ISC Board Examination – 2025
BIOLOGY
PAPER – 1
Solved Paper
Class– 12th

Maximum Marks: 70 *Reading Time: Additional Fifteen Minutes* *Time allowed: Three hours*

GENERAL INSTRUCTIONS:

1. You are allowed an **additional fifteen minutes** for **only** reading the question paper.
2. You must **NOT** start writing during reading time.
3. This question paper has **11 printed pages and one blank page.**
4. It has **eighteen questions** in all. Answer ***all*** questions.
5. There are **four** sections in the paper: **A, B, C** and **D. Internal choices** have been provided in **one question** each in **Sections B, C** and **D.**
6. **Section A** consists of ***one question*** each carrying ***one/two mark(s).***
7. While answering **Multiple Choice Questions** in **Section A,** you are required to **write only one option** as the answer.
8. **Section B** consists of ***seven questions*** each carrying ***two marks.***
9. **Section C** consists of ***seven questions*** each carrying ***three marks.***
10. **Section D** consists of ***three questions*** each carrying ***five marks.***
11. **Diagrams should be drawn** wherever necessary using a **pencil** only.
12. The intended marks for questions are given in brackets [].

SECTION – A (20 MARKS)

Question 1.

Answer the following questions briefly.

(i) A sports person quenched his thirst by drinking some tender coconut water. Name the part of the fruit from where the liquid content is derived. **[1]**

(ii) In a particular ecosystem, there were 1000 species at a given time. After 5 years, 200 more species were added. Calculate the growth rate of the population. **[1]**

(iii) Rachel attained puberty at the age of fourteen years. She conceived for the first time at the age of thirty years.

How many primary oocytes did she lose till the time of conception? **[1]**

(iv) How many nuclei are present in the central cell of the mature embryo sac of angiosperms before fertilisation? **[1]**

(v) A woman's first child suffered from Down's syndrome. During her second pregnancy, she wanted to find out whether her second child would be normal or not.

Which method will the gynaecologist adopt to test the genetic abnormality in the embryo? **[1]**

(vi) Derive a name for a restriction endonuclease which was extracted in the 5th order from the RY13 strain of *E. coli.* **[1]**

(vii) A pistillate flower of a tetraploid angiosperm is pollinated by a pollen grain from a staminate flower of a diploid plant.

What would be the level of the ploidy in the endosperm of seeds thus formed? **[1]**

(viii) Observe the relationship between the first two words/terms and then fill in the fourth word/term. **[1]**

Lipase: *Candida lipolytica* :: Taq polymerase: _____

(ix) The capacitation of sperms plays a significant role in the process of fertilisation in humans. **[1]**

Which of the following events are associated with the process of capacitation?

I. Large quantity of Ca^{+2} ions enter the sperm to enhance the permeability of the acrosome.

II. Antifertilisin reacts with the fertilisin protein.

III. Membrane covering the sperm head and acrosome gets removed.

(a) I and II only **(b)** I and III only

(c) II and III only **(d)** I, II and III

(x) What is the purpose of the Red Data Book? **[1]**

(a) To list the endangered species

(b) To promote sustainable development

(c) To check the growth of the animal species

(d) To identify areas for conservation

(xi) Given below are two statements marked Assertion and Reason. Read both the statements carefully and choose the correct option. **[1]**

Assertion: The eyes of octopus and horse are evidence of convergent evolution.

Reason: Eyes of both the organisms have the same structure and serve the same function.

(a) Both Assertion and Reason are true and Reason is the correct explanation for Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation for Assertion.

(c) Assertion is true and Reason is false.

(d) Both Assertion and Reason are false.

(xii) Given below are two statements marked Assertion and Reason. Read both the statements carefully and choose the correct option. **[1]**

Assertion: In a pond ecosystem, pyramid of biomass shows a sharp decrease in the biomass at higher trophic levels.

Reason: Primary producers convert only 10% of the energy of sunlight into net primary productivity.

(a) Both Assertion and Reason are true and Reason is the correct explanation for Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation for Assertion.

(c) Assertion is true and Reason is false.

(d) Both Assertion and Reason are false.

