

Question Paper Code 57/1

SECTION – A

Q. Nos. 1 - 5 are of one mark each

1. Name the condition in vertebrates where the body attacks self-cells.

Ans Auto immune disorder / auto-immune disease. [1 Mark]

2. Write the function of a Bioreactor.

Ans Bioreactors are required to produce large volumes (100 - 1000 litres) of recombinant proteins/ desired protein / enzymes [1 Mark]

3. A colour blind boy is born to a couple with a normal colour vision. Write the genotype of the parents.

Ans Father - XY , Mother -XX^C = 1/2 + 1/2 [1 Mark]

4. Mention any two conditions that enhance the chances of syngamy in organisms exhibiting external fertilization.

Ans Organisms exhibiting external fertilisation show great synchrony between the sexes , release a large number of gametes into the surrounding medium = 1/2 + 1/2 [1 Mark]

5. Write the conclusion Griffith arrived at the end of his experiment with Streptococcus pneumoniae.

Ans He concluded that the R-strain bacteria had somehow been transformed by heat- killed S-strain bacteria, this must be due to transfer of genetic material = 1/2 + 1/2 [1 Mark]

SECTION - B

Q Nos. 6-10 are of two marks each

6. Plants like potato, sugarcane do not require seeds for producing new plants. How do they produce new plants ? Give two other examples where new plants are produced in the same way.

Ans New plants arise from nodes present in the modified stems of these plants / through vegetative propagation = 1/2 when the nodes come in contact with damp soil or water they produce roots and new plants = 1/2 , e.g Banana / Ginger /Dahlia / *Bryophyllum*/any other correct example (Any two) = 1/2 + 1/2 [2 Marks]

7. Explain the role played by predators in a community.

Ans • Predators act as conduits for energy transfer across trophic levels.
• They keep prey population under control.
• They help in maintaining species diversity in a community by reducing intensity of competition among competing prey species.
• An efficient predator may cause extinction of prey species (Any two) = 1 + 1 [2 Marks]

8. Name the first antibiotic discovered and by whom.

Ans Penicillin , Alexander Flemming = 1 +1 [2 Marks]

9. What happens when chromatids fail to segregate during cell division cycle ? Explain your

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answer with an example.

Ans Failure of segregation of chromatids during cell division cycle results in the gain or loss of chromosome/ called aneuploidy = 1

E.g Down' syndrome results in the gain of extra copy of chromosome 21 /

Turner's syndrome results due to loss of an X-chromosome in human female = 1

OR

ABO blood groups is a good example of co-dominance. Justify.

Ans -ABO blood group in humans is contributed by gene 'I' that has 3 alleles 'I^A' 'I^B' and 'i.'

- Because human beings are diploid each person has two of the three alleles.

- I^A and I^B produce two different types of sugar while allele i does not produce sugar on the plasma membrane of RBC

- When I^A and I^B are present they both express their own type of sugar- this is codominance

= $\frac{1}{2} \times 4$

[2 Marks]

10. What is the pathogenic property of baculovirus, used as a biological agents ? Name the genus of these organisms.

Ans Attacks insect, and other arthropods = $\frac{1}{2} \times 2$

Nucleopolyhedrovirus = 1

[2 Marks]

SECTION - C

Q Nos. 11-22 are of three marks each

11. (a) What is an “allergic reaction” ?

(b) Name any two drugs used to quickly reduce the symptoms of allergy.

(c) Why do more and more children in metro cities of India suffer from allergies and asthma ?

