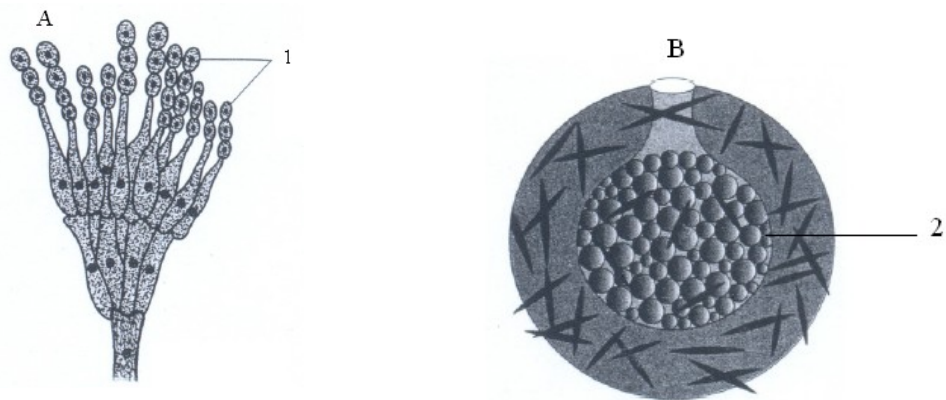


**Chapter 1.**  
**REPRODUCTION IN ORGANISMS**

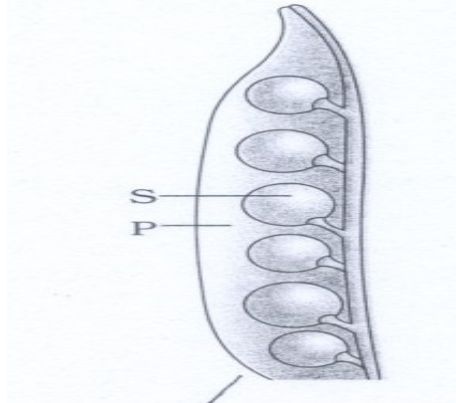
1mark

- 1) No two individuals, especially in mammals (except monozygotic twins) look alike. What distinguishes them from the rest? 1
- 2) A plant was introduced in India because of its beautiful flowers & shape of leaves. It propagates vegetatively at a phenomenal rate and spread all over the water bodies and has become a threat. Which plant is being referred to? 1
- 3) A few plants exhibit unusual flowering phenomena which flowers once in their life time and die. Suggest an evidence of the same from monocotyledon. 1
- 4) Identify A and B Label (1) and (2) in the given figure 1



- 5) The Nilgiris belt form the large blue stretches in the hilly areas of Kerala, Karnataka, & Tamilnadu and attracted a large number of tourists. What reason do you attribute to this phenomenal change of nature once in 12 years? 1
- 6) Why estrous cycle is not seen in humans? 1
- 7) All papaya and date palm plants produce flowers yet only few papaya and date palm seen to produce fruit. What could be the possible reason for the rest not producing them? 1
- 8) Often the number of male gametes produced in an organism is in large number as compared to female. Why has nature taken up this developmental disparity? 1

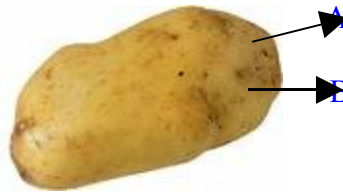
9) This figure shows fruit containing seed inside. Label S & P shown in fig. 1



10) In nature for both plants & animals, hormones are responsible for transitions between the three phases of reproduction. Which 3 phases are being referred to here?1

2 marks

11) Label A and B and write the type of the vegetative propagule. 2



12. (i) Though ginger is found under the soil. Yet it is not a root, but stem. Justify your answer with two reasons.

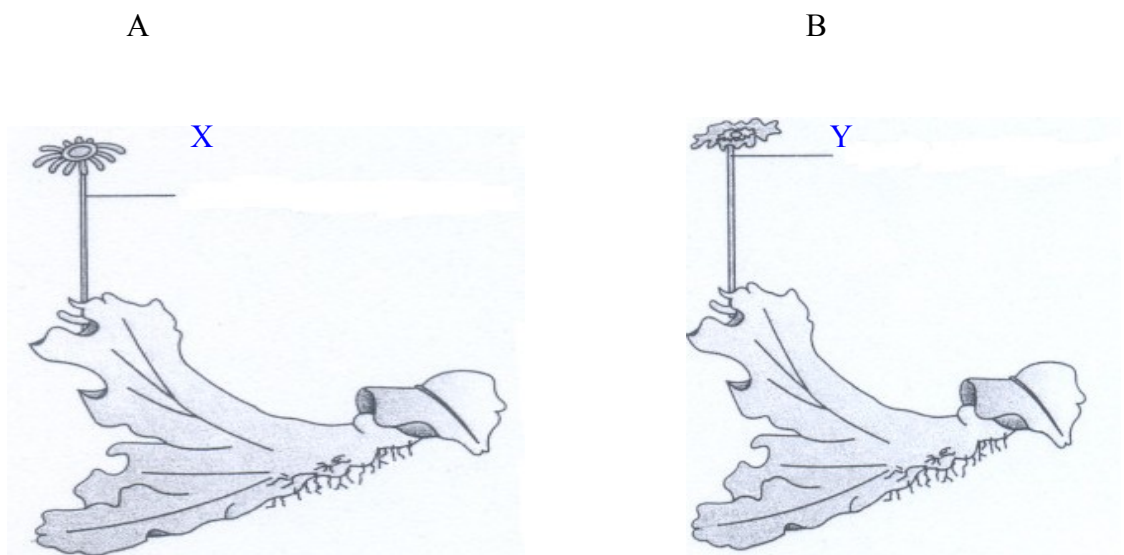
(ii) What are the specialised cells which undergo meiosis in the diploid organisms, called as?

13) Why can't man be oviparous? Justify the statement. 2

14) (i) Name the process of development of embryo from the zygote. 2

(ii) What are the two changes which the zygote undergoes during this process?

15) Label the figures A and B and also mark X and Y. 2

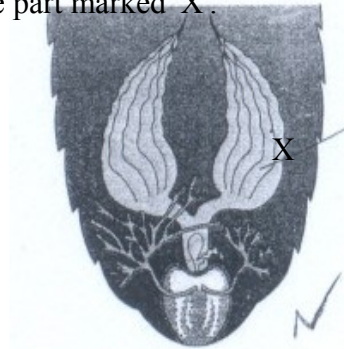


16) Why dogs and cats have oestrus cycle but human beings have menstrual cycle, though all are mammals? 2

17) In bisexual flowers, why is the transfer of pollen grains easier than in unisexual flowers? Name the specialized event in unisexual flowers which helps in transfer of pollen. 2

18) Can we refer the off -springs formed by asexual reproduction, as a clone? If yes, why? 2

19) The posterior end of cockroach shows the following structures. Mention if it is a male or female. Also label the part marked 'X'. 2



20) Arrange the following events in proper sequence:- 2

- (a) Embryogenesis
- (b) Fertilization
- (c) Gametogenesis
- (d) Zygote formation.

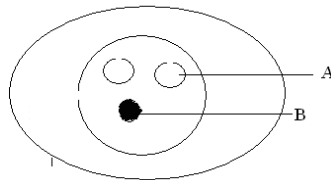
What will happen if meiosis does not take place during gametogenesis?

## Chapter-2.

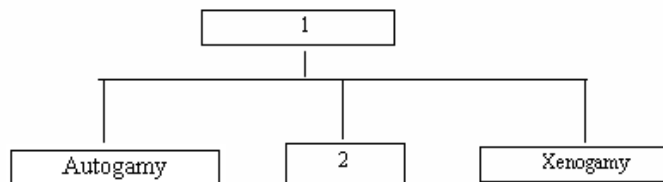
### SEXUAL REPRODUCTION IN FLOWERING PLANTS.

#### 1mark

- 1) Do pollen grains survive in adverse conditions? 1
- 2) Non- albuminons seeds do not have endosperm, then from where do they take the food during germination? 1
- 3) T.S. of anther shows four layers in the wall-epidermis, endothelium, tapetum and middle layer, Arrange them from outermost to innermost. 1
- 4) Identify the figure given below and label the parts indicated in the figure. 1



- 5) Complete the flow chart. 1



- 6) If the number of chromosomes in the leaf cell of a flowering plant is 28, What number would you expect in the embryo and endosperm? 1

2 marks

- 7) (a) "The microspore is haploid while that of microspore mother cell is diploid" comment. 2

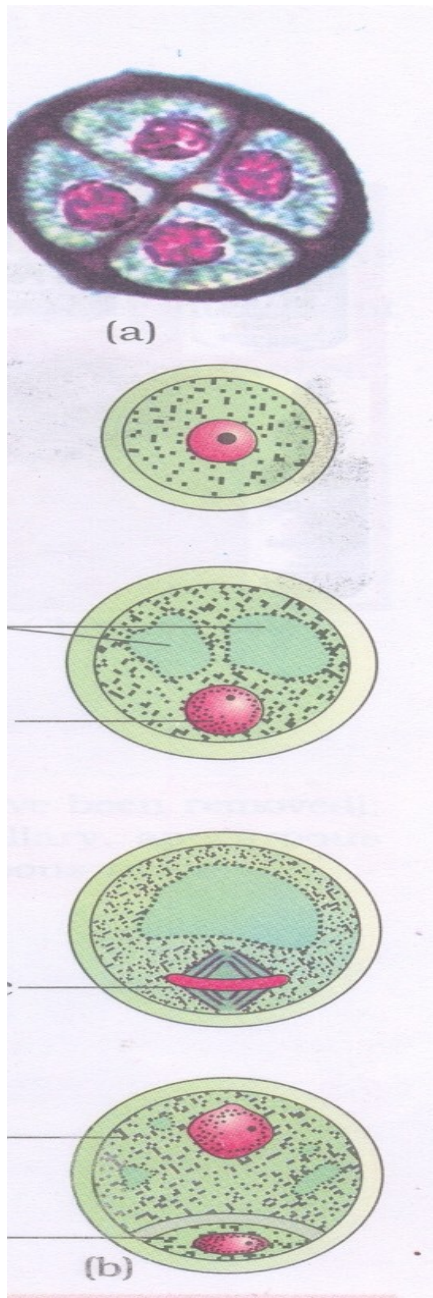
(b) How many male gametes and female gametes are produced by?