(xiii) A forest has a GPP of 20,000 kcal/m^2/year, and 40% of this energy is used for respiration. Calculate the amount of energy available as NPP. **[1]**

(xiv) Ryan used a synthetic hair dye to colour his hair. Within a day of dyeing, red rashes appeared on his face causing constant itching.

What condition do these symptoms indicate? **[1]**

(xv) Answer the following questions.

(a) Name the scientist who is considered the Father of Indian Ecology. **[1]**

(b) Expand the abbreviation SSBP. **[1]**

(xvi) A transformed bacterial cell contains a transgene that can produce one molecule of protein 'X' per cell. This bacterium duplicates every 20 minutes. It is cultured in a nutrient medium for 3 hours. **[1]**

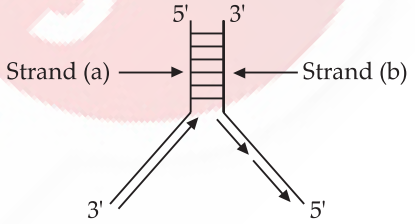
How many molecules of protein 'X' will be produced by the end of this culture?

(xvii) Which drug is extracted from the leaves shown in the image given below? **[1]**

(xviii) Give a reason for each of the following.

(a) The period of lactational amenorrhoea is marked by the absence of menstruation. **[1]**

(b) The diagram given below shows a segment of DNA that codes for the enzyme pepsin. Anita used strand (b) for making mRNA to translate the enzyme pepsin. Even after repeated attempts, she could not create the enzyme. **[1]**

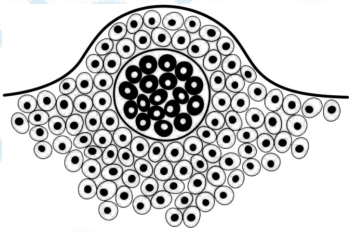


SECTION – B (14 MARKS)

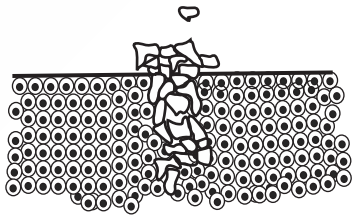
Question 2. **[2]**

The figure given below shows two different types of tumours, Type A and Type B.

State *one* characteristic feature of each type.



Type A



Type B

Question 3. **[2]**

(i) **(a)** Which trophic level has the most energy in an ecosystem?

(b) Expand PAR.

OR

(ii) **(a)** In which year was the Earth Summit held?

(b) What was the main agenda of this historic summit?

Question 4. **[2]**

Discuss the role of two ovarian hormones in the process of parturition in humans.

Question 5. **[2]**

Akshay Shrivastav, a chemical engineer, launched *Navyakosh*, a unique biofertiliser. He started his company, LCB Fertilisers, in his backyard during the COVID-19 pandemic induced lockdown. His creation rapidly gained popularity among the farmers.

Tejraj Sahu, a farmer from Odisha, was one of those who had used the new biofertiliser, *Navyakosh* on his paddy field. The harsh sun and unseasonal rains had reduced water holding capacity of Sahu's field and prompted him to use this biofertiliser.

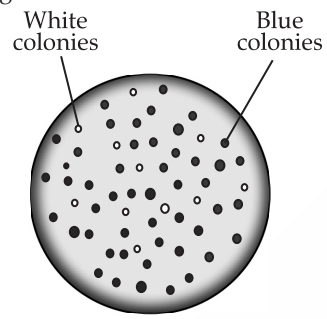
(Source(edited):www.thebetterindia.com)

(i) How do you think the use of the biofertiliser, *Navyakosh* benefitted the paddy field?

(ii) Name the microbe that was used to create the biofertiliser, *Navyakosh*.

Question 6. **[2]**

The diagram given below shows a method of screening the transformed bacterial cells.



Explain how the differently coloured colonies help in identifying the transformed cells.

Question 7. **[2]**

As a student of food technology, Leena has planned to produce two dairy-based processed food products that would be completely organic in nature.

Suggest *any two* food products that Leena can produce.