Ans a) The exaggerated response of the immune system to certain antigens present in the environment (is called allergic reaction) = 1

b) anti-histamine / adrenalin / steroids (Any two) = $\frac{1}{2} + \frac{1}{2}$

c) due to deteriorating air quality / sensitivity to the environment /allergens / lowering of immunity due to modern day life style (which could be due to the protected environment provided largely in life) = $\frac{1}{2} + \frac{1}{2}$

[3 Marks]

12. Identify a, b, c, d, e and f in the following table :

Name of Enzyme/ Bioactive Molecule	Source	Function
(i) a	Streptococcus	b
(ii) c	d	Immuno-suppressive agent in organ transplant patients
(iii) Statins	e	f

Ans i) a) Streptokinase b) 'Clot buster' for removing clots from the blood vessels (of patients who have undergone myocardial infaction leading to heart attack) /clot buster enzyme

ii) c) Cyclosporin A d) *Trichoderma polysporum*

iii) e) *Monascus purpureus* (yeast)

f) Blood cholesterol lowering agent.

[3 Marks]

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13. list any two types of IUDs that are available for human females and state their mode of action.

- Ans i) Non medicated IUDs = 1 , increase phagocytosis of sperms within the uterus = $\frac{1}{2}$
 ii) Copper releasing IUDs = 1 , Cu ions suppress sperm motility and fertilising capacity of sperms = $\frac{1}{2}$
 iii) Hormone releasing IUDs = 1 , make uterus unsuitable for implantation / makes cervix hostile to sperms = $\frac{1}{2}$
 (Any two) ($1\frac{1}{2} + 1\frac{1}{2}$) [3 Marks]

14. Mention the role of (i) selectable marker, (ii) Ori and (iii) rop in *E. coli* cloning vector pBR322.

- Ans i) Selectable marker - helps in identifying and eliminating non transformants and selectively permitting the growth of the transformants = 1
 ii) Ori - helps to start replication and any piece of DNA when linked to this sequence can be made to replicate within host cell, responsible for controlling the copy number of the linked DNA = $\frac{1}{2} + \frac{1}{2}$
 iii) -codes for the proteins involved in the replication of the plasmid = 1 [3 Marks]

15. Write the aim with which animal breeding programmes are carried. Describe the essential steps to be followed in Poultry management.

Ans Aims - increasing the yield of animals , improving the desirable qualities of the produce = $\frac{1}{2} + \frac{1}{2}$