(i) Five microspore mother cell (ii) Five megaspore mother cell

8) (a) what is the process shown in the diagram given below?

(b) Name the structure at (a) of the figure given below

2



9) Why do you think that the zygote is dormant for some time in a fertilized ovule? 2

10) What will be the fate of ovule if the synergids are absent in the embryo sac? 2

11) Your friend would like to cross-pollinate the bisexual flower. How can you guide him to be successful in his experiment? 2

12) How does the flower of maize and cannabis are pollinated? What are the features found in these flowers for such type of pollination? 2

3 marks

13) Generally nucellus does not persist in mature seeds. Cite two examples which show persistence of nucellus in the seed and what name is given to the persistent nucellulus?3

14) If one can induce parthenocarpy through the application of phytohormones, which fruit would you select to induce parthenocarpy and why? 3

5 marks

15) A student wants to know the ploidy of coconut. After studying its different parts he inferred the ploidy of the following parts. Check whether the student is correct. 5

(a) Water inside the fruit-n

(b) White Kernal-2n

(c) Seed coat-n

(d) Embryo-3n

(e) Tepal-2n

## Chapter- 3-HUMAN REPRODUCTION

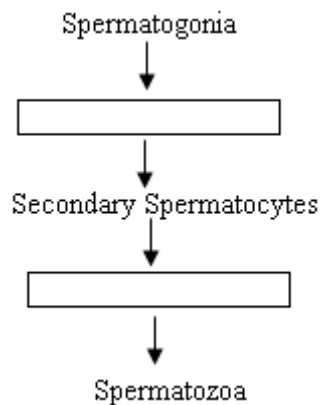
1 mark

1) Zygote undergoes mitosis to form 16 celled stage of embryo. What is it known as? 1

2) Name the important mammary gland secretions that help in resistance of the new born baby. 1

2 marks

1) Fill in the boxes 2



2) Why does fertilisation take place in fallopian tube and not in uterus? 2

3) Which cell organelle is present in the neck of the sperm? What is its significance? 2

4) Failure of fertilisation leads to menstruation. Explain. 2

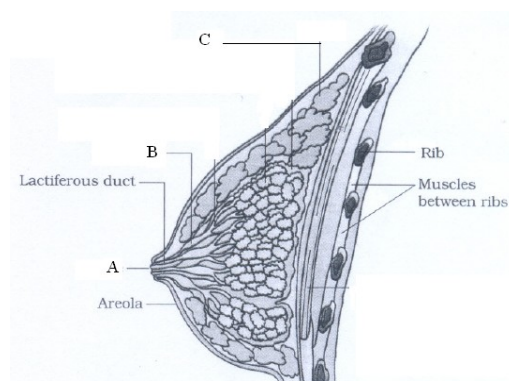
3 marks

1) How does the ovum ensure that only one sperm fertilizes it? 3

2) Name the part of the female reproductive system where the embryo is implanted. Mention the type of tissue by which it is made up of and give their functions? 3

3) What is the fate of inner cell mass in the blastocyst? Mention their significance. 3

4) Label a,b,c in the following diagram. 3



**5 marks**

- 1) Give the term / reason 5
- a) Mechanism responsible for parturition.
  - b) Role of oxytocin during expulsion of the baby out of uterus
  - c) Why does zona pellucida layer block the entry of additional sperms?
  - d) Sperm cannot reach ovum without seminal plasma.
  - e) All copulations do not lead to fertilization and pregnancy.
2. Women are often blamed for giving birth to girl child in our society. What is your view? 5
3. Furnish the technical term for the following: 5
- a) Cushion of fatty tissue covered by skin and pubic hair in female external genitalia.
  - b) The finger like projections which collect ovum after ovulation
  - c) The middle thick layer/wall of uterus
  - d) Semen without sperm
  - e) The finger-like projections appearing on the trophoblast after implantation.

**Chapter- 4**  
**REPRODUCTIVE HEALTH**  
**1MARK**

1. A large number of couples are said to be infertile. The couples could be assisted to have children through certain special techniques. Name the techniques. 1
2. At what stage Zygote can be introduced in the fallopian tube in Zygote Intra Fallopian Transfer (Z.I.F.T)? 1
3. A woman's husband is infertile. So the lady has decided to have baby by taking sperms from sperm bank. Which technique will you suggest for her pregnancy? 1
4. A newly married couple does not want to produce children at least for one year and also not to use any contraceptives. Suggest a method to prevent pregnancy. 1
5. A doctor has been observed the chromosomal disorders in developing foetus and advised the couple to undergo abortion. suggest the technique by which doctor absorbed the chromosomal disorders. 1
6. What precautions a lady can take to prevent unwanted pregnancy? 1
- i) Name the barrier
- ii) Mention the composition of it.

**2 marks**

1. During lactation chances of conception are almost zero. 1+1=2
- (i) Give the reason
- (ii) Give the term used to describe the phenomenon.
2. Following table gives certain terms associated with ARTS  $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$

Fill in the spaces a,b,c and d.

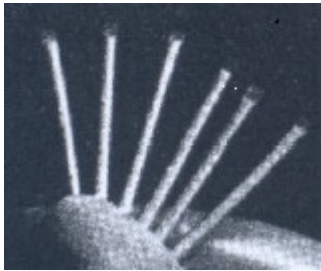
S.NO	COLUMN I	COLUMN II
1	IVF and ET	a

2	b	Introduction of Zygote or embryo with 8 blastomers into Fallopian tube.
3	c	Introduction of ova of a donor into Fallopian tube.
4	I.U.T.	d

3.A barrier method prevents conception is said to be, user friendly, easily available and prevent STD's. 1+1

3 marks

1. (a) Identify the given diagram. What it is used for? 3



## Chapter 5. PRINCIPLES OF INHERITANCE AND VARIATION

1) The following table shows the genotypes for ABO blood grouping and their phenotypes .

Fill in the gaps left in the table..

2

S.NO	Genotype	Blood Group
1	$I^A I^A$	A
2	<input type="text"/>	A
3	$I^B I^B$	B
4	<input type="text"/>	B
5	$I^A I^B$	<input type="text"/>
6	<input type="text"/>	O

2) A homozygous green seeded plant is crossed with yellow seeded plant. The progeny obtained was half yellow seeded and half green seeded .

2

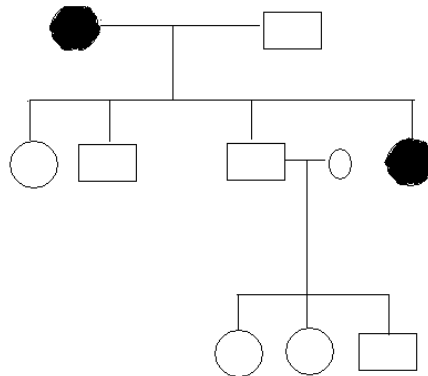
i) Write the genotype of yellow seeded progeny.

ii) Write the technical name of the cross.

3 MARKS

1) In the following pedigree chart, state if the trait is autosomal dominant, autosomal recessive or sex linked. Give a reason for your answer

3



2) A man with blood group A married a woman with B group, they have a son with AB blood group and a daughter with blood group O, work out the possibility of inheritance with the help of a Punnet square.

3

3) In a hybrid cross the following recombination frequencies are observed, i.e. 10%, 22% and 6% of recombinants.

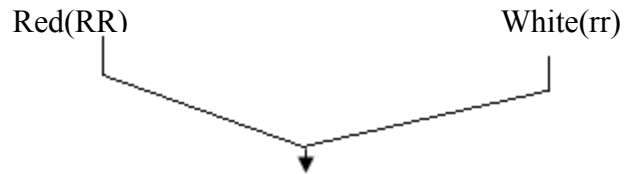
3

i) How is this recombinant percentage related to the loci of the gene responsible for recombinants.

ii) Which phenomenon is associated with this?

5 MARKS

1) Two plants (snapdragon) with red flowers and white flowers are crossed and the following results are shown: 5



F<sub>1</sub> generation: All pink flowers

i) What phenomenon is shown in F<sub>1</sub> generation?

ii) Write the genotype of F<sub>1</sub> and phenotype of F<sub>2</sub> generation.

iii) What is the phenotypic and genotypic ratio of the F<sub>2</sub> generation?

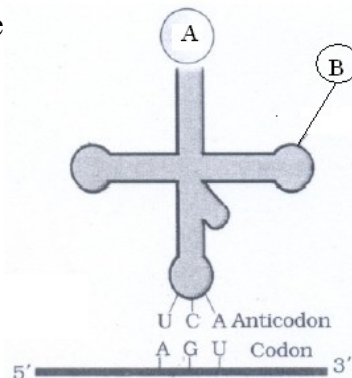
iv) With the help of a punnet square illustrate the result.

## QUESTIONS:

- 1) Name the Amino acid residues of histones. 1
- 2) What function does B-galactosidase carry out? 1
- 3) Which factor determines the coding strand and the template strand? 1
- 4) Why only one mRNA is produced in transcription? 1
- 5) Why the strand 5'-3' is called coding strand though it does not take part in transcription? 1
- 6) What are ESTs? 1
- 7) DNA is a polynucleotide characterised by two types of peaks. Which peak is known as satellite DNA? 1
- 8) A criminal case of 10 years old was registered for investigation. What samples they might have tested? 1
- 9) A particular human gene has the largest number of bases. Identify it. 1
- 10) Isolation, digestion and separation of DNA in a specific gene. Name the technique. 1

### 2 Marks

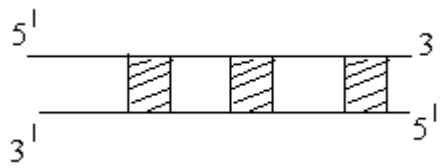
- 11) Three enzymes required for metabolism of lactose, what would happen to the machinery of the operon if mutation occur in z-gene. 2
- 12) A point mutation leads to adverse change in the function of hemoglobin (B-globin chain). Identify the disease that may occur due to this mutation. Mention the change of amino acids in the polypeptide due to this mutation. 2
- 13) i) Label the amino acid at A, and write the name of RNA s below. 2  
ii) Name the proce



### 3 Marks

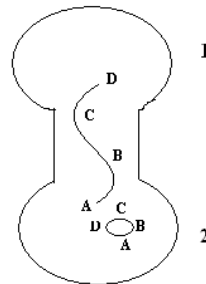
- 14) One student has drawn mRNA but he made some mistake in codons 3





- i) Will the whole gene be transcribed in RNA primarily?
- ii) Name the shaded & unshaded part to the gene.
- iii) Explain how is gene expressed.
- iv) How is this gene different from prokaryotic gene in its expression?