Question 8. **[2]**

Explain *biopiracy* with the help of an example.

SECTION – C (21 MARKS)

Question 9. **[3]**

(i) An organism living at an extremely hot place is likely to have a high GC content in its DNA. Give a reason to explain.

(ii) If you are given the exact quantity of G and T, how will you calculate the quantity of A and C in the DNA? Why is this not possible in the RNA molecule?

Question 10. **[3]**

Michelle, a zookeeper, was collecting data on rabbits. She found that, in a population of 1000 rabbits, 360 had long ears (LL), 150 had medium ears (LI), and 490 had short ears (II) at a given time.

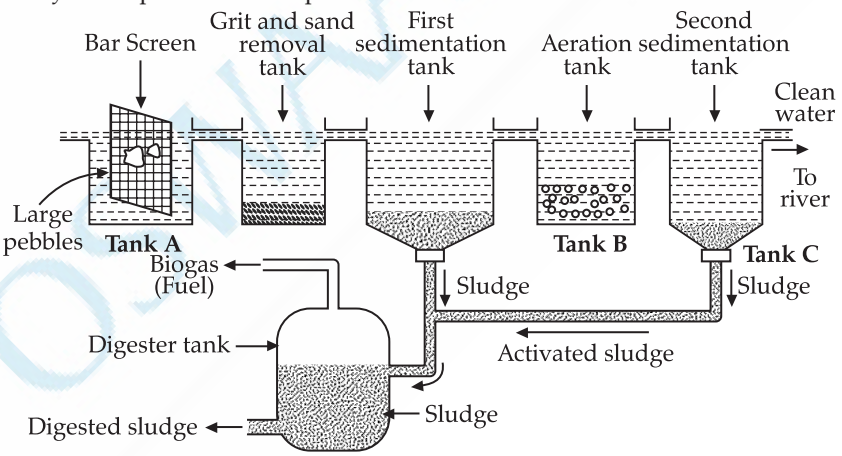
(i) Calculate the frequency of rabbits with heterozygous traits.

(ii) Name the principle applied to calculate the frequency of rabbits.

(iii) Michelle also studied the next generation of rabbits and found that their population decreased significantly to 400. Now, there are 336 rabbits with long ears and 64 rabbits with short ears. Give a reason to explain the change in gene frequencies in the new population.

Question 11. **[3]**

Microbes have been used by humans in household, industrial and agricultural setups. One such use is shown in the diagram given below.



(i) **Tank A** represents primary treatment of sewage while **Tank B** shows its secondary treatment. State *one* difference between the two kinds of sewage treatment.

(ii) Identify the tank in which flocs are added.

(iii) What is the purpose of using microbes in sewage treatment?

Question 12. **[3]**

(i) Draw and explain the Logistic population growth curve.

OR

(ii) What is *parasitism* in population interactions? Explain *any two* types of parasitism with one example each.

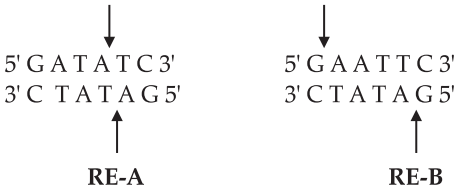
Question 13. **[3]**

Draw a neat and well labelled diagram of T.S. of mammalian testis.

Question 14. **[3]**

(i) What is the role of restriction endonucleases in rDNA technology?

(ii) A biotechnologist was given two restriction endonucleases (RE-A and RE-B) with the following restriction sites:



After the action of respective endonucleases, the fragments separated from the restriction sites. Draw the separated fragments on both the sites.

Question 15. **[3]**

Draw a neat flowchart depicting the life cycle of a *retrovirus* in the infected human cell.

SECTION – D (15 MARKS)

Question 16. **[5]**

(i) Answer the following questions.

(a) Discuss *any three* contrivances for prevention of self-pollination in flowering plants.

(b) Oranges can be produced by processes like Apomixis and Polyembryony. State *two* differences between these processes.

OR

(ii) **(a)** Mention *one* example of each of the following:

(1) Bacterial STD

(2) Viral STD

(3) Protozoal STD

(b) State *any two* artificial methods of contraception which also prevent transmission of STDs.

