CBSE EXAMINATION PAPER-2025

BIOLOGY

(Solved)

Time allowed : 3 hours | Maximum Marks : 83

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **40 questions.** All questions are **compulsory.**

ii. This question paper is divided into **5 sections.**

iii. **Section A** – questions number **1 to 3** are case based questions

iv. **Section B** – questions number **4 to 19** are multiple choice questions

v. **Section C** – questions number **20 to 27** are very short answer

vi. **Section D** – questions number **28 to 34** are short answer

vii. **Section E** – questions number **35 to 40** are long answer

viii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

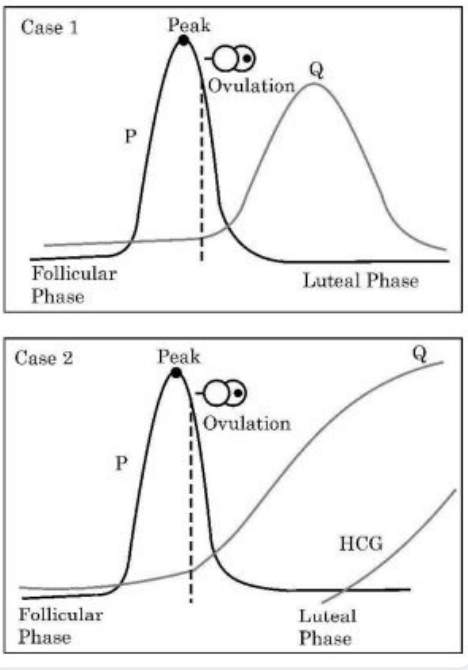
ix. Use of calculator is NOT allowed.

Section A

Question 1.

Question 2.

Study the graphs given below for Case 1 and Case 2 showing different levels of certain hormones and answer the question that follows :



(1)

Which hormone is responsible for the peak observed in Case 1 and Case 2 ? Write one function of that hormone.

[1 Marks]

(2)

Write changes that take place in the ovary and uterus during follicular phase.

[1 Marks]

(3)

Name the hormone Q of Case 2. Write one function of hormone Q.

[2 Marks]

(4)

Which structure in the ovary will remain functional in Case 2 ? How is it formed ?

[2 Marks]

Question 3.

Read the following passage and answer the questions that follow : In nature, we rarely find isolated, single individuals of any species; majority of them live in groups in a well-defined geographical area, share or compete for similar resources, potentially interbreed and thus constitute a population. The population has certain attributes whereas, an individual organism does not. A population at a given time is composed of individuals of different ages. The size of the population tells us a lot about its status in the habitat. Whatever ecological processes we wish to investigate in a population, be it the outcome of competition with another species, the impact of the predator or the effect of pesticide application, we always evaluate in terms of any change in the population size. The size, in nature, could be low or go into millions. Population size, technically called population density (N) need not necessarily be measured in numbers only. The size of a population for any species is not a static parameter. It keeps on changing with time depending on various factors including food availability, predation pressure and adverse weather.

(1)

The Monarch butterfly is highly distasteful to its predator because of a special chemical present in its body. How does the butterfly acquire this chemical ?

[1 Marks]

(2)

If population density at a time t + 1 is 800, Emigration = 100, Immigration = 200, Natality = 200 and Mortality = 150, calculate the population density at time t and comment upon the type of age pyramid that will be formed in this case.

[1 Marks]

(3)

What is the difference in a method of measuring population density in an area if there are 200 carrot grass plants to only single huge banyan tree ?

[2 Marks]

(4)

Name two methods to measure the population density of tigers.

[2 Marks]

Section B

Question 4.

A man whose father was colour-blind marries a woman who had a colour-blind mother and normal father. What percentage of male children of this couple will be colour-blind?

[1 Marks]

(A) 25%

(B) 0%

(C) 50%

(D) 75%

Question 5.

GEAC stands for

[1 Marks]

(A) Ground Environment Action Committee

(B) Genetic and Environment Approval Committee

(C) Genome Engineering Action Committee

(D) Genetic Engineering Approval Committee

Question 6.