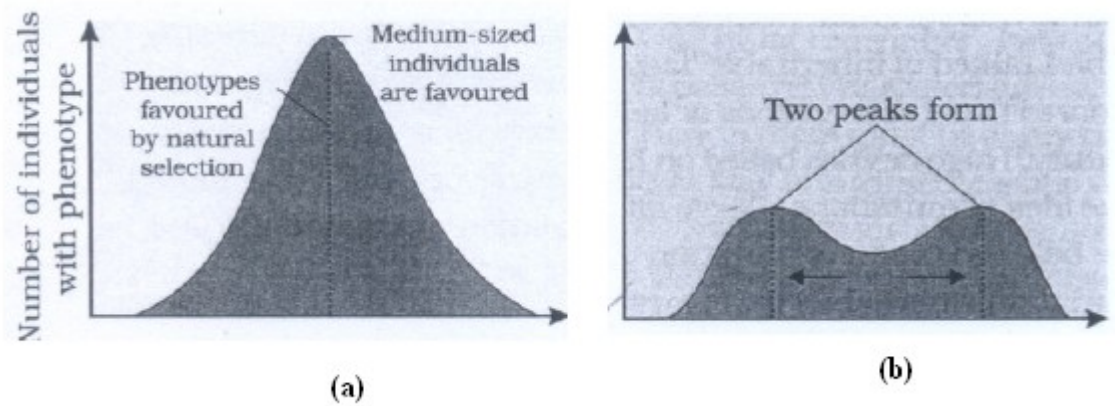
20) Given below schematic representation of two interacting bacterial cells.



- i) Name the bacterium and describe the process illustrate.
- ii) What is the use of such process in genetics?
- iii) Which of two cells act as male?
- iv) Draw a labeled diagram of stage immediately next to the one shown here.

## Chapter7. EVOLUTION

1) Study the figures (a) and (b) given below and answer the question given after the graph 3



i) Under the influence of which type of natural selection would graph (a) become like graph (b) 3

ii) What could be the likely reasons of new variations arising in the population?

iii) Who suggested natural selection as a mechanism of evolution?

2) In England, after industrialization it was observed that white winged moth did not survive. 3

i) What you think the cause may be?

ii) What was the change and why it has happened?

iii) Which organism is known as natural indicator to air pollution?

3) Study the following pairs of organs and identify them as homologous or analogous organs: 3

i) Thorns of Bougainvillea and cucurbit tendrils.

ii) Fore legs of horse and arms of man

iii) Wings of bat and butterfly

iv) Flipper of whale and fins of fish

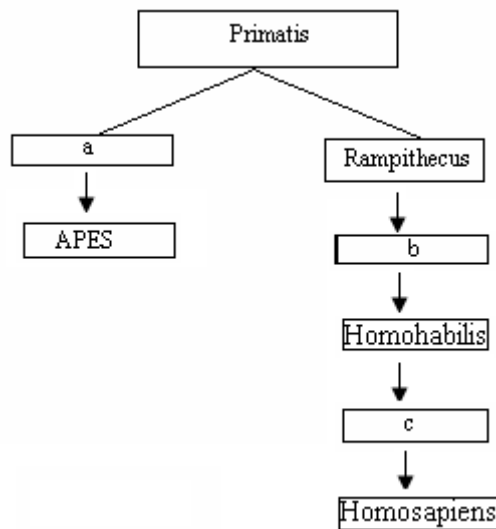
v) Trunk of elephant and human nose.

4) Complete both columns representing evolutionary history of vertebrates, through geological periods. 3

	<b>Geological</b>
<b>Vertebrates</b>	<b>period(300-350)</b>
Early Reptilis	
	Jurassic(150)
	Tertiary (50)

5) Fill up the missing sequence in the evolution of man

3



6) Trace the evolutionary stages of any one bird or animal using various resources such as internet, library etc.

2

7) Sometimes the change in allele frequency is so different in the new sample of population that they become a different species. State the factors known to affect Hardy Weinberg equilibrium.

2

8. Can we call the human evolution as an example of adaptive radiation? 1

## Chapter-8. HUMAN HEALTH AND DISEASE

1) A person's nails and lips turn grey to bluish. Find out the disease he is suffering from. Name the pathogen.

1

2) A group of viruses infect only nose and the respiratory passage but not the lungs.

Mention the disease and its causative organism. 2

3) The health department would like to control malaria without using chemicals in any form.

Being a student of Biology what method would you suggest? 1

4) Only Female Anopheles mosquito acts as a vector? Why? 1

5) Name the missing organisms/ diseases in the table given below. 2

Organism	Disease
Microsporium	A
B	Elephantiasis
C	Amoebiasis
Plasmodium falciporam	D

6) Why do children of metro cities of India suffer from allergies and asthma? 2

7) A doctor injects preformed antibodies against a snake bite. What type of immunity does it develop in the patient? 1

8) A person has developed allergic reactions like sneezing, watery eyes, running nose and difficulty in breathing. What could be the reason for these symptoms? How can it be controlled? 2

9) A patient has lost his immunity. 3

(i) Name the disease associated with it.

(ii) Name the confirmatory test to diagnose the disease.

(iii) Why did he lose his immunity?

10) A person claimed that he has seen sounds, heard colours and smelt light. 3

(i) What could be the possible reason?

(ii) Name two chemicals responsible for this condition.

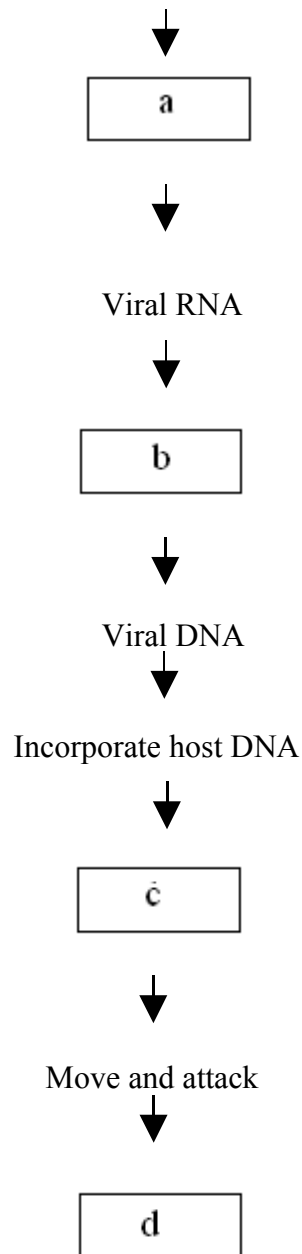
(iii) Mention any one source for these chemicals.

11) Complete the following flow chart showing replication of retrovirus. 2

HIV



Viral RNA



### Chapter-9.

#### STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION

- 1) Which process decreases fertility and productivity in crops? 1
- 2) Why do we use apical and axillary meristems for tissue culture? 1
- 3) Name the technology which in addition to tissue culture techniques play a pivotal role in enhancing food production. 1
- 4) Why mutation breeding is necessary for producing disease resistance? 1
5. What is the reference material for comparison of any new improved variety? 1

6. Why hybrids of selected parents are self pollinated till a state of homozygosity? 1
7. Name the parents of hisardale. 1
8. For which amino acids maize is biofortified ? 1
9. To which micro organism is Parbhani Kranti resistant and give the botanical name of it ? 1
10. Which are the characters will you look for, to confirm that the plant given to you is a pest resistant? 1
11. Why the breeding programme for millets is mainly focused for the development of high yielding varieties? 1

1

2 Marks

- 1) Name the pest organisms for which Pusa stem- 2 & pusa stem – 3 are prepared as pest resistant recombinants 2
  - 2) The somatic hybrid of tomato & potato is 'pomato' but it is not grown on commercial scale. Why? 2
  - 3) To which products are the following related? 2
- a) Green revolution
  - b) Blue Revolution
- 4) Complete the following missing steps and aims in the breeding of new genetic variety of a crop. 2

**Step**

**Aim**

- |   |  |
|---|--|
| a. _____  | -collection of pre-existing genetic variability        |
| B. Pure line creation                             | -To evaluate and select parents.                       |
| c. _____  | -To combine the desired characters of different plants |
| d. screening the superior combinant               | _____  |
| e. Release and commercialization of new cultivars | _____  |
- 5) How is outcrossing different from cross breeding? 2
  - 6) How was Parbhani kranti created? 2
  - 7) Which of the following crop plants are not matching as correct pairs? 2
- a. Wheat - Himgiri
  - b. Brassica- Pusa Gaurav
  - c. Cauliflower- Pusa Shubra
  - d. Chilli-Pusa swarnim

8) Complete the following table

2

Wheat	A	Resistant to leaf and stripe rust
B	<i>Pusa swarnim</i>	Resistant to white rust
<b>Cauliflower</b>	C	Resistant to black rot &
<b>Q</b>	<i>Pusa sadabahar</i>	E

3 marks

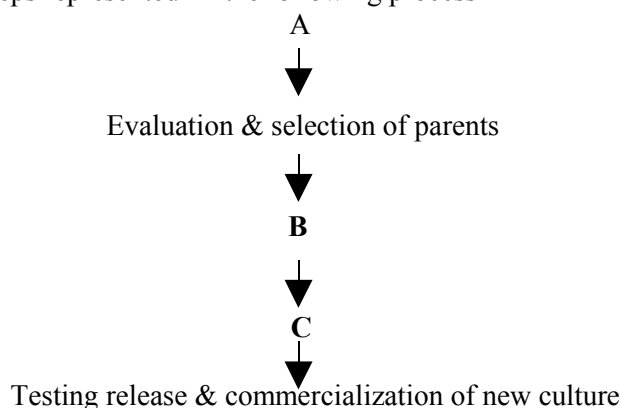
1). "Artificial insemination helps overcome several problems of normal mating"-

Justify the statement and list a few of them.

