Class XII Session 2026-27
Subject - Biology
Sample Question Paper - 1

Time Allowed: 3 hours **Maximum Marks: 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. The hormone releasing IUD is: **[1]**

   a) Multiload-375 b) Lippe's loop

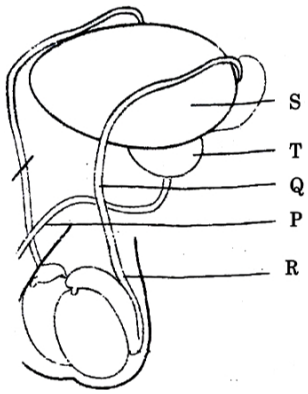
   c) Cu-T d) LNG-20

2. India has only 2.4% of the world's land area but its share of the global species diversity is: **[1]**

   a) 7.3 % b) 5.1 %

   c) 8.1 % d) 12.9 %

3. A human male decides to adopt a surgical method for contraception. Identify the point in the diagram where a cut would be made and tied. **[1]**



   a) Point R b) Point S

   c) Point P d) Point Q

4. The group of letters that form same words when read both forward and backward are **[1]**

called:

a) Endonucleases
b) Puzzle
c) Sticky ends
d) Palindrome

5. The excreta of cattle, commonly called gobar is rich in _____. **[1]**

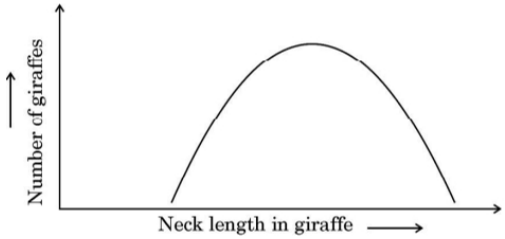
a) Rhizobium
b) Methanobacterium
c) Bacillus species
d) Pseudomonas putida

6. Which of the following statements regarding decomposition is false? **[1]**

a. Warm and moist environment favours decomposition
b. Decomposition rate is slower if detritus is rich in chitin and lignin
c. Earthworm is detritivore
d. Precipitation of soluble inorganic nutrients into the soil horizon as unavailable salt is called mineralisation

a) Statement d is false
b) Statement c is false.
c) Statement b is false
d) Statement a is false.

7. Select the option that gives the correct description of the process of Natural Selection with respect to the length of the neck of giraffe. **[1]**



a) Stabilising selection as giraffes with medium neck lengths are selected.
b) Directional selection as giraffes with longer neck lengths are selected.
c) Disruptive selection as giraffes with smaller and longer neck lengths are selected.
d) Stabilising selection as giraffes with longer neck lengths are selected further.

8. The given diagram shows the skulls of two different mammals. **[1]**



A B

Which of the following options accurately describes the differences between these skulls?

a) Skull B is the ancestor of skull A.
b) Skull A is of an adult chimpanzee and skull B is of a human.
c) Skull A is of a human and skull B is
d) Skull A has more brain capacity

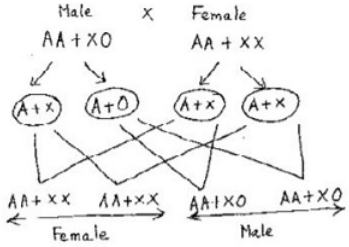
of an adult chimpanzee. than skull B.

9. A large regional unit characterized by a major vegetation type and associated fauna found in a specific climate zone, constitutes: **[1]**

a) Ecosystem b) Biome

c) Biological community d) Biosphere

10. What does the chart give below represent? **[1]**



a) XO - XX type of sex determination b) xy - xx type of sex determination

c) XX - XY type of sex determination d) XX - XO type of sex determination

11. N_2 - fixing bacteria in non-legume plants are: **[1]**

a) Rhizobia b) Plasmodium

c) Frankia d) Aspergillus

12. Genetically modified tobacco plants were produced using Agrobacterium vectors. Which property of Agrobacterium helps in carrying nematode specific genes into the host plant? **[1]**

a) Infectious for monocot plant; has Ti plasmid b) Infectious for dicot plant; has Ti plasmid

c) Infectious for plants and animals; has Ti plasmids d) Infectious for monocot and dicot plants; has cry gene