Question 17.

(i) Explain the Rivet Popper Hypothesis. **[3]**

(ii) Briefly discuss the *narrowly utilitarian* and *broadly utilitarian* arguments for conserving biodiversity. **[2]**

Question 18. **[5]**

Consider the information given below about a family and answer the questions that follow.

- Rafiq, a ten-year-old boy, injured himself badly during the games period in school. He was rushed to a nearby hospital as the bleeding could not be stopped despite the first aid given to him.
- His uncle had lost his life in a similar condition.
- Rafiq's entire family underwent a genetic analysis to detect Bleeder's disease. His parents, sister Farah and paternal grandmother were tested to detect the disease.
- Rafiq's mother and grandmother were found to be carriers of the Bleeder's disease.

(i) Draw a single pedigree chart to show the pattern of inheritance in Rafiq's family.

(ii) What kind of inheritance pattern prevails in Rafiq's family?

(iii) What are the chances of

(a) Farah suffering from the same disease?

(b) Farah being a carrier of the same disease?

■■

ANSWERS

SECTION – A (20 MARKS)

Answer 1.

(i) The liquid content (coconut water) is derived from the endosperm of the fruit.

(ii) Growth rate = [New population – Initial population/ Initial population] × 100

Growth rate = [(1000 + 200) – 1000/1000] × 100

Growth rate = [1200 – 1000 / 1000] × 100

Growth rate = [200/1000] × 100

Growth rate = 20%

(iii) Approximately 192 primary oocytes.

Rachel reached puberty at the age of 14 and conceived at 30, a difference of 16 years. On average, she experienced 12 menstrual cycles per year (16 years × 12 cycles = 192 cycles). During each menstrual cycle, one primary oocyte matures to form the a secondary oocyte or egg. Therefore, Rachel approximately lost 192 primary oocytes by the time she conceived.

(iv) The central cell in a mature embryo sac of angiosperms, before fertilisation, consists of two nuclei called the 'polar nuclei'.

(v) Amniocentesis is the method that the gynaecologist adopts to test for the genetic abnormalities in the embryo.

(vi) EcoRV

"Eco" from *Escherichia coli*.

"R" from the strain RY13.

"V" as it was the 5th restriction enzyme isolated.

(vii) The level of ploidy in the endosperm of seeds formed by the fertilisation of an egg from a tetraploid plant and pollen (sperm cells) from a diploid plant would be 5*n* or pentaploid.

(viii) *Thermus aquaticus*

(ix) Option (b) is correct.

Explanation: Capacitation is the final maturation step of sperms in the female reproductive tract, making them capable of fertilising an egg. During this process:

- A large number of Ca^{2+} ions enter the sperm, enhancing the permeability of the acrosome, which is crucial for releasing enzymes needed for egg penetration.
- The membrane covering the sperm head and acrosome is altered or removed, allowing the acrosomal enzymes to act effectively during fertilisation.

The antifertilisin–fertilisin interaction (II) is related to sperm–egg recognition but not to capacitation, so it is incorrect.

(x) Option (a) is correct.

Explanation: The Red Data Book by IUCN documents species at risk of extinction, helping in conservation planning.

(xi) Option (c) is correct.

Explanation: Octopus and horse eyes evolved independently and are examples of analogous structures that developed as a result of convergent evolution. Here, different structures evolve to serve the same function and therefore exhibit similarity.

(xii) Option (c) is correct.

Explanation: In a pond ecosystem, primary producers have a lower biomass than tertiary consumers, leading to an inverted biomass pyramid. Primary producers convert only a small fraction of sunlight into energy, with approximately 1–2% of solar energy being captured through photosynthesis and transformed into primary productivity.

(xiii) 12000 kcal/m^2/year

NPP = GPP – R

NPP = 20000 – 8000

NPP = 12000 kcal/m^2/year

(xiv) Allergic contact dermatitis

(xv) (a) Ramdeo Misra

(b) SSBP: Single-Stranded DNA Binding Protein

(xvi) 512 molecules

Number of divisions in 3 hours = 180/20 = 9

Total bacteria = 2^9 = 512

Each bacterium produces 1 molecule of protein X.