3

2) Name the steps represented in the following process

3



3). Match A with B

3

- A
- i) Turnip Mosaic
  - ii) Citrus canker
  - iii) Sugar cane red rot

- B
- a) Bacteria
  - b) Virus
  - c) Fungi

4) Following are the steps for breeding process. Arrange them in correct order, name the process & state its advantages.

3

- a. The female is mated with a male of good variety
- b. The fertilized egg at 8-32 called stage are recovered & transferred to surrogate mother.
- c. The female is administered hormones to induce super-ovulation.

## Chapter 10. MICROBES IN HUMAN WELFARE

1 mark

1) Drinks like Whisky and Rum are more intoxicating than wine. Why? 1

2) Can we imagine a world without antibiotics? Explain briefly. 1

3) Bottled juices are clearer compared to homemade juice. Give reason. 1

4) Which one of these is a proteinaceous infecting agent? 1

a) Viroids, b) prions, c) protorn, d) wat.

- 5) An organic farmer requires a bio control agent which is species specific and has no negative impact on non-target organism. Suggest the name of such a bio control agent. 1
- 6) Scientists have succeeded in introducing toxin gene of *Bacillus thuringiensis* into plants like cotton. What purpose is achieved through this action? 1
- 7) A small amount of curd was added to cold milk for converting it into curd. But milk did not get curdled. Why? 1
- 8) Consuming curd keeps the gastro-intestinal tract in tact. Give reason. 1
- 9) On fermentation the dough of idli and dosa puffs up. Which metabolic pathway is responsible for this process? 1
- 10) How do lactic acid bacteria help in increasing the nutritional quality of curd?
- 11) The excreta of cattle do not contain any cellulose but human excreta may contain cellulose. Why? 1
- 12) Antibiotics are always sold in combination with *Lactobacillus*. Why? 1
- 13) Why are some microbes useful in detergent formulation? 1
- 14) Microbes release gases during metabolism. How will it help in the production of energy? 1
- 15) Why does 'Swiss-cheese' contain large holes?. 1
- 16) In what way the relationship between BOD and organic matter in Sewage will be useful in ecology?
- 17) Why do bottled fruit juices appear clearer than the home made ones?
- 18) What is the principle behind the conversion of milk into curd and partial digestion of milk protein performed by Lactic Acid Bacteria?
- 19) Wine and beer are different from whisky and brandy though they are all alcoholic beverages. What is the name of the process that brings out this difference?
- 20) Name the group of bacteria that are capable of living at high temperature above 100°C. How does it become possible by these bacteria?(1/2+1/2)
- 21) Why do doctors prescribe Streptokinases for brain hemorrhage patients?  
Mention the source of industrial production of this biomolecule.(1/2 + 1/2)
- 22) How are the holes produced in bread and cheese?

**2marks**

1) A farmer was suggested to apply certain microbial culture in his field to increase the yield. Suggest the types of microbes he could use in his paddy field and how do they help in increasing the yield. 2

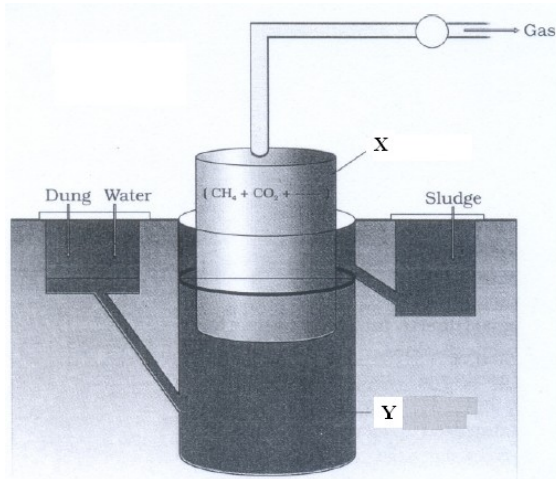
2) It was observed that certain plant roots are infected by fungus. in spite of this infection the plant showed increased growth and development. Give reason.2

3) Arrange the steps in sewage treatment in proper sequence. 2

- a) Anaerobic sludge digestion
- b) 'Floc' formation
- c) Primary effluent in aeration tank
- d) Formation of biogas
- e) Constant agitation in presence of oxygen.
- f) Digestion by anaerobic bacteria

4) Bacteria that convert effluent into activated sludge play one more beneficial side. Mention the role

5) In the given figure label X & Y and explain the functioning of the below plant.



6) How does Monascus help in lowering blood-cholesterol?

7) Complete the given table

<b>Name of the organism</b>	<b>Product/Enzyme/Bioactive molecule</b>
Aspergillus niger	(i)
(ii)	Ethanol
(iii)	Cyclosporin-A
(iv)	Acetic acid
Monascus purpureus	(v)
Streptococcus	(vi)

3 marks

1) For what significant properties the Baculoviruses are considered as best Biological control agent?. Mention its importance in organic farming.

2). Give one example and one use of the following:-

- i) Free living fungi
- ii) Symbiotic fungi
- iii) Free living bacteria

### **5 Marks**

1) Why is organic farming favoured these days? Describe the methods employed in the process.

2.) (i) Three water samples namely river water, untreated sewage water and secondary effluent discharge from a sewage treatment plant were subjected to BOD test. The samples were labeled A, B and C but the lab attendant did not note which BOD is for which water. The BOD values of three samples A, B and C were recorded as 20mg/L, 8mg/L and 400mg/L respectively. Which sample of the water is most polluted? Can

you assign the correct label to each, assuming that the river water is relatively clean.  
(1)

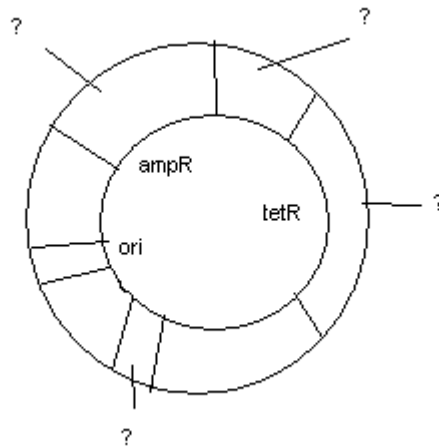
(ii) Which is not a tool of Recombinant DNA technology.

- a) Restriction enzyme
- b) Vector
- c) Bioreactor

(1)

(iii) Label the following diagram & Identify the selectable markers

(2)

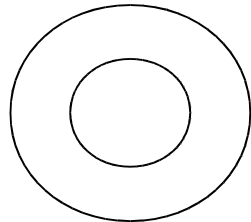


(iv) What is the role of polymerase?

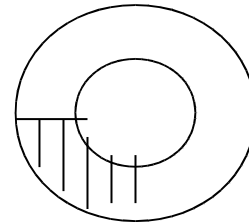
(1)

1 Restriction Enzymes are called “Molecular scissors”. In what context they are referred so?

2 In what way the following two plasmids differ? 1



A



B

3. What is the source of thermostable DNA polymerase and Name that polymerase. Why thermostable DNA polymerase is essential in PCR? 1

4 “The prophase I of meiosis plays a vital role in r-DNA formation” Justify the statement.1

5 Eukaryotes do not have restriction endonuclease, then how they manage with normal endonuclease enzyme?1

6 What special feature do prokaryotes have to defend themselves from bacteriophages?1

7 \_\_\_\_\_ = Denaturation + \_\_\_\_\_ + Extenton.1

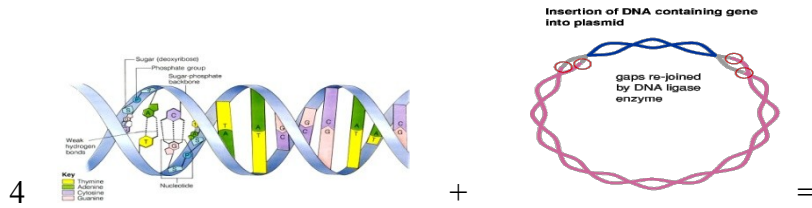
8. Complete the following palindrome sequence and name the restriction endonuclease that recognises this.1

5'	G	?	A	?	T	C	3'
3'	C	?	T	?	A	G	5'

1) Is advisable to use different restriction endonucleases to cut the vector DNA and source DNA? Why? 2

2) What will happen if more than one recognition sites are present in a vector?2

3 Uncontrolled recombinant DNA technology experiments is dangerous to mankind. Comment on it. 2



Foreign DNA + plasmid = .....??.....

Complete the above sequence of diagrammatic representation and name it.

5. (a) Which is the most commonly used matrix in gel electrophoresis ?

(b) What is the source of it?

6 Find the 'odd one out and write why that is 'odd'

(a) Sal I, Pst I, Cla I, BamH I, pBR 322

(b) Bacteria, Virus, Gene-gun, Fungi

7 Detect the mismatch from the following and replace the wrong match with a right one

(a) ECOR I –Bacteria

(b) Ethidium Bromidqe- Gel electrophoresis

(c) Lysozyme- Fungi

(d) Palindrome sequence-Restriction enzyme

Resistant gene.

(b)Cellulose, \_\_\_\_\_, \_\_\_\_\_, fungus

8. Write the use of the following in Biotechnology.

(a) Chilled ethanol (b) Microinjection

(c) Bioreactor (d) plasmid

9. Is there any difference between recombinant DNA and recombinant protein? Support your answer.

**3 MARKS**

1. Give the correct term for the following; -

(a) Replacing a defective mutant allele with a normal functional allele / gene.

(b) Increasing the copies (content) of a gene

(c) Preventing m-RNA translation

(d) Specific pattern of base pairs that are recognized by restriction enzymes.

(e) Mobile genetic element

(f) One DNA copies itself and produces two

2. Name the enzyme involved in the following process:

(a) Repeated amplification of DNA fragments.

(b) Formation of short piece of RNA strand for annealing.

(c) Breaking of bacterial cell to release DNA and other macromolecules.

(d) Cutting and rejoining DNA fragments.

(e) Formation of m-RNA.

(f) Joining of foreign DNA fragments with plasmid.