Match the items in Column-A with that of Column-B:

[1 Marks]

	Column-A		Column-B
(i)	Lady bird beetle	(a)	Methanobacterium
(ii)	Mycorrhiza	(b)	Trichoderma
(iii)	Biological control	(c)	Aphids
(iv)	Biogas	(d)	Glomus

(A) (i) - (c), (ii) - (d), (iii) - (b), (iv) - (a)

(B) (i) - (b), (ii) - (d), (iii) - (c), (iv) - (a)

(C) (i) - (c), (ii) - (b), (iii) - (a), (iv) - (d)

(D) (i) - (d), (ii) - (a), (iii) - (b), (iv) - (c)

Question 7.

The process of mineralization by microorganisms help in the release of:

[1 Marks]

(A) inorganic nutrients from humus.

(B) both organic and inorganic nutrients from detritus.

(C) organic nutrients from humus.

(D) inorganic nutrients from detritus and formation of humus.

Question 8.

Transplantation of tissues/organs to some patients often fails due to rejection of such tissues/organs by the body of the patient. Which type of immune response is responsible for such rejections?

[1 Marks]

(A) Autoimmune response

(B) Humoral immune response

(C) Cell mediated immune response

(D) Physiological immune response

Question 9.

Match the following items of Column-I with that of Column-II:

[1 Marks]

Column-I		Column-II	
(a)	Trophoblast	(i)	Embedding of blastocyst in the endometrium
(b)	Implantation	(ii)	Group of cells that would differentiate as embryo
(c)	Inner cell mass	(iii)	Embryo with 8-16 blastomeres
(d)	Morula	(iv)	Outer layer of blastocyst

Choose the option that matches Column-I with Column-II correctly.

(A) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

(B) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(C) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

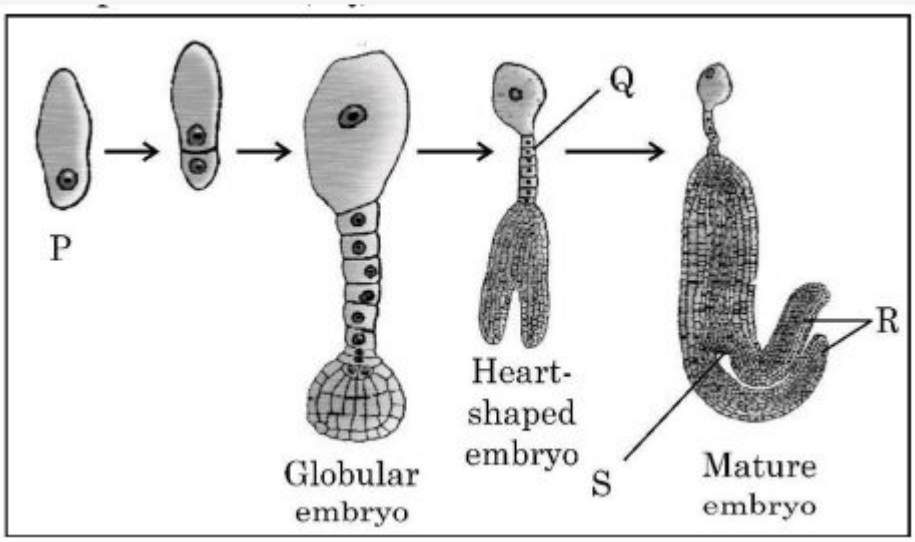
(D) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

Question 10.

The diagram given below shows labelling of four parts of a dicot embryo during its development as P, Q, R and S.

Choose the option that indicates correct labelling of 'P', 'Q', 'R' and 'S' of embryo in different stages of its development:

[1 Marks]



(A) P: Zygote, Q: Suspensor, R: Cotyledon, S: Radicle

(B) P: Egg, Q: Radicle, R: Suspensor, S: Cotyledon

(C) P: Zygote, Q: Suspensor, R: Cotyledon, S: Plumule

(D) P: Egg, Q: Suspensor, R: Radicle, S: Cotyledon

Question 11.

Amplification of gene of interest by using DNA polymerase may go upto:

[1 Marks]

(A) 1 million times

(B) 1 billion times

(C) 0.1 million times

(D) 1 trillion times

Question 12.

The sequence of nitrogenous bases in a segment of a coding strand of DNA is 5' — AATGCTAGGCAC — 3'. Choose the option that shows the correct sequence of nitrogenous bases in the mRNA transcribed by the DNA.