So, total molecules of protein X = 512.

(xvii) Cannabinoids

(xviii) (a) The lactational amenorrhoea (absence of menstruation) method is based on the fact that ovulation and the menstrual cycle do not occur during the period of intense lactation following parturition, as the high levels of prolactin changes the release of oestrogen and progesterone.

(b) In the given image, strand (a), which has 3′→5′ polarity, serves as the template strand for transcription, while strand (b) acts as the coding strand. This is because DNA-dependent RNA polymerase catalyses RNA synthesis in a 5′→3′ direction, requiring a complementary 3′→5′ template. Consequently, strand (b), having 5′→3′ polarity, remains untranscribed. In the absence of mRNA synthesis from this strand, the required protein is not produced.

SECTION – B (14 MARKS)

Answer 2.

Type A tumour is called 'benign tumour'. It does not invade the surrounding tissues.

Type B tumour is called 'malignant tumour'. It exhibits metastasis and invades the surrounding tissues.

Answer 3.

(i) (a) First trophic level comprising the producers has the highest amount of energy in an ecosystem.

(b) PAR – Photosynthetically Active Radiation

OR

(ii) (a) The Earth summit was held in the year 1992.

(b) The main agenda of this summit was that all nations should take appropriate measures for the conservation of biodiversity and for the sustainable utilisation of its benefits.

Answer 4.

The two ovarian hormones involved in parturition are oestrogen and progesterone.

Oestrogen increases secretions from the cervix and vagina and facilitates the dilation of cervix to prepare for delivery. It also helps regulate the levels of oxytocin and increases oxytocin receptors in the uterus, making it more sensitive to contractions. Oxytocin is responsible for uterine contractions during labour.

Progesterone maintains a state of uterine relaxation, thereby preventing premature delivery.

Answer 5.

(i) The use the biofertiliser, *Navyakosh*, benefitted the paddy field by increasing the water retention capacity of the soil, which helped the paddy plants to survive in extreme weather conditions.

(ii) The biofertiliser, *Navyakosh*, has nitrogen fixing cyanobacteria that increase organic matter of soil and increase its fertility.

Answer 6.

White colonies: Transformed bacteria (contain recombinant plasmid; lack β-galactosidase).

Blue colonies: Non-transformed bacteria (contain functional β-galactosidase, hydrolyzing X-gal).

Selectable markers have been developed which differentiate transformed from non-transformed based on their ability to produce colour in the presence of a chromogenic substrate. In this method, recombinant DNA is inserted within the coding sequence of the enzyme β-galactosidase. This results in the inactivation of the gene responsible for the synthesis of this enzyme, a process known as 'insertional inactivation'. The presence of a chromogenic substrate gives blue-coloured colonies if the plasmid in the bacteria does not have an insert. However, the presence of an insert leads to insertional inactivation of the β-galactosidase gene and the colonies do not produce any colour. These are identified as transformed or recombinant colonies.

Answer 7.

Two dairy-based processed food products that would be completely organic in nature include cheese and curd. Both are fermented dairy products made using lactic acid bacteria such as *Lactobacillus* and *Streptococcus thermophilus.*

Answer 8.

Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment.

Example: Basmati rice is distinct for its unique aroma and flavour and 27 documented varieties of Basmati are grown in India. There are references to Basmati in ancient texts, folklore and poetry, as it has been grown for centuries. In 1997, an American company was granted patent rights on Basmati rice by the US Patent and Trademark Office. This allowed the company to sell a 'new' variety of Basmati in the US and abroad. This 'new' variety of Basmati had actually been derived from Indian farmer's varieties.

SECTION – C (21 MARKS)

Answer 9.

(i) An organism living in an extremely hot environment is likely to have a high GC content in its DNA because GC base pair are thermally more stable than the AT base pairs. The extra thermal stability in GC pairs is attributed to the three hydrogen bonds present in them. These hydrogen bonds make the GC pair stronger and resistant to heat-induced denaturation of DNA.