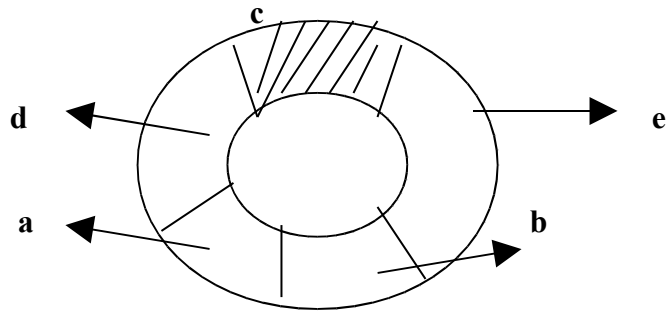
3. Explain the following, emphasizing their formation.

(a) rDNA

(b) cDNA

(c) dsRNA

4. Name the diagram and label the parts 'a' to 'e'.



**PART – D [5 MARKS EACH]**

1.

(a) Explain how recombinants and non-recombinants are differentiated on the basis of colour production in the presence of a chromogenic substrate. Name that procedure.

(b) Describe the temperature treatment (-3 step-) that enhances the bacteria to take up the rDNA.

1) "The Green Revolution has been achieved due to the use of improved crop varieties and agrochemicals, but it is still not enough to feed the growing population". Suggest a suitable method of agriculture to meet the demand. 1

2) A species of Solanum is intolerant to salty soil. How will you make the species tolerant to the given abiotic stress?. 1

3) Why do we use GM to create tailor made plants?. 1

**2 marks**

1) Some cotton plants grown by farmers are known as 'Bt cotton'. 2

a) What does Bt stand for?.

b)What is the advantage of this cotton plant?

c)How did scientists achieve this?

2) The bacillus is not killed even after the application of insecticidal protein which is toxic. Comment. 2

3) Bt toxins are insect group specific. The toxin is coded by a gene named cry. How does the genes cry IAc differ from cry IAb?

4) Dr.Arun developed a vitamin A rich potato through his research on genetics.

a)What do you call such potato plants? 2

b)Who can approve the validity and safety of introducing potato for public uses.

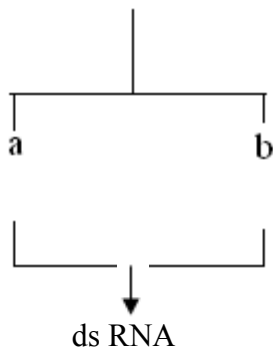
5) Nematode specific genes.

+

Agro bacterium



Host plant with nematode gene



↓  
C

- i) What is this technique of pest control called?
- ii) Specify a, b & c in the chart given.

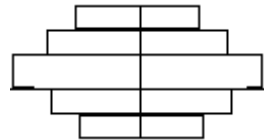
3 MARKS

- 1) A 4-year old girl suffered from ADA deficiency. 3  
she was cured by inserting a correct gene into her.
  - a)What is this process called?
  - b)In which cells are the genes introduced?
  - c) Name the vector used to introduce the gene?
- 2) Turmeric is being used as a traditional medicine by Indians for a long time.  
The genetic material of this species was taken out of the country and a hybrid variety created. This 'New' variety was claimed as an invention by them. 3
  - a)Do you think it is an invention?
  - b)How could we have restricted the movement of this material?
  - c)What term is used for such an act?
- 3) Indians have been producing and utilising basmati rice, turmeric, neem etc.  
how can they be protected from biopiracy? Who is authorized to amend the rule?

**Chapter13. ORGANISMS AND POPULATIONS**

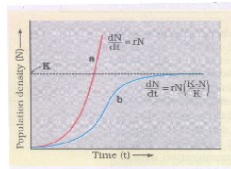
- 1) Most living organisms cannot survive at temperatures above 45°C. How are some microbes able to live in habitats with temperature beyond 100°C? 1
- 2) An orchid plant is growing on a mango tree. How do you describe the interaction between the orchid and the mango tree? 1
- 4) People living in higher altitudes have higher RBC count. Give reasons
- 5) Cattle or goats never graze on weeds of calotropis. Give reasons. 1

- 5) Two closely related species competing for the same resources cannot co-exist indefinitely. State the principle which supports this phenomenon. 1
- 6) What type of growth status the following pyramid represents 1



- 7) "Abingdon tortoise in Galapagos islands became extinct within a decade after goats were introduced in that island". Can you cite the possible reason for the same? 1 2 MARKS

- 1) Study the graphical representation shown below and mention the conditions responsible for the curves "a" and "b" respectively. 2



- 2)

$$\frac{dN}{dt} = rN \left[ \frac{K-N}{K} \right]$$

- a) Which type of growth curve does it represent?

b) What do the notations represent in the above equation?

3) Kangaroo rats can survive in the absence of an external source of water. How do they adapt themselves to such conditions? 2

4) Small animals are rarely found in Polar Regions. Give reasons. 2

5) If a marine fish is placed in fresh water aquarium, will the fish be able to survive? Why? 2

5) "Snow leopards are not found in Kerala forests and tuna fish are rarely found beyond tropical latitude in the ocean". Study the above two cases and states the possible reasons for the same. 2

3 MARKS

1) Mr. Ram on a trip to Rohtang Pass Suddenly experienced heart Palpitations, Nausea, fatigue etc on reaching the destination. Suggest the reasons for his sudden deterioration of health and also state Whether his body will withstand this problem if he stays there for long and how? 3

2) Anand on a visit through an under the ocean aquarium found that many sea anemones are attached to hermit crab shells, sucker fisher attached to the ventral surface of sharks and clown fish living among the sea anemones. He wondered whether all these associations are of the same type; can you help him to arrive at the correct conclusion. 3

## Chapter 14. ECOSYSTEM

1) How does the man made ecosystem differ from the natural ecosystem? 1

2) Detritus contribute to the biogeochemical cycles, how? 1

3) Can temperature regulate the rate of decomposition how? 1

4) The detritus food chain and grazing food chain differ. How? 1

5) As succession proceeds the numbers and types of animals and decomposers also change. How? 1

6) In burnt out Forests and flooded lands succession takes place faster. Why? 1

7) Sedimentary cycle is quite different from a gaseous cycle with respect to its reservoir. Bring out the difference. 1

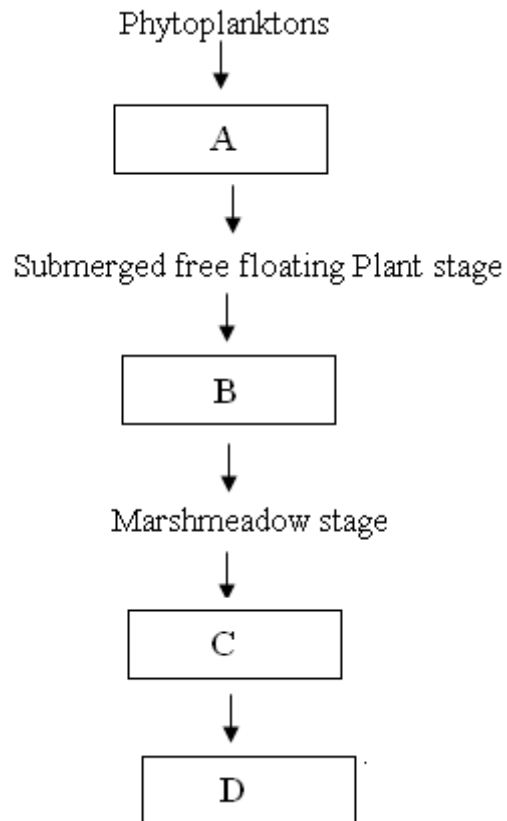
2 marks

1) "Flow of energy is unidirectional but nutrient flow is in a cycle" Give reason 2

2) "Decomposition is an oxygen requiring process" comment. 2

3) Some organisms are called top carnivores. Why? Give some examples. 2

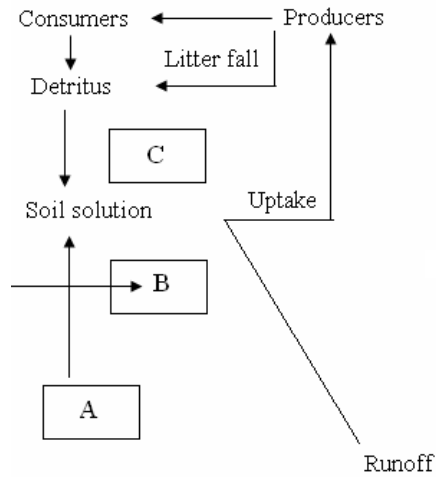
4) Given below is the primary hydrarch succession. Bring out the missing sere stages in the process 2



5) Given below is a simplified model of phosphorus cycle. Write down the natural reservoir of phosphorus and also the processes that put in phosphorus to

the soil.

1+½+½



3 marks

1) Both carbon and phosphorus cycles are biogeochemical cycles but they differ in three aspects. List them. 3

2) Ecosystems should carry a hefty price tag for its various services. Enlist six of them. 3

## Chapter -15. BIODIVERSITY

1 marks

1) a) India has more than 50000 different strains of rice and 1000 varieties of mangoes.

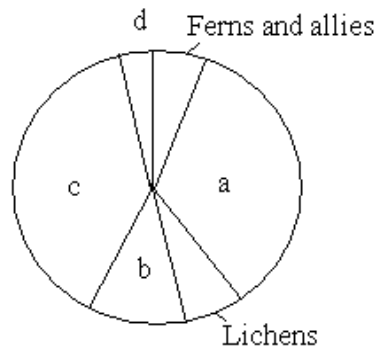
b) Western Ghats have a greater Amphibian diversity than the Eastern Ghats.

What do you infer from the above two statements?

2 marks

1)

2



Identify a,b,c and d in the above pie diagram showing global biodiversity of plants.

2) Columbia located near the equator has nearly 1400 species of birds while new york at 41° N has 105 species and Greenland at 71° N has only 56 species.