13. **Assertion (A):** Counselling and creating awareness among people about safe and hygienic sexual practices is the primary step towards reproductive health. **[1]**
Reason (R): Parents, other close relatives, teachers, and friends, would help people, especially those in the adolescent age group to lead a reproductively healthy life.

a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false. d) A is false but R is true.

14. **Assertion (A):** Enzymes application in industry is enhanced by its immobilisation. **[1]**
Reason (R): Immobilisation provides protection to enzymes without affecting their activity.

a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false. d) A is false but R is true.

15. **Assertion (A):** In a terrestrial ecosystem, DFC is the major conduit for energy flow. **[1]**
Reason (R): Solar energy is required for energy supply in a DFC system.

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

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

c) A is true but R is false.

d) A is false but R is true.

16. **Assertion:** Reproductive isolation brings about sympatric speciation **[1]**

Reason: It is the primary mode of speciation e.g. Darwin's finches.

a) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

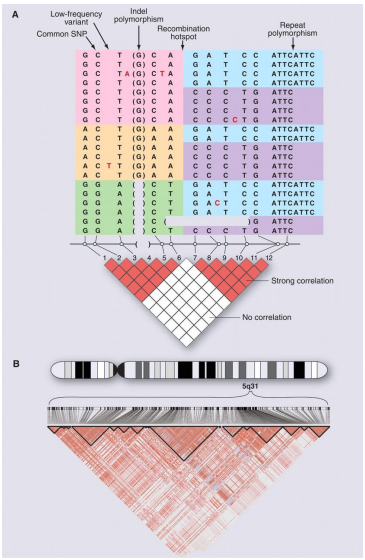
b) If both Assertion & Reason are true and the reason is the correct explanation of the assertion

c) If Assertion is true statement but Reason is false

d) If both Assertion and Reason are false statements

Section B

17. Observe the diagram for genetic mapping of human DNA and answer the following questions: **[2]**



i. Explain DNA polymorphism as the basis of genetic mapping of the human genome.

ii. State the role of VNTR in DNA fingerprinting.

OR

What is the cause of discontinuous synthesis of DNA on one of the parental strands of DNA? What happens to these short stretches of synthesised DNA?

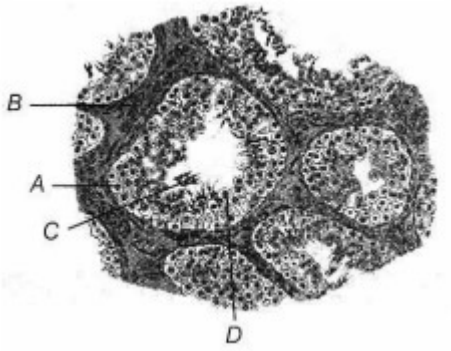
18. Name the bioactive molecule and its microbial source generally used by physicians to treat the patients for: **[2]**

i. Myocardial infarction

ii. High blood cholesterol level

iii. Organ transplantation

19. Study the sectional view of human testis showing seminiferous tubules given below. **[2]**



i. Identify A, B and C.

ii. Write the function of A and D.

20. Explain the mechanism of pollination in marine sea-grasses like Zostera. **[2]**

OR

Comment upon the mode of pollination in Vallisneria and Zostera.

21. Lactic Acid Bacteria (LAB) sets milk into curd and also plays a very beneficial role for human health. Give any two suitable reasons. **[2]**

OR

Mention the common bacterium found in the anaerobic sludge during sewage treatment and also in the rumen of cattle. How is this bacterium commercially useful?