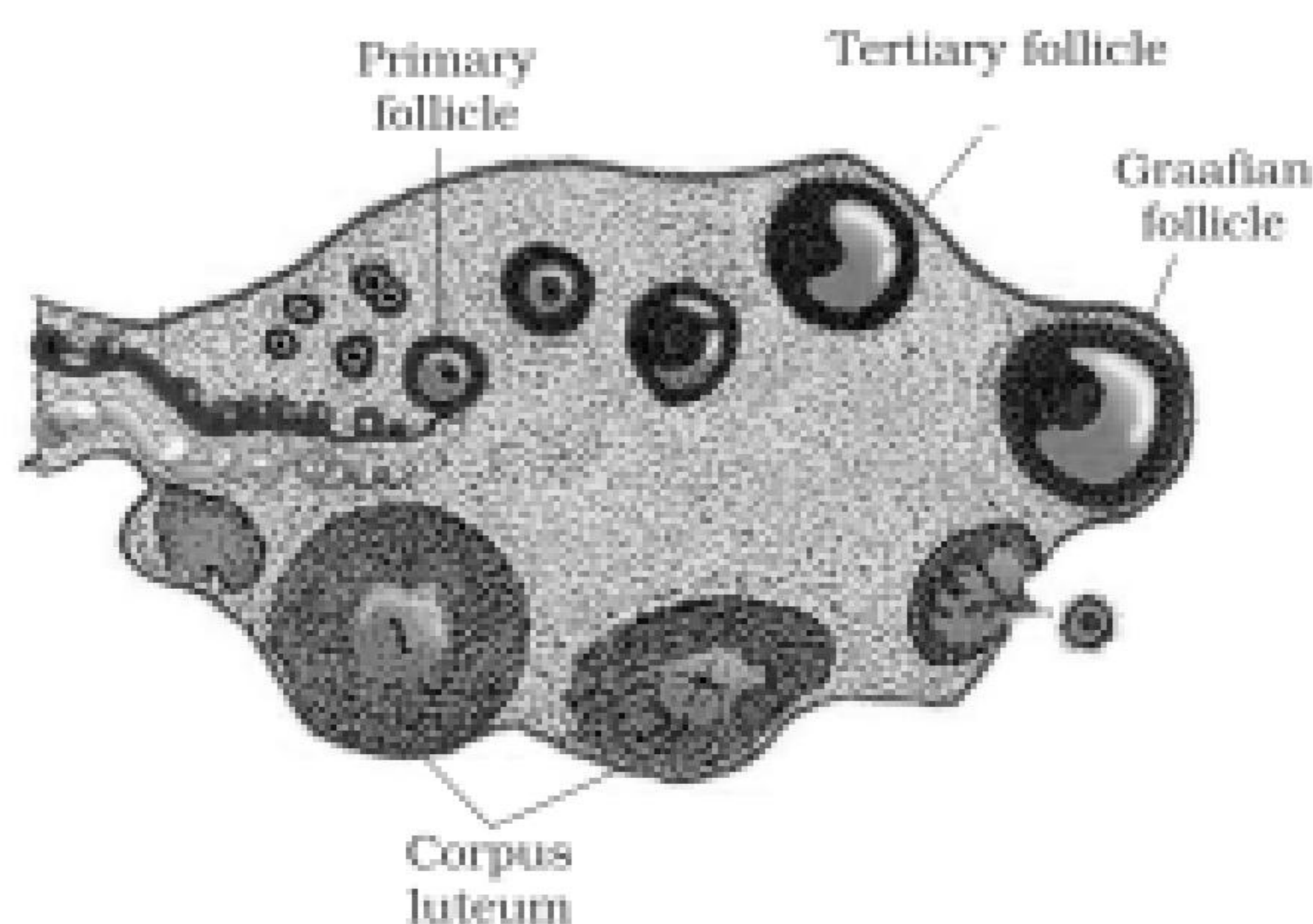
Steps to be followed in Poultry Management

- Selection of disease free and suitable breeds
- Proper and safe farm conditions
- Proper feed and water
- Proper hygiene and health care = $\frac{1}{2} \times 4$

[3 Marks]

16. (a) Draw a diagram of a sectional view of human ovary and label (i) Primary follicle; (ii) Tertiary follicle; (iii) Graafian follicle and (iv) Corpus luteum.
 (b) Write the function of corpus luteum.

Ans



= $\frac{1}{2} \times 4$

[3 Marks]