Comment. 2

3) Would the extinction of one insect pollinator affect the ecosystem? Explain 2

4) The species diversity of plants is much less than that of animals. What could be the reason for this and figure out how animals achieved greater diversifications? 2

5) Seeds of different genetic strains are kept for long periods in seed banks. Explain the conservative strategy involved in this process. 2

6) Amazon forests are regarded as "Lungs of the Planet". Why? 2

7) National parks come under 'in situ' conservation while Zoological parks under 'exsitu' conservation. comment. 2

8) There are 34 biodiversity hot spots in the world. What are the criteria of selection of such hot spots? 2

9) Lantana & Eichornia are examples of two weeds. How do they affect the ecosystem? 2

3 marks

1) Biologists are not sure about how many prokaryotic species there might be. Give reasons. 3

2) In an experiment, the slope of regression ( $z$ ) is 0.2 and in another experiment the value obtained is 1.2. Explain the two situations in respect of species area relationships. 3

3) Would Western Ghats ecosystems be less functional if one of its tree frog species is lost forever? Substantiate your answer in the light of hypothesis proposed by Paul Ehrlich. 3

## **Chapter16. ENVIRONMENTAL ISSUES**

**1 mark**

1).A factory drains its waste water into a nearby lake. What will be its effect on the lake after a few days?

2. The names of organisms in an aquatic food chain is given below. Give the organism having the maximum concentration of DDT. 1

Large fish-Zooplankton-fish Eating birds- small fish-phytoplankton.

3)The central pollution control board observed that a thermal power plant is emitting 80% of its particulate matter in the exhaust due to poor maintenance? What could be the cause for this increase in % of particular matter? 1

4) The birds egg shells become thinner in an area where there is an excess application of pesticides. Comment. 1

5) Motor vehicles with catalytic converter should use unleaded petrol. Why?1

6) Why should we be thankful to micro-organism present in domestic sewage?1

**2 marks**

1) Vehicles are fitted with catalytic converters. Give reason 2

2) It was observed that some of the aquatic birds' population has been declining. On analysis of the water in their habitat, high concentration of DDT was found

a) What caused the decline in birds' population?

b) What is this phenomenon known as? 2

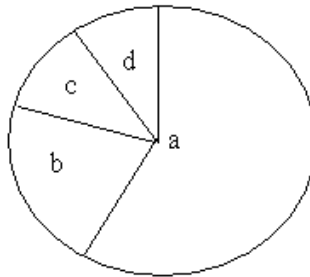
3) A man had a B. class Benz which has a very good catalytic converter. On his way the petrol was exhausted & he stopped at a petrol pump. The person at the petrol pump had only leaded petrol. Out of necessity the man had to fill leaded petrol in his car. 2

a) What is its impact on the catalytic activity of the converter?

b) Explain the impact on the environment.

4) A person has inhaled air having particulate pollutants of size less than 2.5 micrometers in diameter. What could be the impact of their pollutants on his respiratory system? 2

5) Mention the green house gases & their proportion in the pie diagram given below.2

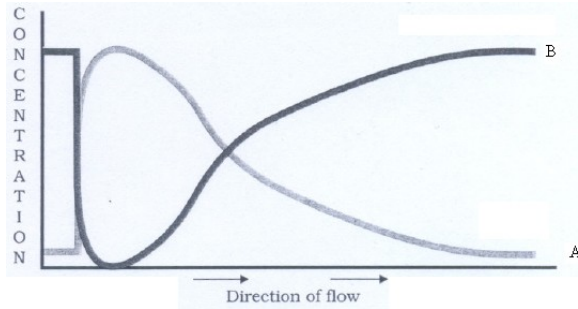


6) A farmer saw water in a pond turned green & with dead fishes. 2

a) What is the reason for the death of fishes?

b) Name the phenomenon that leads to the death of fishes.

7) (Fig 16.3 pg No. 274-biology text book for class xii)



In the above graph what does A & B depict?

2

8) The application of DDT for a long period resulted in the elimination of bird species from a locality. How does it happen? Explain. 2

9) Identify the wrong pair/s and correct it. 2

- a) Chernobyl incident-Radio active waste
- b) Snow blindness cataract- High dose of CFC
- c) Chipko movement- Save trees
- d) Polyblend-Solves air pollution.

10) Dumping waste in landfills is not a real solution for disposing wastes. Why? 2

11) Ramesh collected water samples on his boat-trip downstream along a river. On analysis it was observed that the dissolved oxygen content reduced initially and later increased gradually. Can you help him plot a graph on concentration of DO & BOD downstream? 2

3 marks

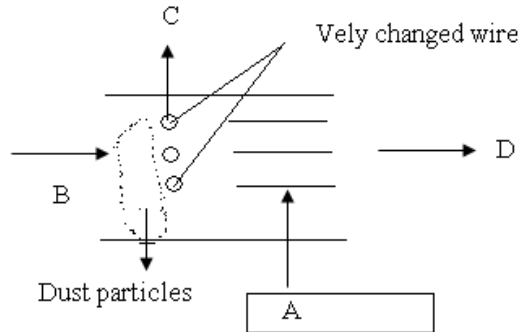
1) Many coastal areas may get submerged due to the environmental changes taking place at the present rate. Give the cause, and state two measures to check it. 3

2) Integrated organic farming is a cyclical zero waste procedure. Justify. 3

3) Ecosan toilets are a hygienic, efficient and cost effective solution to the disposal of human wastes. Justify. 3

5 marks

1) Observe the following figure carefully and answer the questions that follow.  
2+2+1=5



- Label the parts A, B, C & D
- What are the steps involved in the removal of particulate matter?
- How is it different from scrubber?

### **ANSWERS:1. REPRODUCTION IN ORGANISMS**

- Monozygotic twins develop from a single zygote. In rest of the individuals, the zygote develops directly into an individual.
- Water hyacinth. It grows in abundance as result oxygen depletion occurs.
- Bamboo.
- A- Penicillium 1. Conidia  
B-Sponge 2. Gemmules
- Its shows mass flowering of *Strobilanthus kunthiana*.

- 6) Man is an advanced animal, with more reproductive capacity.
- 7) Papaya and date are dioecious plants.
- 8) Male gametes are motile in nature and they are destroyed.
- 9) S- Seed, P-Protective pericarp.
- 10) a) Pre-fertilization    b) Post-fertilization    c) Embryogenesis
- 11) A-Eyes    B-Germinating eye bud    Type-Tuber
- 12) (i) It is a modified stem and has nodes, internodes and bud.  
(ii) Cell division and cell differentiation.
13. Man is a placental animal having adaptation to give birth.
14. i)Embryogenesis ii)cell differentiation and organogenesis
- 15) Parts of fig-X-Archegoniopore  
Y-Antheridiophore  
a- Female thallus of marchantia  
B-Male thallus of marchantia.
- 16) Dogs and cats are seasonal breeders having heat period during which ovulation takes place but human females have this cycle every month.
- 17) Both the reproductive organs stamens and pistils are present in the same flower close to each other but in unisexual flower they are present in two different flowers.    ii) Pollination
- 18) Yes, since all the organisms are exactly similar to the parents.
- 19) The figure indicates part of female cockroach, name of the part- ovary.
- 20) Gametogenesis, fertilization, zygote embryogenesis.  
Gametes will be diploid.

## **Answers 2: Sexual Reproduction In Plants**

- 1) Yes, sporopollenin is present in exine  
which is not digested by enzymes.
- 2) They take food from cotyledons
- 3) outer most- Epidermis  
Endothecium  
Middle layer

Inner most. Tapetum

4) A. vacuoles

B. Nucleus

Development of pollen grain

5) (i) Pollination

(ii) Geitonogamy

6) Embryo - 28

Endosperm - 42

7) (a) MMC undergoes meiotic division to form microspores.

(b) (i) Male gametes-20

(ii) Female gametes-5

8) (a) Microsporogenesis

(b) Pollen grain tetrad.

9) Zygote divides only after the formation of endosperm because endosperm nourishes the developing embryo.

10) Synergids have filiform apparatus at the micropylar end which guides pollen tube into the egg apparatus, otherwise pollen tube may not enter to embryo sac, no fertilization.

11) Emasculation followed by artificial pollination, i.e. Pollens of selected plants have to be dusted on the stigma before bagging the flower.

12) By Wind

(i) Pollen grains are dry, light, produced in large quantity

(ii) stigma is hairy and feathery

13) (a) Black pepper and beet

(b) Perisperm

14) Orange, lemon, watermelon, Guava etc.

These seedless fruits are economically important

Commercially viable for horticulturists.

15)

(a) 34

(b) 34

(c) 24

(d) 24

(e) 24

### **Answers -3. Human Reproduction**

#### **One mark**

1. Morula
2. Colostrum

#### **Two mark questions:**

1. a) Primary spermatocytes  
b) Spermatids
2. The pH is not suitable for fertilization in uterus.
3. Mitochondria

It produces energy for the movement of tail that facilitates sperm motility essential for fertilization.

4. In the absence of fertilization corpus luteum degenerates. This causes disintegration of endometrium leading to menstruation.

**Three marks**

1. During fertilisation a sperm comes in contact with Zona pellucida layer of the ovum & induces change in the membrane that block entry of additional sperms. Thus it ensures single sperm entry.

2. Uterus

Uterus is made of three tissue layers \_\_\_\_\_

- a) External thin membranous layer\_\_Perimetrium
- b) Middle thick layer of smooth muscle\_\_Myometrium
- c) Inner glandular layer\_\_Endometrium.

Endometrial layer undergoes cyclic changes during menstrual cycle. Myometrium exhibits strong contraction during delivery of the baby.

3) The inner cell mass of embryo differentiates into

- i) Outer layer----Ectoderm
- ii) Inner layer----endoderm
- iii) Middle layer----Mesoderm

These three layers give rise to all tissues (organs) in adults.

4.a). Nipple

b). Ampulla

c). Fat

**Five marks**

1. a) complete neuro-endocrine mechanism

b) Oxytocin acts on uterine muscle for stronger contraction

c) To ensure the fusion of one sperm

d) Seminal plasma is a liquid medium which helps the sperm to move & nourishes it.

e) The movement of sperm and ovum does not occur simultaneously many times.

2. The belief is totally wrong.

It is the probability of X or Y chromosome combination that decides the sex of the child.

Detail in page 52 of NCERT class xii (sex determination)

Chromosome Y decides the sex.