Section C

22. a. What is a genetic code? **[3]**

b. Why did scientists feel the need to propose a genetic code?

c. Genetic code is said to be 'Universal'. Why?

23. Gregor Mendel conducted hybridisation experiments in garden pea for seven years and proposed the law of inheritance. **[3]**

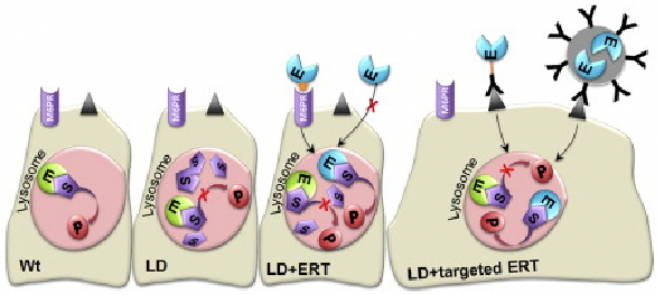
a. Why was he successful in his hybridisation experiments? Give two reasons.

b. State the law of independent assortment as proposed by Mendel after his dihybrid crosses.

24. Study the table showing the population interaction between species **Z** and **Y** respectively. Assign the appropriate **+/–** signs for **A**, **B**, **D**, **E** and respective interactions for **C** and **F**. **[3]**

Species 'Z'	**Species 'Y'**	**Name of Interaction**
A	B	Mutualism
–	–	C
D	E	Parasitism
+	O	F

25. The image below eleborates enzyme-replacement therapy. **[3]**



i. Explain enzyme-replacement therapy to treat adenosine deaminase deficiency.

ii. Mention two disadvantages of this procedure.

26. **Forests provide intangible benefits to us.** Explain by taking three different areas, how. **[3]**

27. i. Write how parasites have evolved with adaptation to co-exist with their hosts in an ecosystem. **[3]**

ii. Parasites are host specific and tend to co-evolve. How would the parasite respond if the host evolves a certain mechanism to resist or reject the parasite?

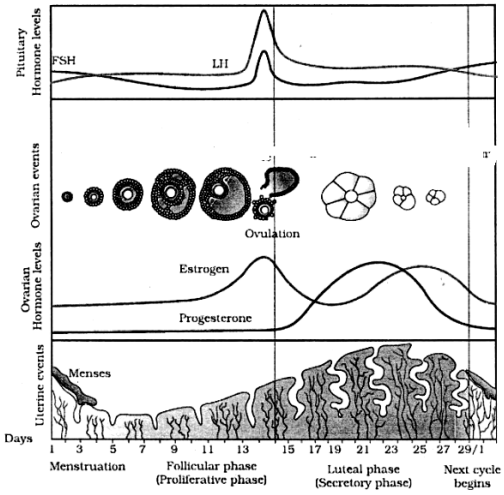
28. a. Development of recombinant DNA technology has made the expression of protective protein antigens (to be used as **vaccines**) in heterologous systems/bacteria or any other organism. Give an example of a vaccine developed by such a technology and the host used. **[3]**

b. Explain how a humoral immunity system gets into action when a foreign antigen enters the human body.

Section D

29. **Read the following text carefully and answer the questions that follow:** **[4]**

The reproductive cycle in female primates (e.g. monkeys, apes and human beings) is called the menstrual cycle. In human females, menstruation is repeated at an average interval of about 28/29 days, and the cycle of events starting from one menstruation till the next one is called the menstrual cycle Anita has show Diagrammatic presentation of various events during a menstrual cycle.



i. What role do pituitary gonadotropins play during the follicular and ovulatory phases of the menstrual cycle? (1)

ii. The first half of the menstrual cycle is called the proliferative phase as well as the follicular phase. Give reason. (1)

iii. Why does corpus luteum stay active throughout pregnancy and in the absence of fertilization, is active only for 10-12 days? (2)

OR

What happens to corpus luteum in human female if the ovum is (2)

a. fertilised,

b. not fertilised?