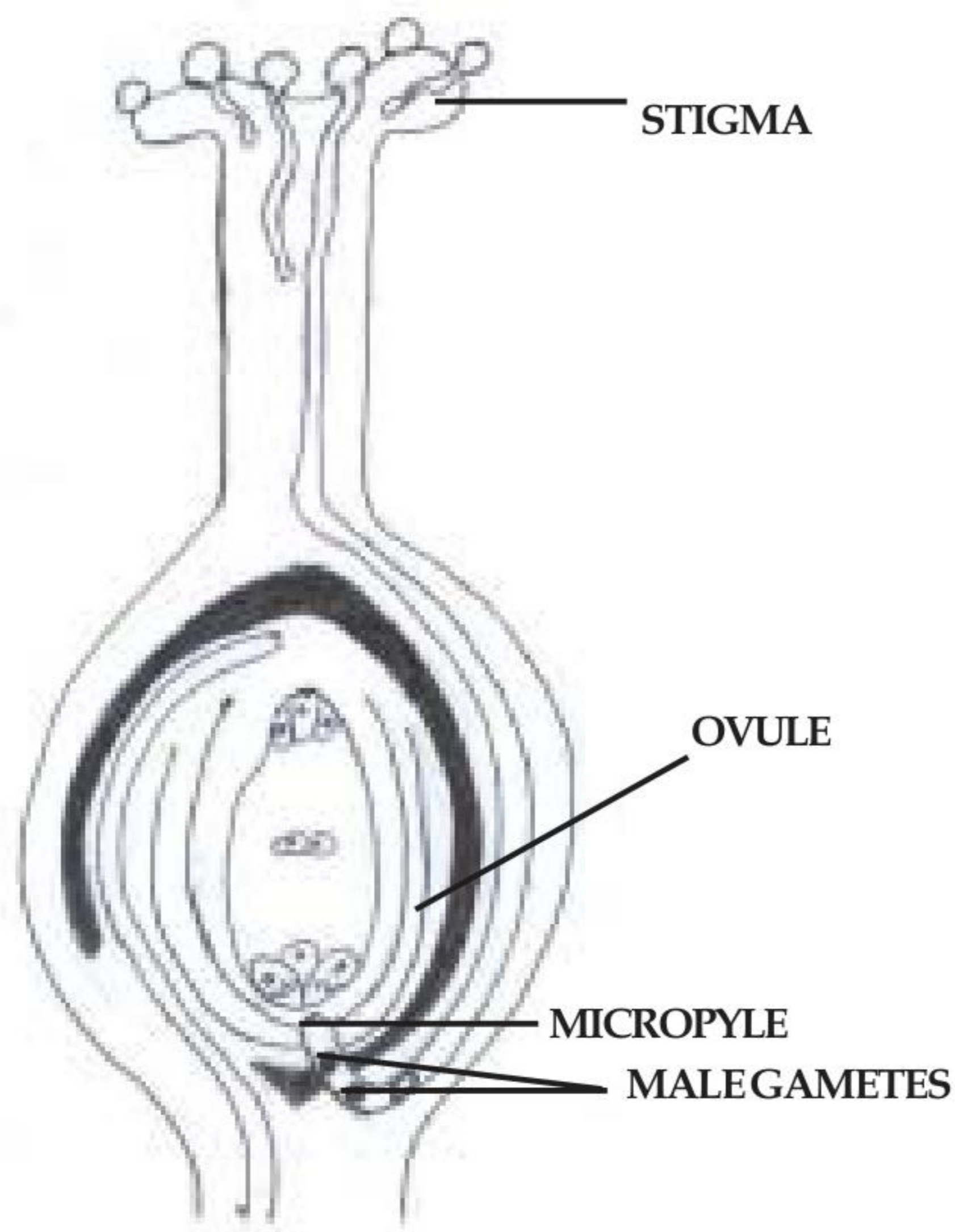
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- b) Secretes (large amounts of) progesterone, which is essential for maintenance of endometrium = $\frac{1}{2} \times 2$

OR

- (a) Draw a diagram of Pistil showing pollen tube growth in angiosperm and label (i) Stigma; (ii) male gametes; (iii) micropyle and (iv) Ovule.
 (b) Write the function of micropyle.

Ans (a)



= $\frac{1}{2} \times 4$

- (b) the pollen tube enters the ovule through micropyle, it facilitates the entry of oxygen and water for seed germination. = $\frac{1}{2} + \frac{1}{2}$

[3 Marks]

17. What was the challenge for production of insulin using rDNA techniques? How did Eli Lilly produce insulin using rDNA technology?

Ans The challenge for production of insulin using rDNA technique was getting insulin assembled into a mature form = 1

- Prepared two DNA sequence corresponding to A and B chains of human insulin.
- introduced them in plasmids of *E.coli* to produce insulin chains.
- chains A and B were produced separately.
- extracted and combined by creating disulfide bonds to form human insulin = $\frac{1}{2} \times 4$

[3 Marks]

18. Identify A, B, C, D, E and F in the following table

S.No.	Component-I	Component-II	Chemical linkage bonding the two components	Product
i.	A	B	C	Nucleoside
ii.	Nucleoside	D	E	Nucleotide
iii.	Nucleotide	Nucleotide	F	Dinucleotide

- Ans i) A - Nitrogenous base / A - Pentose sugar .
 B - Pentose Sugar / B- Nitrogenous base
 C - N glycosidic linkage.
 ii) D - phosphate group.
 E - phospho ester linkage

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iii) F- (3 -'5') phosphodiester linkage.