3. a) Mons pubis

b) Fimbriae

c) Myometrium

d) Seminal plasma

e) Chorionic villi

#### **chapter-4. Reproductive Health**

##### **Answers 1 MARK**

- |   |   |
|---|---|
| 1. Assisted reproductive technologies(ART)  | 1 |
| 2. 8-celled stage                           | 1 |
| 3. Intra cytoplasmic sperm injection(ICSI)  | 1 |
| 4.Periodic abstinence or coitus interruptus | 1 |

5. Amniocentesis 1

6. Pills (Progestogen-estrogen combination.)or Progestogen

2 MARKS

1. a) Ovulation does not take place

b) Lactational amenorrhea.

1+1

2. a-In vitro fertilization and embryo transfer

b-Z.I.F.T

c- GIFT

d-Intra uterine insemination

3.a) Condom

b) Latex/rubber

3MARKS

1. Implants

Functions

1+1+1

i) They contain progestogens or progestogen. estrogen combination

ii) They inhibit ovulation and implantation of embryo to the uterine wall.

.

### 5. Principles of Inheritance & Variation

#### ANSWERS:

2 Marks

1)  $I^A_i, I^B_i, AB, ii$

2) It is a back cross. The genotype of yellow seed is Yy.

3 Marks

1) The trait is autosomal dominant. The dark circle character is on autosomal dominant character in the heterozygous condition. The progeny is 1:1

2)

♀	A	O
♂	AB	BO
	AO	OO

3. i) More the recombination frequency percentage more recombinant varieties..ii) linkage.

**5 Marks**

1.i) Incomplete dominance.

ii) Genotype  $F_1 = Rr$

Genotype  $F_2 = 1RR : 2 Rr : 1rr$

iii) Phenotypic ratio Red : Pink : White

1 : 2 : 1

iv)  $F_1 \quad Rr \quad \times \quad rr$

Gametes

♂	R	r
♀	R	Rr
r	Rr	rr

1 RR- Red

2 Rr-Pink

1 rr-White

Gametes

♂	R	r
♀	R	Rr
r	Rr	rr

**ANSWERS:**

1) Lysine and Arginine.

2) It hydrolyses lactose into galactose and glucose.

3) The polarity 3'-5' determines the template strand and 5'-3' and determines coding strand.

4) Template strand only is involved in transcription.

5) All the reference point is made with coding strand.

- 6) Expressed sequence Tags is one of the methodologies involved in Human Genome project.
- 7) Small peaks are referred as satellite DNA.
- 8) A sample of hair follicle or bone.
- 9) Dystrophin-2.4 million bases.
- 10) PCR/DNA finger printing
- 11) Z-gene can not produce beta-galactosidase. Hint- NCERT-page 116& 117
- 12) Sickle cell anemia, glutamate to valine  
NCERT page -113
- 13) i) A- Methionine, B-.t-RNA ii) Transcription  
hint:-NCERT Page-114
- 14) i) the initiating and terminating codon changed.  
ii) AUG as initiating codon, UGA- terminating codon.  
hint-NCERT page 115.
- 15) A-Hydrogen bond between base pairs. B-Phosphate and sugar bonds. C- Bond between sugar and basis  
hint:-NCERT page-96
- 16) The biological father can be identified by DNA finger printing technique.  
( NCERT TEXT BOOK - page 121)

$$\frac{\text{No. of base pair in Mammalian cell}}{\text{Base pairs in one nucleosome}} = \frac{\text{No. of Nucleosome}}{\text{Nucleosome}}$$

$$\frac{66 \times 10^9}{200} = 3.3 \times 10^8$$

Nucleosome

- 18) i) A-leading strand  
B-lagging strand.  
ii) DNA- replication  
iii) S-phase of the cell cycle.

Hint:- NCERT page 107

19)

ii) The shaded parts are introns and un shaded parts are exons.

iii) The primary RNA script undergoes splicing, in this process, the introns are removed exons are joined together to form m-RNA.

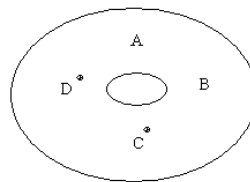
iv) In prokaryotes, the information is continuous and there is no need for splicing, the entire DNA is transcribed into RNA.

20) i) E. coli, The figure illustrate conjugation between Hfr cell and F cell, in which a portion of donor DNA has come into the recipient (F<sup>-</sup>cell). The conjugation bridge last only for a short period before the entire DNA move into the recipient, it breaks. It will be incorporated into recipient DNA by replacing an equivalent segment.

ii) it is one of the method by which genetic recombination is effected in bacterial cell.

iii) Hfr cell is the male (donor).

iv)



### Answers-7-EVOLUTION

1) i) Average single- stabilizing selection

ii) Directional selection

iii) Darwin

2) i) White winged moths disappeared as they were eaten up by predator.

ii) This change was due to darkening of trees bark on which moth lived due to industrial pollution. Moths could not camouflage and are thus eaten up by predators.

iii) Lichens

3) i) Homologous

- ii) Homologous
- iii) Analogous
- iv) Analagous
- v) Homologous\_

#### **4)Vertebrates**

#### **Geological Periods**

Therapsidus

Carboniferous

Dinosaurs

- (Extinct)

5) a) Dryopithecus b) Australopithecus c) Homo erectus

6)Evolution of beaks of finches that Darwin found.Refer NCERT text book page 133 Fig 7.5.

7) Five factors are known to affect Hardy- Weinberg's equilibrium

- a) Gene migration/ gene flow
- b) Genetic drift
- c) Mutation
- d) Genetic Recombination

8) Hints- page-no133.NCERT Textbook for class XII

### **CH-8Human Health and Diseases**

#### **ANSWERS:**

1. i) Pneumonia ii) Streptococcus pneumonia
2. Common cold  
Rhino virus
3. By the introduction of the mosquito larvae feeding fish Gambusia
4. Because they require human blood protein for the production of egg.
5. A. Ring worm  
B. Wuchereria sps.  
C.Entamoeba histolytica  
D.Malignant malaria

6. Because of the protected environment provided early in life and due to exposure to high level of pollution.
7. Passive immunity
8. Secretion of Histamine & Serotonin by mast cells  
Antihistamine, Adrenalin, steroid
9. i) AIDS  
II) ELISA  
III) His T-Lymphocytes were destroyed
10. i) Hallucination  
ii) LSD, cocaine  
iii) Erythroxyllum coca/Atropa belladona/Datura sps.
11. a)Viral RNA enters macrophages  
b) Reverse transcriptase  
c) HIV viral particles  
d) T-Lymphocytes.

## **CH-9-STRATEGIES FOR ENHANCEMENT INFOOD PRODUCTION**

### **ANSWERS:**

#### **One mark:-**

- 1) Inbreeding depression
- 2) It is free of virus
- 3).Embryo Transfer technology
- 4) Because there is limited availability of disease resistance genes in the crop plants & their wild relatives.
- 5)the best available local cultivar

- 6) To produce pure or inbred lines, so that there will be no segregation of characters in the progeny.
- 7). Bilkneri ewes & Marino rams
- 8). Tryptophan & lysine
- 9). Yellow mosaic virus, *Abelmoschus esculentus*
- 10). Morphological, physiological & biochemical
- 11). Resistant to water stress.

**Two marks**

- 1) Yellow mosaic virus, *Abelmoschus esculentus*
- 2) Morphological, physiological & biochemical

- 3) a. Increased food production (Wheat & paddy)
- b. Increased fish production

- 4) a. Germ plasm collection
- b. Cross Hybridization
- c. To select and test the hybrid for the desired character combination for success of breeding objective.

d. Obtained hybrid is evaluated in the crop field and is compared with the local crop cultivar.

5) Outcrossing is the practice of mating animals of the same breed that have no common ancestors on either side of their pedigree upto 4-6 generations whereas cross breeding is the cross of one with superior females of another breed.

6) It was created by transferring gene for resistance to yellow mosaic virus(YMV) in bhindi from a wild species to (*Abelmoschus esculentus*.)

7) Pusa Gaurav and Pusa swarnim are mismatching pairs.

8). A)Himgiri B)Brassica c)Pusa shubhra D) Chilli E)Chilly  
mosaic & leaf cure

**Three marks:**

- 1) This statement is true

-it helps in selective breeding in animals.  
-semen of a single bull can be used to impregnate several females.  
-quality semen is available in preserved form all the time at all places- Frozen semen can be exported or imported. It is the most reliable method.

2)A-Collection of variability    B-Cross hybridization among the selected parents.

C – Selection and testing of superior recombinants.

3) i) b)

ii) a)

iii) c)

4) Correct order – c) → a) → b)

Process-Multiple ovulation embryo transfer

Advantage – To increase herd size in short time.

## **ANSWERSCH -10 MICROBES IN HUMAN WELFARE**

### **1mark**

1) Wine is produced without distillation and whisky and rum are produced by distillation of the fermented broth.

2) No, because, Antibiotics are needed to kill millions of microbes which cause many deadly diseases like plague, whooping cough, dysphasia etc.

3) Bottled juices are clarified by the use of pectinases and proteases.

4) Prions are proteinaceous infecting agents.

5) Nucleopolyhedrovirus

6) Pest resistant cotton plant.

- 7) Optimum temperature is needed for the action of lacto bacillus and to convert milk to curd. Bacteria becomes inactive at low temperature
- 8) Curd contains lactic acid bacteria which checks the growth of disease causing microbes and protects the gastro intestinal tract
- 9) Cellular respiration/anaerobic respiration in bacteria produces  $\text{CO}_2$  gas which puffs up the dough
- 10) The nutritional quality of curd is improved by Lactic acid bacteria by increasing vitamin  $\text{B}_{12}$
- 11) The rumen of cattle contains methanogens which help in the digestion of cellulose but these bacteria are not present in human stomach
- 12) Antibiotics may kill even the useful bacteria present in the digestive tract LAB will protect some microbes in the digestive tract and enhance the production of vitamin  $\text{B}_{12}$ .
- 13) Some microbes produce enzymes like lipases which help in removing oil stain when used in detergent formulation.
- 14) Some microbes mainly methanogens release large quantities of methane along with  $\text{CO}_2$  and  $\text{H}_2\text{S}$  during metabolism and these gases are used for the production of biogas which is a good source of energy
- 15) The large holes on 'Swiss cheese' are due to production of large amount of  $\text{CO}_2$  during fermentation by the bacteria *Propionibacterium sharmani*.
  
16. To determine pollution it helps. More organic waste BOD increases.
17. Bottle fruit juices are treated with the yeast *Saccharomyces cervisiae*.
  