30. **Read the following passage and answer the questions that follow.** **[4]**

A senior student, sneezing very badly, with watery eyes and having difficulty in breathing was brought to the school medical room by his fellow friends. The medical room nurse enquired as to what had happened. One of the students said "after the football match we all were sweating profusely, one of our friends sprayed deodorant on us. Soon after the deodorant was sprayed on the senior boy, the symptoms appeared."

a. What are the symptoms seen in the student indicative of? Elaborate. **(1)**

b. State how the cause of such responses can be confirmed. **(1)**

c. i. Name the cells in our body and the chemicals produced by them that are responsible for such reactions. Name any two drugs used to reduce these symptoms. **(2)**

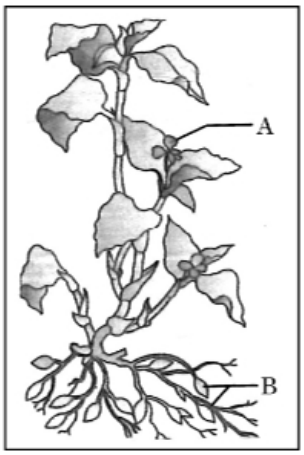
OR

ii. 'In recent times there is a rise in such reactions amongst urban human population.' Do you agree? Give three reasons in support of your answer. **(2)**

Section E

31. What develops into a microspore mother cell in a flower? Trace the development of this cell into a pollen grain which is ready for germination. Draw a labelled figure by a mature pollen grain. **[5]**

OR



Observe the picture of Commelina plant bearing two types of flowers given above.

i. Identify the two types of flowers labelled 'A' and 'B' in the picture.

ii. Compare the two types of flowers with reference to:

1. Characteristic feature
2. modes of pollination

iii. List any two **out breeding devices** in flowering plants. Explain why do plants develop such devices.

32. a. State the reasons for which Hershey and Chase carried out their experiments. **[5]**

b. Answer the following questions based on the experiments of Hershey and Chase:

i. Name the different radioactive isotopes they used, and explain how they used them.

ii. Why did they need to agitate and spin their culture?

iii. Write their observations and the conclusions they arrived at.

OR

i. Watson and Crick's discovery of double helical structure was based on which two findings. Also mention the name of the scientists associated with these findings.

ii. Write down the salient features of double helix structure of DNA.

33. Explain how more than a billion copies of a fragment of DNA are formed using the technique of PCR. **[5]**

OR

Explain how does an antibiotic resistance gene in a cloning vector (plasmid pBR 322) help in selecting the recombinants from the non-recombinants.

Solution

Section A

1.

(d) LNG-20
Explanation:
LNG-20

2.

(c) 8.1 %
Explanation:
8.1 %

3.

(d) Point Q
Explanation:
Point Q

4.

(d) Palindrome
Explanation:
A palindrome is a word, phrase, number, or other sequences of characters that reads the same backward as forward. For example, MALAYALAM which read the same from both side.

5.

(b) Methanobacterium
Explanation:
Excretory wastes of animals (gobar) is used to get manure and gobar gas. Gobar gas is a methane rich fuel gas produced by the anaerobic breakdown of gobar with the help of methanogenic bacteria present in the gobar in very large numbers.

6. **(a)** Statement d is false
Explanation:
Process is illuviation and not mineralisation

7.

(b) Directional selection as giraffes with longer neck lengths are selected.
Explanation:
Directional selection as giraffes with longer neck lengths are selected.

8.

(b) Skull A is of an adult chimpanzee and skull B is of a human.
Explanation:

Skull A has a projecting jaw, smaller braincase and pronounced brow ridges, typical of an adult chimpanzee. Skull B has a larger cranium and flatter face, characteristic of humans.

9.

(b) Biome
Explanation:
Biome

10.