[1 Marks]

(A) 5'-UUACGAACCGAG— 3'

(B) 5'-AAUGCUAGGCAC — 3'

(C) 5'-UUACGUACCGUG-— 3'

(D) 5'-AACGUAGGCAGC — 3'

Question 13.

How many pollen grains and ovules are likely to be formed in the anther and the ovary of an angiosperm bearing 50 microspore mother cells and 50 megaspore mother cells respectively?

[1 Marks]

(A) 100, 25

(B) 50, 50

(C) 200, 100

(D) 200, 50

Question 14.

Evolution of modern man involves the following man-like primates. Choose the correct series of human evolution.

[1 Marks]

(A) Australopithecines → Ramapithecus → Dryopithecus → Homo sapiens

(B) Dryopithecus → Homo erectus → Australopithecines → Homo sapiens

(C) Australopithecines → Homo erectus → Neanderthal → Homo sapiens

(D) Homo erectus → Australopithecines → Homo sapiens → Neanderthal

Question 15.

RNA interference (RNAi) helps in making tobacco-plant resistant to a nematode (Meloidegyne incognitia). Choose the correct option that shows how RNAi is achieved:

[1 Marks]

(A) Preventing the process of replication of DNA of the nematode.

(B) Preventing the process of translation of mRNA of the nematode.

(C) Preventing the process of transcription of DNA of the plant.

(D) Preventing the process of replication of DNA of the plant.

Question 16.

Assertion (A): Saheli is the World's first non-steroidal oral contraceptive pill.

Reason (R): It has been developed by National Institute of Immunology, New Delhi.

[1 Marks]

(A) (A) is false, but (R) is true.

(B) (A) is true, but (R) is false.

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

(D) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

Question 17.

Assertion (A): One of the property of genetic code is degeneracy.

Reason (R): Some amino acids can be coded by more than one codon.

[1 Marks]

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

(B) (A) is true, but (R) is false.

(C) (A) is false, but (R) is true.

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

Question 18.

Assertion (A): A bioreactor provides the optimal conditions for achieving the desired product by providing optimum growth conditions.

Reason (R): The most commonly used bioreactors are of stirring type.

[1 Marks]

(A) (A) is false, but (R) is true.

(B) (A) is true, but (R) is false.

(C) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

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

Question 19.

Assertion (A): When the two genes in a dihybrid cross are situated on the same chromosome, the proportion of parental gene combinations is much higher than non-parental type.

Reason (R): Higher parental gene combinations can be attributed to crossing over between two genes.

[1 Marks]

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

(B) (A) is true, but (R) is false.

(C) (A) is false, but (R) is true.

(D) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

Section C

Question 20. How are morphine and heroin related? Mention their effect on the human body.

[2 Marks]

Question 21.

(i) Name an alcoholic drink which is produced by the help of microbes:

(1) With distillation

(2) Without distillation

(ii) Explain how cyanobacteria can be used as bio-fertilizer.

[2 Marks]

Question 22. Analyse the following ecosystems and discuss, which will be more productive in terms of primary productivity: A young forest, a natural old forest, a shallow polluted lake.

[2 Marks]

Question 23. Differentiate between Net primary productivity and Gross primary productivity in an ecosystem.

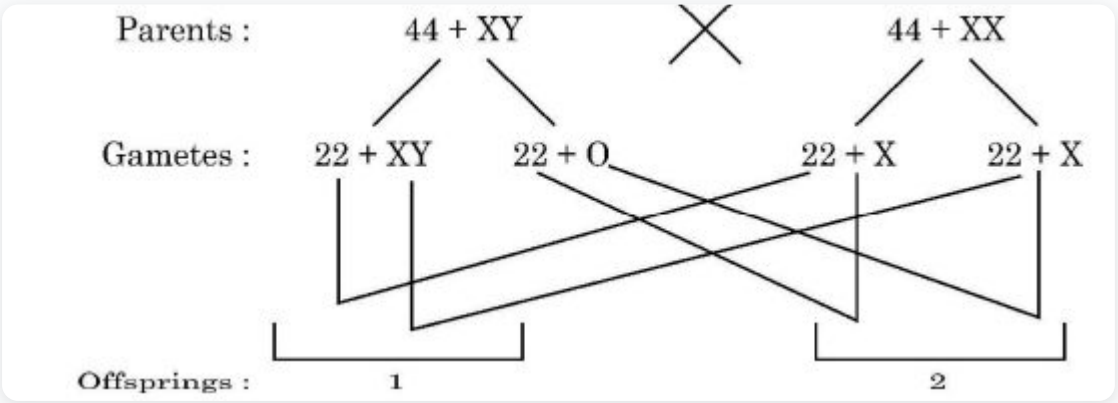
[2 Marks]

Question 24.

