such birds? Explain giving reasons.

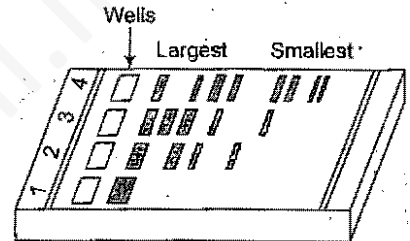
25. a DNA b DNA



Study the linking of DNA fragments shown above.

- (a) Name a DNA and b DNA.
 (b) Name the restriction enzyme that recognizes this palindrome.
 (c) Name the enzyme that can link these two DNA fragments.

26.



- (a) What does this diagram depict?
 (b) What is meant by largest and smallest in the picture?
 (c) Name the compound used to visualize them.
 (d) Define elution.

27. Explain with reference to PCR.

- (a) A specific enzyme helps in amplification in PCR. Name the bacterium from which it is isolated and state how its thermostable nature is helpful.
 (b) Explain the use of PCR in molecular diagnosis.

Section D

28. A woman has conceived and implantation has occurred in her uterus. Explain the sequence of changes up to parturition, which take place within her body.

OR

'Incompatibility is a natural barrier in the fusion of gametes'. Justify the statement.

29. (a) Give reasons for
 (i) Both strands of DNA are not copied during transcription.
 (ii) Transcription and translation in bacteria can be coupled.

- (b) Name the regions of a transcription unit.
 (c) Differentiate between the process of transcription in prokaryotes and eukaryotes.

OR

Stanley Miller performed an experiment by recreating in the lab the probable conditions of the atmosphere of the primitive Earth.

- (a) What was the purpose of the experiment?
 (b) In what form was the energy supplied for the chemical reaction to occur?
 (c) Give a diagrammatic representation of Miller's experiment.

30. (a) On seeing the bad state of roads in your locality, as a student, you have recommended the the Municipal Corporation to use polyblend.

(i) What is polyblend? Point out its raw material?

(ii) How will it be advantageous?

- (b) What are E-wastes? Explain the method of their disposal.

OR

- (a) What is meant by ecological succession? How does it occur? Explain.

- (b) Differentiate between primary and secondary succession.

Explanations

1. In a true reproduction occurs through parthenogenesis. In this process, female gametes undergo development without fertilization.

2. Meicyte = 32 chromosomes (2n).

Hence, its gamete will have $32/2 = 16$ chromosomes.

So, endosperm will contain

$$16 \times 3 = 48 \text{ chromosomes (3n)}$$

3. (a) Genotypes for blood group = 6

(b) Phenotypes = 4

4. Seed ferns.

5. Source of smack's-Latex of poppy plant (*Papaver somniferum*).

Affect It acts as a depressant in human body

6. By the method of bolistics or gene gun. In which, the plant cells are bombarded with high velocity micro-particles of gold or tungsten coated with DNA.

7. Third trophic level.

8. Curve 'a'.

9. a-Chasmogamous flk

b-Cleistogamous flo

an assured seed seed

10. For male partner vasectomy can be done. In this, a small part of the vas deferens is removed or tied up through a small incision in the scrotum.

For female partner tubectomy is the method for birth control. In this, a small part of the Fallopian tube is removed or tied up through a small incision in the abdomen or through vagina.

OR

Cu-T releases copper ions which increases phagocytosis of sperms, suppresses sperm motility, reduces fertilizing capacity.

11. Genotype of human male is - XY

Genotype of female bird is - ZZ

Because both the sex chromosomes in human males and female birds are dissimilar. So, they are called heterogametic.

Genotype of human female is XX and genotype of male bird is ZZ.

Because their sex chromosomes are similar, They are called homogametic.

12. Interferons are proteins secreted by virus-infected cells.

at they produce

Material Downloaded from <http://www.evidyarthi.in/>

Role They protect non-infected cells of body from further viral infection.
Innate immunity.

13. Allergy is the exaggerated response of the immune system to certain antigens present in the environment.
Antibody-IgE.
 Histamine and serotonin are secreted by mast cells.

14. (a) Bottled juices are clarified by the use of pectinases and proteases.
 (b) In Swiss cheese, large holes are formed due to production of large amount of CO₂. This is due to the use of a bacterium named *Propioni bacterium sharmanii* in its making process.

15. (a) Inside stomach/intestine of mosquito.
 (b) In the blood of human.
 (c) Into the blood of human.
 (d) Inside the liver cells and RBCs of human.