(d) XX - XO type of sex determination
Explanation:
The chart given below represents XX-XO type of sex determination in which XX forms the female and XO develops as a male. It is common in birds.

11.

(c) Frankia
Explanation:
Frankia

12.

(b) Infectious for dicot plant; has Ti plasmid
Explanation:
Agrobacterium tumefaciens is used as a gene vector because it carries a Ti (tumour-inducing) plasmid whose T-DNA region is naturally transferred and integrated into the host plant genome; this property is exploited to introduce any desired gene (for example a nematode-specific gene) into the plant. Wild-type Agrobacterium has a natural host range mainly among dicotyledonous plants (dicots) such as tobacco, so the statement that it is infectious for dicot plants and has a Ti plasmid correctly identifies the key features used in making transgenic tobacco. The other options are incorrect: Agrobacterium is not primarily an animal pathogen, monocots are not its natural hosts (so "infectious for monocot" is wrong in the textbook context), and the cry gene mentioned in one option is the Bacillus thuringiensis insecticidal gene, not a feature of Agrobacterium's Ti plasmid.

13. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
Both A and R are true and R is the correct explanation of A.

14. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
An immobilised enzyme is physically entrapped or covalently bonded by chemical means to an inert and usually insoluble matrix, where it can act upon its natural substrate. The matrix is usually a high molecular weight polymer such as polyacrylamide, cellulose, starch, glass, beads, etc. Because of its binding with a matrix the immobilised enzyme has better stability in many cases. Efficiency of immobilised enzyme is better. The enzyme can be recovered at the end of the reaction and can be used repeatedly.

15. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
In the terrestrial ecosystem energy from the sun enters through plants in a food chain. Dead plants and animals, undigested food is decomposed by decomposers hence we can say that energy from the sun is required in DFC (detritus food chain) directly or indirectly. Also, the DFC is a major energy flow system in the terrestrial ecosystem because at each trophic level of the grazing food chain some of the organic matter enters into DFC.

16. **(a)** If both Assertion & Reason are true but the reason is not the correct explanation of the assertion

Explanation:

Sympatric speciation is the evolution of a new species from a surviving ancestral species while both continue to inhabit the same geographic region. Reproductive isolation brings about sympatric speciation. The mechanisms of reproductive isolation are a collection of evolutionary mechanisms, behaviors, and physiological processes critical for speciation. They prevent members of different species from producing offspring or ensure that any offspring are sterile.

Section B

17. i. Polymorphism is inherited from parents to children. So, it is useful for identification and paternity testing. It arises due to the mutations and plays an important role in speciation and evolution. Thus, DNA polymorphism exhibited by certain repetitive DNA sequences and it is the basis to construct genetic and physical maps of the genome which are used in the human genome project.

ii. Variable Number of Tandem Repeats (VNTRs) belongs to a class of satellite DNA called a minisatellite. VNTRs are used as probes in DNA fingerprinting.

OR

DNA polymerase catalyses polymerization in only one direction, i.e. 5' – 3'. Due to this, replication is continuous on one strand (3'-5'), while it is discontinuous on another strand (5' – 3'). The fragments which is discontinuous is later joined by DNA ligase.

18.

		Bioactive molecule	Microbial source
(i)	Myocardial infarction	Streptokinase	Streptococcus
(ii)	High blood cholesterol level	Statins	Monoascus purpureus
(iii)	Organ transplantation	Cyclosporin A	Trichoderma polysporum

19. 1. A-Spermatogonia,
B-Interstitial cells
C-Spermatozoa.

2. A-Spermatogonia produces a spermatogonium (plural: spermatogonia) is an undifferentiated male germ cell. Spermatogonia undergo spermatogenesis to form mature spermatozoa in the seminiferous tubules of the testes.
D-Sertoli cells provide nutrition to sperms.

20. In the case of marine seagrass like Zostera the female flowers remain submerged in water. The pollen grains are released inside the water.The pollen grains are long, thread-like, and are carried with the water and reach the stigma and achieve pollination.