(ii) If we are given the exact quantity of G and T, the quantity of A and C in the DNA can be calculated by Chargaff's rule. According to these rules, the amount of guanine is equal to the amount of cytosine (G = C) and the amount of adenine is equal to thymine (A = T).

This calculation is not applicable to RNA molecule because it is single stranded and does not follow the Chargaff's rules in the same way as the double stranded DNA. Also, in RNA, instead of thymine, uracil is present.

Answer 10.

(i) The frequency of rabbits with heterozygous genotype (2pq) = Total number of heterozygous organisms/ total population size= 150/1000 = 0.15 or 15%

(ii) The principle applied to calculate the frequency of rabbits is 'Hardy–Weinberg Principle'.

(iii) The reason for the change in gene frequencies in the new population may be natural selection or genetic drift. Genetic drift refers to a random change in allele frequencies due to a drastic reduction in

population size. Initially, there were 1,000 rabbits, but the population dropped to 400, reducing genetic variation. In small populations, random events such as disease, natural disaster can disproportionately affect allele frequencies. Here, alleles for medium ears (Ll heterozygous) may have been lost due to random sampling effects, leading to only long-eared (LL) and short-eared (ll) rabbits in the new generation.

Answer 11.

(i) Primary treatment involves physical removal of solids from the sewage through filtration and sedimentation. Secondary treatment involves biological degradation using microbes that consume the major part of the organic matter in the effluent.

(ii) Flocs are added in tank B (aeration tank).

(iii) Microbes are used in sewage treatment as they break down the organic matter, thereby reducing the pollutants. The microbes also facilitate the purification of waste water making it safer to be discharged in water bodies and also reusable for different purposes.

Answer 12.

(i) A population growing in a habitat with limited resources initially shows a lag phase, followed by phases of acceleration and deceleration and finally an asymptote.

- **Initial Lag Phase:** Population growth is slow as individuals adapt to the environment. Few individuals are reproducing, so the overall growth rate is low.
- **Exponential Growth Phase:** Once adapted, the population grows rapidly due to abundant resources. The birth rate exceeds the death rate, causing exponential increase.
- **Deceleration Phase:** As resources become limited (e.g., food, space), growth slows down. Intraspecific competition (competition within the species) increases.
- **Stationary Phase (Carrying Capacity K):** The population reaches the environment's carrying capacity (K). Birth rate is almost equal to the death rate, leading to a stable population. The population fluctuates around K due to minor environmental changes.

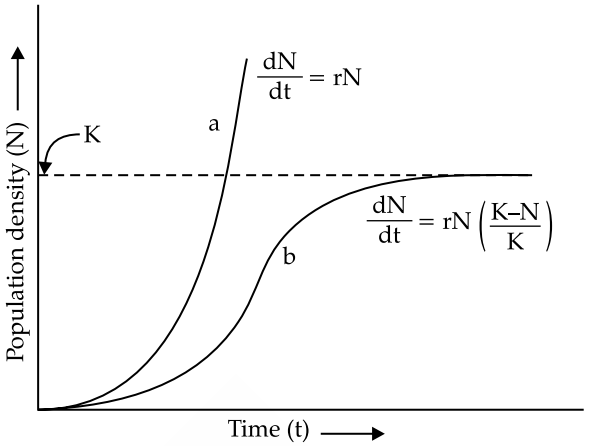
A plot of N in relation to time (t) results in a sigmoid curve. This type of population growth is called Verhulst–Pearl Logistic Growth and is described by the following equation:

$dN/dt = rN\,(K - N/K)$

where N = population density at time t

r = intrinsic rate of natural increase

K = carrying capacity



OR

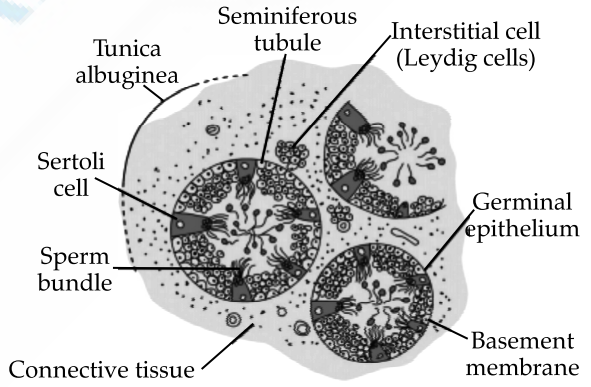
(ii) Parasitism is a type of population interaction in which one organism (the parasite) derives its nutrition from another living organism (the host), thereby harming the host. In parasitism, one species benefits (the parasite), while the interaction is detrimental to the other species (the host).