Study the cross given below :

Identify the abnormalities '1' and '2' in the offsprings of a cross done between a couple and distinguish between them.

[2 Marks]



Question 25.

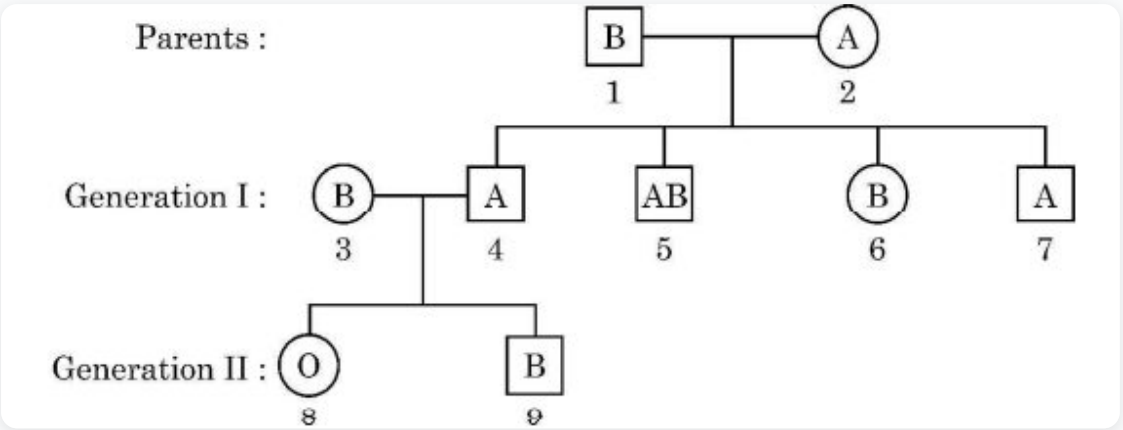
Study the pedigree chart given below, showing the inheritance pattern of blood group in a family :

Answer the following questions :

(a) Give the possible genotypes of individual 1 and 2.

(b) Which antigen or antigens will be present on the plasma membranes of the R.B.Cs of individuals '5' and '8' ?

[2 Marks]



Question 26.

A patient with ADA deficiency requires periodic infusion of genetically engineered lymphocytes. Explain why such periodic infusion is required and also suggest a permanent cure for such ADA deficiency.

[2 Marks]

Question 27.

Describe in brief any two techniques that can be utilised to transfer recombinant DNA into the host cell directly without using any vector.

[2 Marks]

Section D

Question 28.

(a) Write the palindromic nucleotide sequence for following sequence of DNA segment : 5'- GAATTC - 3'

(b) Name the restriction endonuclease that recognizes this sequence.

(c) How are sticky ends produced ? Mention their role.

[3 Marks]

Question 29.

Study a part of life cycle of Plasmodium given below :

Answer the following questions :

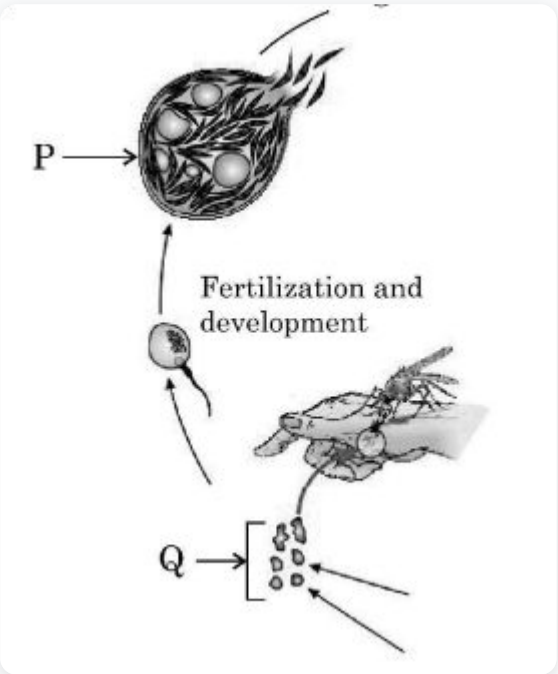
(a) Name the infective stage of Plasmodium that is stored in the female Anopheles mosquito.