OR

- Vallisneria- Female flower reaches surface of water and male flower or pollen grain are released on the surface of water.
- Zostera- Female flower remain submerged in water and pollen grain are released inside water.

21. i. Improves nutritional quality by increasing Vitamin B_{12}

ii. Beneficial role in checking disease causing microbes in stomach.

OR

The group of bacteria found in both the rumen of cattle and sludge of sewage treatment is Methanogen bacteria. Biological methanation occurs naturally in swamps, digestive systems of animals, oil fields and other environments and is already commonly used in sewage water plants and biogas plants.

Section C

22. a. **Genetic Code:** It is the sequence of three nitrogenous bases (codon) on mRNA that directs the sequence of amino acids during synthesis of proteins.

b. To provide complementarity between nucleotides and amino acids / to support the notion that change in nucleic acids was responsible for change in amino acids in proteins / to establish the correlation between genetic information and protein synthesis / to constitute a combination of four bases to code twenty amino acids.

c. As a codon from bacteria to human code for the same amino acid.

23. a. True breeding pea plant varieties were selected, distinct contrasting characters were selected for different traits, artificial (self and cross) pollination was conducted carefully, large sample size was used, results were confirmed by performing experiments for several generations, any other correct point.
(any two reasons)

b. When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters.

24. A = +
B = +
C = Competition
D = +
E = -
F = Commensalism

25. In enzyme replacement therapy, the patient is given functional ADA (Adenosine Deaminase) by injection.
Hereditary disease can be corrected by gene therapy. It is a collection of methods that allows correction or replacement of defective genes. The first gene therapy was given in 1990 to a 4 years old girl with Adenosine Deaminase (ADA) deficiency. It is caused due to the deletion of gene for adenosine deaminase.
Disadvantages

i. The patient does not completely recover from the disease.

ii. It needs periodic injections of the enzyme to the patients.

26. i. **Improvement of climate:** The influence of forests on things like wind, temperature, rainfall, and humidity is improved. They control the water cycle, O_2, CO_2 balance in the atmosphere, and temperature.

ii. **Control of flood:** Forests prevent flooding by minimising erosion on sloping hills and silting up in lakes, rivers, and other reservoirs.

iii. **Aesthetic, recreational and development of tourism facilities:** Any person, especially those who live in cities, can find relief from their repetitive lives in forests.

iv. **Conservation and development of wildlife including birds:** In terms of shelter, a place to reproduce, and a supply of food, forests are the optimal environment for wildlife.

27. i. Parasites have evolved with special adaptations to co-exist with their hosts in an ecosystem in the following ways:
Loss of unnecessary sense organs
Presence of adhesive organs or suckers to cling on to the host iii. Loss of digestive system and high reproductive capacity.

ii. If the host evolves special mechanisms for rejecting or resisting the parasite, the parasite also evolves mechanisms to counteract and neutralise them, in order to be successful with the same host species. In accordance with their life styles, parasites evolve special adaptations and co-evolve with the host.

28. a. Hepatitis B Vaccine and HPV (Human Papilloma Virus) Vaccine are two examples of recombinant DNA vaccines.

b. The antibodies produced by B-lymphocytes are present in the blood cells and they are transported all over the body. This is why it is called the humoral immune response as it consists of an antibody produced by the lymphocytes.It depends upon the action of antibodies circulating in the body. When an antibody on a B-cell binds with an antigen, humoral immunity comes into play. The antigen is internalized by the B cell and presented on the

helper T cell. This activates the B-cell.

The activated B cells grow and produce plasma cells.These plasma cells release antibodies in the bloodstream. The memory B cells retain the information about the pathogen to prevent any disease caused by that pathogen in the near future.