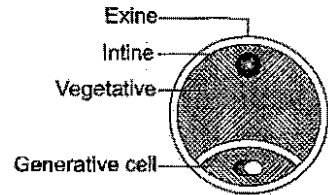
16. The latest methods of detection of cancer are surgery, radiation therapy, chemotherapy and immunotherapy.

17. Defence mechanism in plants against herbivory:
 (i) Thorns are the most common means of defence, e.g., Acacia and cactus.
 (ii) Toxic chemicals such as cardiac glycosides are produced by certain plants to discourage browsing animals for example, *Calotropis*.

18. (a) In grazing food chain, producers or plants are the starting point. For example,
 Plant → Deer → Lion
 In detritus food chain, organic matter is the first step.
 Dead plants and animals (organic matter) → Bacteria → Nutrients mix in soil and taken by plants.
 Grazing food chain starts from producers while detritus food chain starts from organic matter.

(b) Grazing food chain is the major conduit of energy flow in aquatic ecosystem.

19.



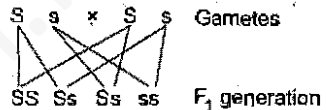
Exine It can withstand high temperature/strong acids/alkali.

Intine It is a thin and continuous layer made up of cellulose and pectin.

Vegetative cell It is bigger, has abundant food reserve.

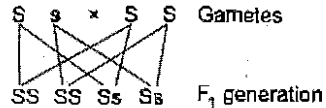
Generative cell It divides mitotically to give rise to two male gametes.

20. (a) Heterozygous smooth × Heterozygous smooth—(Ss × Ss) Parents



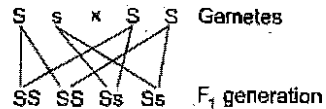
[S = smooth seed coat (dominant)]
 [s = wrinkled seed coat (recessive)]
 Phenotype = 3 smooth : 1 wrinkled
 = 3 : 1 ratio

(b) Heterozygous smooth × Homozygous wrinkled—(Ss × ss) Parents



Phenotype = 2 smooth : 2 wrinkled
 = 1 : 1

(c) Heterozygous smooth × Homozygous smooth (Ss × ss) Parents



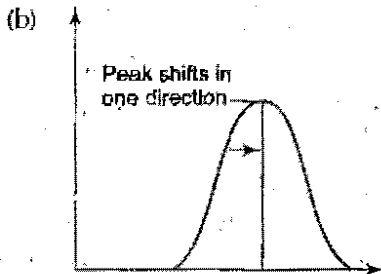
Phenotype = All smooth
 = 1 : 0

21. (a) Initiation

(b) mRNA codon = AUG and tRNA anticodon = UAC

(c) Heterochromatin is densely packed and dark stained/transcriptionally inactive chromatin present in the nucleus of the cells.

22. (a) **Hardy-Weinberg principle** This principle states that allelic frequencies in a population are stable and remain constant from generation to generation. The factors affecting it are gene flow, genetic drift mutation, genetic recombination, natural selection, etc.



23. (a) Replication of retrovirus
 (b) a- Plasma membrane.
 b- Formation of viral DNA by reverse transcriptase.
 (c) ELISA (Enzyme Linked Immunosorbent Assay).
- OR
- (a) Contaminated food items and water with the eggs of parasite.
 (b) *Salmonella typhi*.
 (c) Malaria.

24. The high concentration of DDT (5PPM) in cranes disturbs their calcium metabolism in body. Due to this thinning of eggs shell and their premature breaking occurs, eventually causing the decline in crane populations.

25. (a) 'a' - Vector DNA 'b' - Foreign DNA
 (b) Eco RI
 (c) DNA ligase

26. (a) Gel electrophoresis
 (b) DNA fragments/ bands
 (c) Ethidium bromide
 (d) The separated bands of DNA are cut from agarose gel and DNA is extracted from gel piece. This is called elution.

27. (a) Taq DNA poly is obtained from a thermophilic organism. *Thermus aquaticus*.

Taq polymerase is active during the high temperature induced denaturation.

- (b) PCR is very sensitive technique which enables the specific amplification of desired DNA from a limited amount of DNA template. It can detect the presence of an infectious organism in the infected patient at an early stage of infection.

28. Changes in woman's body after implantation of embryo. After implantation the chorionic villi and uterine tissue become interdigitated to form placenta.

Placenta facilitates supply of oxygen and nutrients to the embryo and removes CO_2 and excretory materials produced by it.