(b) Where does fertilization and development of parasite take place ?

(c) Identify labels P and Q in the given diagram.

(d) Asexual and sexual phase of the life cycle of the Plasmodium takes place in two different hosts. Write their names.

[3 Marks]



Question 30.

(a) Indiscriminate human activities such as alien species invasion, fragmentation and habitat loss have accelerated the loss of biodiversity. Justify by taking one example for each.

(b) State the importance of the following :

(i) IUCN Red data list

(ii) Hot spots in conservation of biodiversity

[3 Marks]

Question 31.

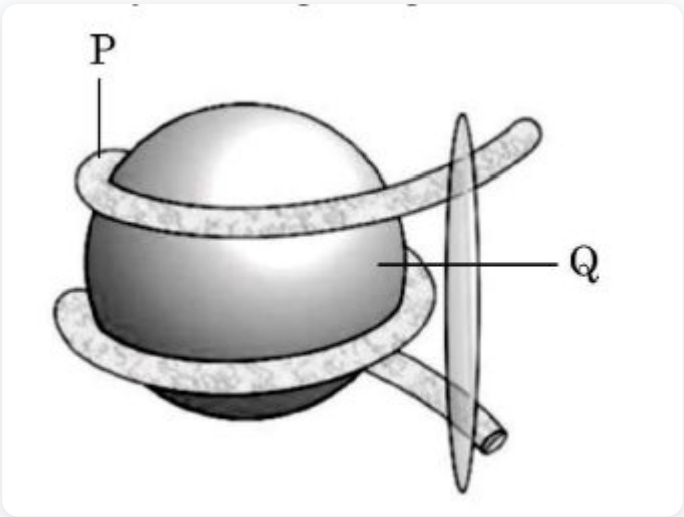
Study the diagram given below and answer the questions that follows :

(a) Identify the structure shown in the above figure. (b) Identify the labels P and Q.

(c) Write the nature of histone proteins.

(d) Distinguish between Euchromatin and Heterochromatin.

[3 Marks]



Question 32.

Shyam and Radha are expecting their first child with Radha being in her second month of pregnancy with no complications. Shyam's family has a history of cystic fibrosis while Radha's family has a history of Down's syndrome, leading to a concern that the baby may have one of these conditions.

(a) Suggest and explain a way of testing if their baby is at risk for any genetic disorders.

(b) In case of presence of one or both of the abnormalities and posing a risk to the mother's health, mention one possible option for them to consider. Is that option safe for Radha at the current gestational age ? Justify.

(c) Under what conditions is the process mentioned in (b) illegal ?

[3 Marks]

Question 33.

Explain the basis on which gel electrophoresis technique works. Write any two ways the products obtained through this technique can be utilised.

[3 Marks]

Question 34.

Compare and contrast convergent and divergent evolution.

[3 Marks]

Section E

Question 35.

Answer the following questions :

(i) State what do you understand by “MALT” ? Where it is located inside our body ?

(ii) Explain cytokine barriers.

(iii) Name the diagnostic test for AIDS. On what principle does it work ?

(iv) Bone marrow and thymus play an important role in human immune system. Explain how are they able to achieve this.

[5 Marks]

Question 36.

(i) Study the following table & fill ‘H’, ‘T, ‘J’, ‘K, ‘L’ and ‘M’ in following table with suitable words :

(ii) Why are baculoviruses used as biological control agents ?

[5 Marks]

	Chemical / Bioactive Molecule	Micro-organism	Category	Use
(a)	Butyric acid	H	I	Important applications in food, chemical & pharma industry
(b)	J	Monoscus purpureus	K	Inhibit cholesterol biosynthesis pathway
(c)	Cyclosporin A	L	Fungus	M

Question 37.

(a) Distinguish between the two cells enclosed in a mature male gametophyte of an angiosperm.

(b) Study the diagram given below showing the modes of pollination. Answer the questions that follow.

(i) The given diagram shows three methods of pollen transfer in plants. Examine them carefully and write the technical terms used for pollen transfer methods ‘1’, ‘2’ and ‘3’.