Section D

29. i. Gonadotropin-releasing hormone (GnRH) also called gonadotropin-releasing factor (GnRH) is secreted by the hypothalamus of the brain, which stimulates the release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH). FSH stimulates the ovarian follicles to produce estrogens during the proliferative phase. LH stimulates the corpus luteum of the ovary to secrete progesterone.

ii. The first half of the menstrual cycle is called the follicular phase because estrogens secreted by the cells of maturing Graafian follicles control the changes in the secondary sex organs. It is also called the proliferative phase because the growth and proliferation of tissue on the wall of the uterus, vagina take place.

iii. During the luteal phase, the leftover parts of Graafian follicle transform into the corpus luteum. It discharges large quantities of progesterone hormone which is required for the maintenance of the endometrium. The endometrium is important for implantation of the fertilized egg and various other stages of pregnancy. Hence, corpus luteum has a long life in pregnancy. In the absence of fertilization, upholding of the corpus luteum is not required and thus it declines within 10-12 days, which causes the lining of the endometrium to menstruate and hence the onset of the new menstrual cycle.

OR

i. In case of fertilisation, the corpus luteum continues secreting progesterone which is required for the maintenance of endometrium during pregnancy.

ii. In the absence of fertilisation, the corpus luteum degenerates and gets converted into corpus albicans. Deficiency of progesterone causes disintegration of the endometrium leading to menstruation and thus, a new cycle starts.

30. a. Allergy, the exaggerated response of the immune system to certain antigens present in the environment.

b. By analysing the production of IgE type of antibodies/by injecting very small doses of possible allergens and study the reaction.

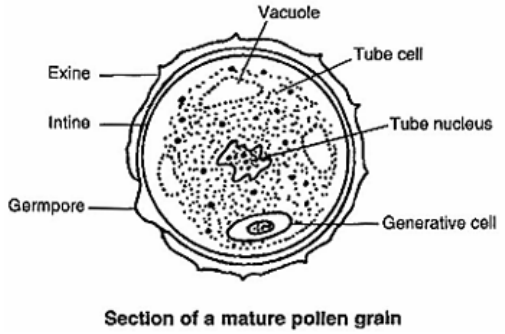
c. i.
- Mast cells
- Histamine, serotonin
- Drugs are - Anti-histamine, Adrenalin

OR

ii. Yes, lowering of immunity due to modern lifestyle, more sensitivity to allergens, protected environment provided in early life.

Section E

31. Sporogenous cell divide and ultimately transformed into microspore mother cells. Microspore mother cells develop an internal layer of callose which breaks the plasmodesmal connections among themselves. The separated mother cells round off and undergo meiosis to produce tetrads of haploid microspores or pollen grains.



Section of a mature pollen grain

OR

i. A- chasmogamous flower
B- cleistogamous flower

ii.

	A	B
	(1) open flower/blossom	closed flower/Do not blossom
	(2) Autogamy as well as geitonogamy and xenogamy/cross pollination	only autogamy/self-pollinatio

iii.
- In some species, pollen release and stigma receptivity are not synchronized. Either the pollen is released before the stigma becomes receptive or stigma becomes receptive much before the release of pollen.
  Self-incompatibility. This is a genetic mechanism and prevents self-pollen from fertilizing the ovules.
  Production of unisexual flowers.
- To prevent inbreeding depression/ to discourage self-pollination and to encourage cross pollination/to develop genetic variation.

32. a. To find out that DNA is the genetic material Hershey and chase carried out their experiment.

b. (i) P^{32} labelled DNA, S^{35} labelled protein capsule of Bacteriophage.
(ii) To remove virus coat from bacteria, separation of virus particles from bacteria by agitation and spinning.