Types of parasitism:

i. **Ectoparasitism:** Lice are external parasites that live on the human scalp, feeding on blood and causing irritation and itching.

ii. **Brood parasitism:** It is another example of parasitism in which the parasitic bird (e.g., cuckoo) lays its eggs in the nest of its host (e.g., crow) and lets the host incubate them. The eggs of the parasitic bird have evolved to resemble the host's egg in size and colour to reduce the chances of the host bird detecting the foreign eggs and ejecting them from the nest.

Answer 13.



Answer 14.

(i) The restriction endonucleases act as 'molecular scissors' and help in cutting the DNA at specific locations. The cut piece of DNA can then be linked with the plasmid DNA to form the recombinant DNA.

(ii) RE-A

5′ G A T A 3′ 5′ T C 3′

3′ C T A T 5′ 3′ A G 5′

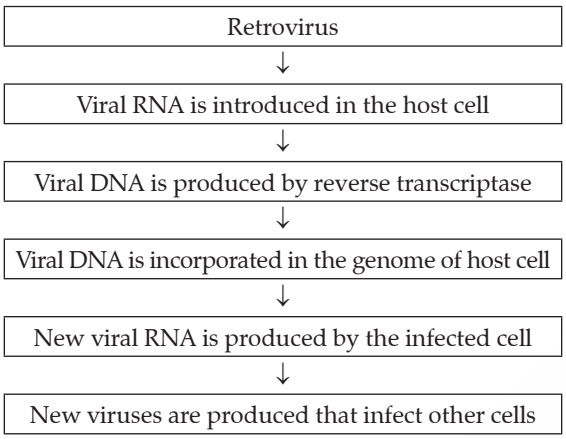
(iii) RE-B

5′ G 3′ 5′ A A T T C 3′

3′ C T A T A 5′ 3′ G 5′

Answer 15.

Flowchart showing life cycle of a retrovirus in the infected human cell:



SECTION – D (15 MARKS)

Answer 16.

(i) **(a)** Three contrivances for prevention of self-pollination are as follows:

A. **Dichogamy:** In bisexual flowers, the male and female reproductive structures mature at different time. When anthers mature first, the term used is 'protandry', e.g., sunflower, cotton. When gynoecium matures first, the term used is 'protogyny', e.g., *Ficus*, *Magnolia*.

B. **Dicliny:** It refers to the formation of unisexual flowers, which makes cross-pollination obligatory, thus ruling out self-pollination, e.g., Papaya.

C. **Self-incompatibility:** It is a genetic mechanism in flowering plants that prevents self-fertilisation by inhibiting pollen germination or pollen tube growth on the stigma of the same flower or genetically similar individuals. It is controlled by the S-gene complex and promotes cross-pollination for genetic diversity. For example, in *Brassica* (mustard family), self-incompatible pollen fails to fertilise the ovule, ensuring reproduction only through cross-pollination.

(b) Differences between apomixis and polyembryony

Apomixis	Polyembryony
1. Apomixis is a type of reproduction in which a new individual is produced without the fusion of gametes.	**1.** Polyembryony is a phenomenon in which multiple embryos develop from a single fertilised egg.
2. The embryos may be formed directly from the diploid nucellar cell or from megaspore mother cell.	**2.** In flowers of citrus plants, like orange, lemon, etc., there is formation of additional embryos from different parts of the ovule. These include nucellus tissue, integuments, synergids, antipodals cells.