[3 Marks]

19. Name the organism from which the 'cry' genes are isolated. Mention with the help of suitable example why and how bio-technologists have made use of 'cry' genes.

Ans *Bacillus thuringiensis* = 1

- Source of insecticidal (crystal) protein that control the cotton bollworms / corn borer = 1

- Specific Bt toxin genes were isolated from *Bacillus thuringiensis* , incorporated into several crop plants such as cotton = $\frac{1}{2} \times 2$

[3 Marks]

20. Excessive and continuous use of pesticides has resulted in evolution of some new species of pests. Explain what must have led to this. What is this type of evolution called ?

Ans Excessive use of pesticides has resulted in selection of resistant varieties in a much lesser time scale, as evolution is a stochastic process based on chance events in nature and chance mutation in organism = 1 +1

Evolution by anthropogenic action = 1

[3 Marks]

21. Explain with the help of two examples how certain plants have evolved morphological and chemical defenses against primary consumers such as cows and goats.

Ans - Thorns of *Acacia* / Cactus are morphological means of defence against cows & goats = 1

- Plants produce & store chemicals that make herbivore sick when they are eaten inhibit feeding or digestion and disrupt its reproduction or even kill it = 1

- *Calotropis* produces highly poisonous cardiac glycosides so cows and goats can never browse on these plants / Chemical substances like nicotine / caffeine / defences / strychnine / opium are actually defences against grazers & browsers = 1

[3 Marks]

22. What type of organs eye of an Octopus and that of a human called ? Give another example from the animal group and one from the plants of such organs. Name and explain the evolutionary process they exhibit.

Ans Analogous = 1

- Flippers of Penguins & Dolphins / Eye of octopus and mammals = $\frac{1}{2}$ (any other appropriate & correct example)

- Sweet potato (root modification) and potato (stem modification) = $\frac{1}{2}$

They are anatomically dissimilar structure though they perform similar function , convergent evolution = $\frac{1}{2} + \frac{1}{2}$

[3 Marks]

SECTION - D

Q No. 23 is of four mark

23. With the revolution in information technology, now it has become an integral part of everybody's life, living in rural and urban India. You are asked to address the gathering of students of eco-clubs of your neighbourhood schools on generation and management of e-waste.

(a) Write how e-waste is generated.

(b) Explain how would you address the awareness issue of e-waste management amongst the students.

(c) How have the developed countries exploited the developing countries with respect to e-waste managements ?

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- Ans (a) irreparable computers / any other electronic good = 1
 (b) Recycling is the only possible solution of e-waste management keeping in mind the safety measures to be adopted by the worker involved in the cycling of e-wastes, so as to avoid their exposure to the toxic substance present in the e-wastes = 1 + 1
 (c) By exporting their e-waste to the developing countries / China / India / Pakistan = 1

[4 Marks]

SECTION - E

Q Nos. 24-26 are of five marks each

24. (a) Explain the steps involved in *in vitro* fertilisation popularly known as test tube baby programme.
 (b) State the importance of this programme.

- Ans (a) i) Ova from wife / donor and sperms from husband / donor are collected
 ii) They are induced to form zygote under simulated conditions (in the labortory)
 iii) The zygote or early embryos upto 8 blastomeres could then be transferred to fallopian tube /ZIFT
 iv) Embryos more than 8 blastomeres, into the uterus / IUT/ Intra uterin transfer = 1 × 4
 (b) Allows couples to bear children who were unable to do so naturally = 1

[4+1=5]

OR

- (a) State one difference and one similarity between geitonogamy and xenogamy.
 (b) Explain any three devices developed in flowering plants to discourage self pollination and encourage cross pollination.