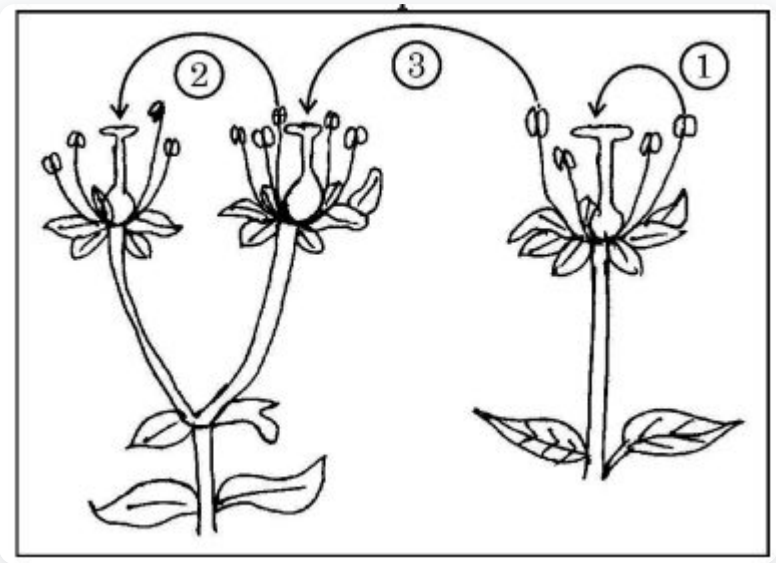
(ii) How do the following plants achieve pollination successfully ?

(a) Water lily

(b) Vallisneria

(iii) Write advantages of pollen transfer in method ‘3’.

[5 Marks]



Question 38.

Given below is the diagram of human ovum surrounded by a few sperms. Observe the diagram and answer the questions that follows :

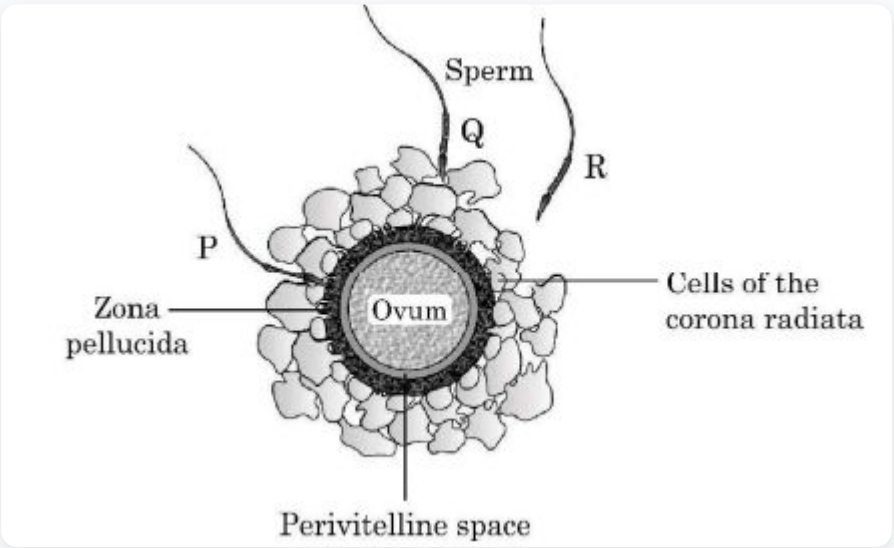
(i) Compare the fate of sperms ‘P’, ‘Q’ and ‘R’ shown in the diagram.

(ii) Write the role of Zona pellucida in this process.

(iii) Analyse the changes occurring in the ovum after the entry of sperm.

(iv) How acrosome and middle piece of a human sperm are able to play an important role in human fertilization ?

[5 Marks]



Question 39.

(i) Perform a cross between two sickle cell carriers. What ratio is obtained between carrier, disease free and diseased individuals in F_1 progeny? Name the nitrogenous base substituted, in the haemoglobin molecule in this disease.

(ii) Explain the difference in inheritance pattern of flower colour in garden pea plant and snap-dragon plant with the help of monohybrid crosses.

[5 Marks]

Question 40.

Explain with the help of well-labelled diagrams how lac operon operates in E. coli:

(i) In presence of an inducer.

(ii) In absence of an inducer.

[5 Marks]