OR

(ii) **(a)** **(1)** Bacterial STD – Gonorrhoea

(2) Viral STD – Genital warts

(3) Protozoal STD – Trichomoniasis

(b) Artificial methods of contraception that prevent STDs too are:

A. **Condoms:** Condom is a sheath-shaped barrier device used during sexual intercourse to reduce the probability of pregnancy or a sexually transmitted infection (STI). The male condom is rolled onto an erect penis before intercourse and works by forming a physical barrier which blocks semen from entering the body of a sexual partner.

The female condom is an elongated thin, structure made of latex sheath. It has rings on both the ends. It is inserted through the vagina, wherein the ring on one side covers the opening of cervix into the vagina. The other end of the female condom is open to receive the penis during intercourse.

The female condom covers the opening of cervix, thereby preventing the sperms released during ejaculation from moving upwards into the uterus and fallopian tube. In this way, it prevents the entry of sperm and helps to prevent conception.

B. **Diaphragm:** A dome-shaped rubber cap placed over the cervix before intercourse to block sperm entry. When used with spermicides, it provides contraception and offers some protection against STDs, though less effective than condoms.

Answer 17.

(i) The 'Rivet popper hypothesis' was used by Stanford ecologist Paul Ehrlich to explain the importance of species in an ecosystem. He compared the ecosystem to an airplane. In an airplane (ecosystem), all parts are joined together using thousands of rivets (species). If every passenger travelling in it starts popping a rivet to take home (causing a species to become extinct), it may not affect flight safety (proper functioning of the ecosystem) initially, but as more and more rivets are removed, the plane becomes dangerously weak over time. Furthermore, which rivet is removed may also be critical. Loss of rivets on the wings (key species that drive major ecosystem functions) is obviously a more serious threat to flight safety than loss of a few rivets on the seats or windows inside the plane.

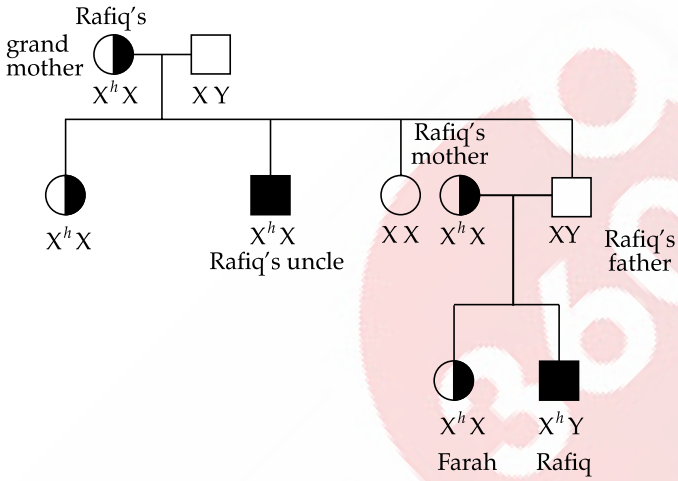
(ii) To understand the need for conservation of biodiversity, the following arguments are relevant:

a. Narrowly utilitarian: The narrowly utilitarian arguments for conserving biodiversity refer to the countless direct economic benefits that humans obtain from nature, such as food (cereals, pulses, fruits), firewood, fibre, construction material, industrial products (tannins, lubricants, dyes, resins, perfumes) and products of medicinal importance. With increasing resources being invested in exploring molecular, genetic and species-level diversity for products of economic importance, nations endowed with rich biodiversity can expect to reap enormous benefits.

b. Broadly utilitarian: The broadly utilitarian argument says that biodiversity plays a major role in many ecosystem services that nature provides. Forests like those of the Amazon provide 20% of the total oxygen in the Earth's atmosphere. Pollination (without which plants cannot give us fruits or seeds) is another service that ecosystems provide through pollinators layer such as bees, bumblebees, birds and bats. Nature also provides us the aesthetic pleasures of walking through thick woods, watching spring flowers in full bloom or waking up to a bird's song in the morning.

Answer 18.

(i)



(ii) It is referred to as 'sex-linked/X-linked' inheritance pattern.

(ii) (a) There is a 0% chance of Farah suffering from the same disease, as the father is unaffected.

(b) There is a 50% chance of Farah being a carrier of the disease, as her mother is a carrier and can thus contribute affected X chromosome.

■■