More secretion of oestrogens. Progesterone prolactin occurs for supporting foetal growth metabolic changes in the mother and maintenance of pregnancy.

In embryo, the inner cell mass differentiates into three distinct germ layers (mesoderm, ectoderm and endoderm) which give rise to the formation of tissues and organs.

After one month, the embryo's heart is formed.

By the end of the second month, the foetus develops limbs and digits.

By the end of 12 weeks (first trimester), most of the major organ systems are formed.

By the end of 24 weeks (second trimester), the body is covered with fine hair, eye-lids separate and eyelashes are formed.

By the end of nine months, the foetus is completely developed and is ready for its delivery. Parturition initiates by the signals obtained from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex.

Parturition is induced by complex neuro endocrine mechanism.

This triggers release of oxytocin from maternal pituitary along with stimulatory reflex resulting in stronger contractions. This leads to parturition (expulsion of baby).

OR

In compatibility in plants is a natural barrier:

It is considered as the most widespread and effective device to prevent inbreeding and outbreeding.

Pollen pistil interaction is a dynamic process involving pollen recognition followed by promotion or inhibition of the pollen.

Chemical substances produced by the style act as barrier.

Normally the pollen belonging to right mating type germinate on stigma, develop pollen tube and bring about fertilization.

The pollen grains belonging to other mating type are discarded.

29. (a) (i) During transcription, if both strands act as a template, they would code for RNA molecule with different sequences in turn, they code for proteins, the sequence of amino acids in the proteins would be different. One segment of the DNA would be coding for two different proteins and this would complicate the genetic information transfer machinery. Second, the two RNA molecule if produced simultaneously would be complementary to each other. This would form a double stranded RNA. Preventing RNA from being translated into protein and the exercise of transcription would become a futile one.
- (ii) Transcription and translation take place in the same compartment in bacteria. Because there is no separation of cytosol and nucleus in bacteria.

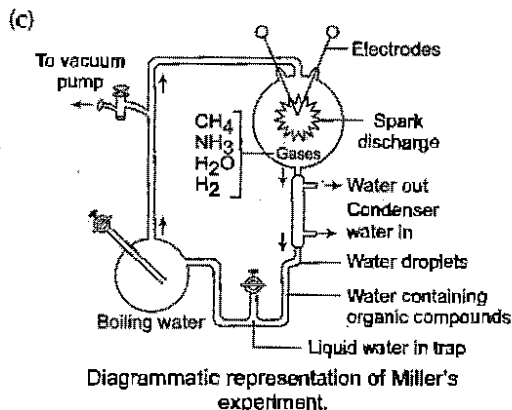
- (b) (i) A promotor
(ii) The structural gene
(iii) A terminator

(c) **In prokaryotes** There is a single DNA dependent RNA polymerase that catalyses transcription of all types of RNA.

In eukaryotes The RNA polymerase I transcribes rRNAs, RNA polymerase III for transcription of tRNA and RNA polymerase II transcribes precursor of mRNA. The primary transcripts contain both exons and introns and it is subjected to a process called splicing. Also hnRNA undergo two additional processing called as capping and tailing.

OR

- (a) Purpose of Miller's experiment is to prove Oparin Haldand Theory proposed that the first form of life could have this theory come from pre-existing non-living organic molecules and that the formation of life was preceded by chemical evolution.
- (b) He created electric discharge in a closed flask containing CH_4 , H_2 , NH_3 and water vapour at $800^\circ C$. For chemical reaction to occur.



30. (a) (i) Polyblend is a fine powder of recycled modified plastic. This mixture is mixed with bitumen used to lay roads. Raw material - Plastic film waste.
- (ii) Mixture of polyblends and bitument, when used to lay road, enhances the bitumen's water repellent properties and helps to increase road life by a factor of three.
- (b) Irreparable computers and other electronic goods are known as E-wastes. Buried in landfills or incinerated. Recycling is the only solution for treatment of E-wastes.

OR

- (a) The sequential gradual and predictable changes in the species composition in an area are called succession or ecological succession. During succession some species colonise an area and their populations become more numerous, where as populations of other species decline and even disappear. Differences between primary succession and secondary succession.

Primary Succession	Secondary Succession
It occurs in an area which has been bare from the beginning.	It occurs in area which has been denuded recently.
Soil is absent at the time of beginning of primary succession.	Soil is present in the area, where secondary succession begins.
It takes a long time for completion.	It takes less time for completion.