- Ans (a) Difference- In geitonogamy pollen grains from one flower are transferred to the stigma of another flower on the same plant whereas in xenogamy the pollen grains are transferred to the stigma of a flower on another plant(of the same species) genetically similar, genetically different
 Similarity -In both types of pollination pollen grains from the anther are transferred to the stigma of another flower of the same species =1
 (b) - Pollen release & stigma receptivity not synchronised / hence the maturity of stigma and pollen are different /Protandry / Protogyny
 - Anther and Stigma are placed at different positions so that pollen cannot come in contact with stigma of the same flower.
 - Self incompatibility/ Self sterility.
 - Production of unisexual flowers (Any three) = 1 × 3

[5Marks]

25. (a) Hershey and Chase carried their experiment in three steps : infection, blending, centrifugation. Explain each step.
 (b) Write the conclusion and interpretation of the result they obtained.

- (a) • Infection- Radioactive phosphorus / phosphorus labelled bacteriophages were allowed to infect *E.coli* - growing in a culture medium, simultaneously radioactive sulphur / sulphur labelled bacteriophage was allowed to infect *E.coli* growing in another culture medium = 1+1
 • Blending- As infection proceeds- the viral coats are removed from the bacteria by agitating in a blender =½

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- **Centrifugation** - virus particles were separated from bacteria by spinning them in a centrifuge = $\frac{1}{2}$

(b) Conclusion - DNA is the genetic material = 1

Interpretation - sulphur labelled viral protein did not enter the bacteria during infection, whereas phosphorus labelled viral DNA entered into the bacteria to cause infection = $\frac{1}{2} + \frac{1}{2}$

OR

Taking an example of white-winged moths and dark-winged moths of England in pre and post industrialised era, explain evolution by natural selection.

Ans The number of light winged moths was more during the pre industrialised period in England than dark winged moth where as it reversed in the post industrialised period = 1

In Pre industrialised period the tree trunks were covered with white coloured thick growth of lichens = 1

hence the light coloured moth were not spotted by the predator and their number increased, whereas the dark coloured moths were captured and their numbers decreased = 1

During post industrialisation period the tree trunks became dark due to industries smoke and hence the dark coloured moths were not captured by the predators and their number increased whereas the light coloured moths were captured and their number decreased = 1

In a mixed population those moths that are better adapted camouflaged to the changed environment survive and increase in population size = 1 [5Marks]

26. (a) **Write the percentage of land area that was covered by forests by the end of the last century.**

(b) **Describe any two practices that led to deforestation.**

(c) **State the consequences of deforestation.**

(d) **Suggest a method to overcome deforestation.**

Ans (a) 19.4% = $\frac{1}{2}$

(b) -Trees are axed for timber / firewood / land for industrial requirement

-Slash and burn agriculture

- habitat loss and fragmentation- clearing of forest land into grass land for raising cattle

(Any two) = 1+1

(c) -Deterioration of our environment in terms of air - water and soil quality.

-causes loss of bio diversity

- disturbance in hydrological cycle / biogeochemical cycle

(Any two) = 1 + 1

(d) Reforestation or any other appropriate alternative = $\frac{1}{2}$

[5Marks]

OR

(a) **Comment on the pattern in which all communities undergo a change in composition and structure with changing environmental conditions.**

(b) **Explain 'Climax community' and 'sere'.**

(c) **Differentiate between primary and secondary succession with examples.**

Ans (a) Orderly and sequential changes parallel with changes in physical environment = 1

(b) climax community-changes finally lead to a community that is in equilibrium with environment = 1

Sere-the entire sequence of communities that successively change in a given area = 1

(c) **Primary succession**

Secondary succession

(i) occurs in newly cooled lava / bare rock / newly created pond.

occurs in abandoned / destroyed forest

(ii) Slow process

Fast Process

$\frac{1}{2} \times 4 = 2$

[5Marks]

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