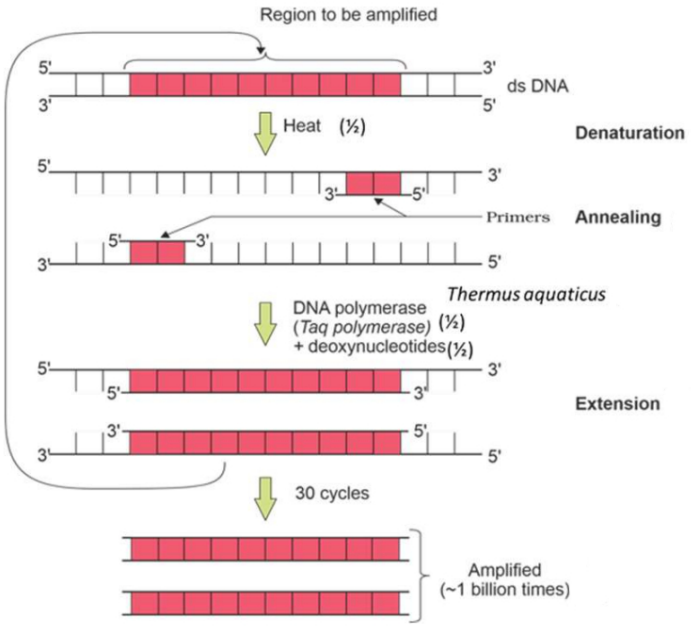
(iii) S^{35} Radioactive detected in supernatent, Radioactive P^{32} detected in the cell, the proteins did not enter the bacteria from the viruses therefore DNA is the genetic material (that is passed from virus to bacteria)

OR

i.
- Maurice Wilkins and Rosalind franklin, X ray diffraction studies of DNA.
- Erwin Chargaff, For a double stranded DNA the ratios between Adenine and Thymine and Guanine and Cytosine are constant and equal to one.

ii. The salient features of double helix structure of DNA are as follows:
- It is made of two polynucleotide chains, in which backbone is constituted by sugar phosphate and the bases project inside.
- The two chains have antiparallel polarity.
- The bases in two stands are paired through hydrogen bonds forming base pairs(bp). Adenine form double hydrogen bond with thymine and Guanine form triple hydrogen bond with cytosine.
- The two chains are coiled in a right handed fashion.The pitch of helix is 3.4 nm and 10b.p in each turn. Distance between base pair in a helix is approximately 0.34 nm.
- The plane of one base pair stacks over the other in double helix.

33.
- **Denaturation:** strands of dsDNA are separated by heating
- **Annealing:** Multiple copies of the gene (or DNA) of interest is synthesised 'in vitro' using two sets of primers
- **Extension:** the enzyme thermostable DNA polymerase/Taq polymerase, isolated from a bacterium Thermus aquaticus, extends the primers using the deoxyribonucleotides provided in the reaction and the genomic DNA as a the template
- **Amplification:** replication of DNA is repeated many times to form more than a billion copies of a fragment of DNA



OR

An antibiotic resistance gene in a cloning vector, such as plasmid pBR322, serves as a selectable marker to distinguish recombinant DNA containing the desired insert from non-recombinant DNA.

The plasmid pBR322 contains two antibiotic resistance genes: ampicillin resistance (ampR) and tetracycline resistance (tetR). The presence of these genes allows bacteria carrying the plasmid to survive in the presence of corresponding antibiotics.

During the cloning process, the target DNA is inserted into the pBR322 plasmid. Recombinant plasmids carry the desired insert, disrupting one of the antibiotic resistance genes.

After introducing the recombinant plasmids into bacteria, the next step involves plating the transformed bacteria on agar plates containing antibiotics. Only bacteria carrying the recombinant plasmids will be unable to grow in the presence of the specific antibiotic, while non-recombinant bacteria will survive due to their intact antibiotic resistance gene.

By observing the growth or lack thereof on the selective medium, researchers can identify and select the recombinant colonies while eliminating non-recombinant colonies. This antibiotic resistance gene-based selection allows for efficient isolation and identification of the desired recombinant DNA. Hence, an antibiotic resistance gene in a cloning vector (plasmid pBR 322) help in selecting the recombinants from the non-recombinants.