- 18.i) Coagulation  
 ii) Lactic acid produced by LAB coagulate and partially digest the milk protein.
  
19. Wine & Beer is produced without distillation. Whisky & brandy are produced by distillation.
- 20.. Thermoacidophils. This bacterial Enzyme is resistant to high tem.
21. streptokinase is a 'clot buster' for removing the blood clots from blood vessels. Bio molecules are produced from *Streptococcus* Bacteria.
  
22. Bread and cheese have large holes due to production of Large amount of  $\text{CO}_2$ .

## 2 marks

- 1) The microbial culture containing anabaena, Oscillatoria or Nostoc. They act as biofertilizer by fixing the atmospheric nitrogen in the soil and thereby increasing the soil fertility
- 2) The plant roots which are infected by fungi form symbiotic association with them and the fungi help the plant to absorb phosphorus from the soil and the plant becomes resistant to salinity and drought thus this symbiotic association called mycorrhiza help in the development of the plant.
- 3) The proper sequence is c-e-b-a-f-d
- 4) A small portion of the activated sludge containing bacteria is pumped back into the aeration tank to act as inoculums.
- 5) x-gas holder, y-Digester.
- 6) Statin produced by *Monascus purpureus* competitively inhibit the enzyme responsible for synthesizing cholesterol
- 7) i) Citric acid
  - ii) *saccharomyces cerevisiae*
  - iii) *Trichoderma Polysporum*
  - iv) *Acetobacter aceti*
  - v) Statin
  - vi) *Streptokinas*

## 3marks

- Ans 1 I) Baculo viruses attack the specific insects & arthropods. They have no negative impact on plants, birds, mammals or even other non-target insects. The desirable aspect is conservation of beneficial insects. Organic farming uses biopesticides & biofertilizers. Baculo viruses are used as good biopesticides.
- Ans 2. I) Free living fungi – *Trichoderma* – used as biocontrol agent.  
ii) Symbiotic fungi – *Glomus* – helps in absorption of nutrients from soil.  
iii) Freelifving bacteria – *Azotobacter* – helps in increasing yield by fixing atmospheric  $N_2$  & making it available to the plants.

### (Marks 5)

- Ans 1. I) Chemical fertilizers causes environmental pollution.  
ii) It decreases the fertility and productivity of the soil.  
iii) Farming with chemical fertilizers is expensive.

Organic farming uses biopesticides and biofertilizers.

i) Biopesticides – a) Baculo viruses – attack harmful insects.

b) *Bacillus thuringiensis* – introduced in crop field. (These bacteria are available packets as dried spores) which are mixed with water & spread over vulnerable plants.

ii) Biofertilizers – a) Cyano bacteria are used in crop field to increase the fertility of soil.

b) *Azolla* is used in crop field which is decomposed & increases the fertility of soil.

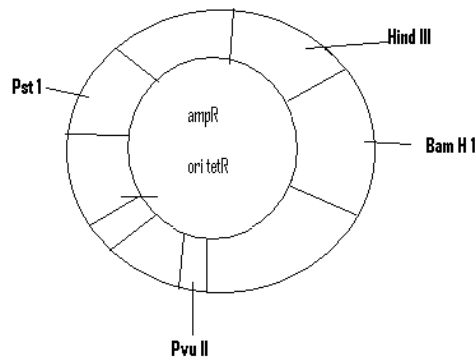
Ans 2. I) A- 20 mg /L → Secondary effluent

B – 8 mg/L → River water

C – 400 mg/L → Untreated sewage water

ii) Bioreactor

iii)



iv) Role of polymerase – DNA – polymerase is an enzyme used to make copies of DNA making use of the genomic template DNA and the primer.

## CH 11-BIOTECHNOLOGY-PRINCIPLES & PROCESSES

ANSWERS: 1 mark

1 They cut DNA molecules at specific sites and then fragment

2 a- non recombinat b. recembinqat

3 Bacteria – *Thermus aquaticus*: Taq polymerase: During Denaturation in PCR high temperature is required and thermostable DNA polymerase remains stable in that high temperature.

4 crossing over occurs in this phase helps to produce recombinants.

5 In Eukaryotes, normal endonuclease attach with special proteins, like initiator, terminator, Snrbs etc. to perform their functions.

6 .Restriction Endonuclease enzyme.

7 .PCR, Annealing.



r-protein is the product of transgenic gene in the host body /cell.

3 MARKS.

1. (a) gene therapy  
(b) amplification  
(c) RNA interference  
(d) palindromic sequence  
(e) transposones  
(f) DNA replication
2. (a) tag polymerase (DNA polymerase )  
(b) primase  
(c) lysozyme  
(d) topoisomerase  
(e) RNA- polymerase  
(f) DNA ligase
- 3 (a) Linking a foreign DNA with a plasmid(vector)  
(b) DNA formed by a RNA by Reverse Transcription.  
(c) ds RNA- complementary RNA
4. E.coli cloning vector  
(a) ori (b) rop (c) ECOR I (d) amp<sup>R</sup> (e) tet<sup>R</sup>

**5MARKS**

.1. (a) "Insertional inactivation"

In this recombinants & non recombinants are differentiated on the basis of the ability to produce colour in the presence of a chromosomic substrate – In this, a rDNA is inserted in an enzyme –  $\alpha$  galactosidase – leads to inactivation of the enzyme which does not produce colour due to insertion.

(b)

- (i) Host cells are incubated with rDNA on ice.
- (ii) Followed by placing them briefly at 41°C heat.
- (iii) Then transforming them back on ice.

This enables the host cells (bacteria) to take up the rDNA.

## **CHAPTER 12 BIOTECHNOLOGY AND ITS APPLICATIONS**

**ANSWERS: 1mark**

1. Genetically engineered crop based agriculture.
2. By genetic modification
3. To supply alternative resources to industries in the form of starch, fuels, pharmaceuticals etc.

**2 marks**

- 1.a) Bt- Bacillus thuringiensis
- b) pest resistant
- c) By genetic modification/cloning
2. It is in the form of inactive protoxin.
3. Cry I Ac- Controls the cotton Bollworms
- Cry I Ab- Controls corn borer
- 4.a. G M Potato
- b. GEAC
- 5.i) RNA interference
- ii) a) sense RNA
- b) Anti sense RNA
- c) Silencing The m-RNA

3 marks

- 1.a) Gene therapy
- b) Lymphocytes
- c) Retrovirus
2. a. No
- b. By getting a patent
- c. Biopiracy.
3. Through Indian Patent Bill
- Indian Parliament.

### **ANSWERS: CHAPTER 13 - ORGANISMS AND POPULATIONS**

1) Microbes possess physiological and biochemical adaptations which allow them to live in habitats with temperature exceeding 100°C. There are branched chain lipids in the cell membrane and special resistant enzymes which deal with high temperatures. 1

2) Commensalism, In this interaction the orchid is benefitted on attaining the support whereas mango tree is neither benefitted nor harmed.

$\frac{1}{2} + \frac{1}{2}$

- 3) Due to low atmospheric pressure at higher altitudes body compensates low oxygen availability by increasing red blood cell production, decreasing the binding affinity of hemoglobin and by increasing breathing rate. 1
- 4) The plant produces highly poisonous cardiac glycosides. 1
- 5) Gause's competitive exclusion principle 1
- 6) Declining population.
- 7) Goats have greater browsing efficiency and hence the tortoises died of lack of food. 1

2 marks

1) **Curve 'a' represents exponential growth where the resources are not limiting the growth.** 1

b) Curve 'b' represents logistic growth where the resources are limiting the growth 1

2)a) Logistic growth curve

$$\frac{1}{2}$$

b)  $N$  = population density at-time ' $t$ '

$$1\frac{1}{2}$$

$r$  = Intrinsic rate of increase

$K$  = carrying capacity

3) Kangaroo rat is capable of meeting all its water requirement through its internal fat oxidation in which water is a by-product. It has the ability to concentrate urine. 1+1

4) Smaller animals tend to lose more body heat due to large surface area relative to their volume. Therefore, they have to spend more energy to generate body heat. 1+1

5) No, it will not survive in fresh water aquarium because of osmotic problem it would face.

6) Change in temperature from their established habitats affects the kinetics of the enzymes and through it the basal metabolism, activity and other physiological functions of the organism. 1+1

3 marks

1) Atmospheric pressure in Rohtang pass, which is at high altitude, is low and hence the body does not get enough oxygen. Ram is suffering from altitude sickness. 1+1

If he stays for long the following change will occur in the body and he will become acclimatised to the conditions. 1

a) RBC production increases

b) Breathing rate increases

c) Binding capacity of hemoglobin decreases.

2) a) Relation between sea anemones and hermit crab is mutualism since sea anemones protects the hermit crab and crab provides bits of food to sea anemone, thus both benefitted. 1

b) Relation between shark and suckerfish is commensalism because only sucker fish gets food and is benefitted while shark is neither harmed nor benefitted. 1

c) Relation between sea anemone and clown fish is also commensalism since only the fish gets protection from predators. 1

## CHAPTER 14-ECOSYSTEM

1) Man made ecosystem

Under regular control

And monitored by man

Natural ecosystem

not under the control of man

- 2) By the decomposition of detritus, the simple minerals are released into the atmosphere & from there it come back to the earth.
- 3) High temperature favours decomposition and low temperature inhibits decomposition
- .4) Detritus food chain begins from the dead and decaying matter while grazing food chain starts from the green plants(Producers).
- 5) Vegetation changes in turn change the food and shelter for various types of animals. As a result the foresaid changes happen.
- 6) In burnt out forests and flooded lands some soil or sediment is present. There is no need for soil to be formed.
- 7) The reservoir of gaseous cycle exists in the atmosphere and for the sedimentary cycle it is located in earth's crust

2 marks

- 1) Energy flow is always from the sun to 'producers' and to the different trophic levels. so it is unidirectional. But the nutrients are moving from the living to non-living and vice-versa.
- 2) Detritus is rich in nitrogen and sugars. For oxidation of nitrogen and sugars oxygen is required by a class of aerobic microbes.
- 3) Top carnivores do not have direct predators. so they are referred to as top carnivores  
eg: Man, Lion, Tiger etc.
- 4) A-Submerged plant stage, B-Reed swamp stage  
C-scrub stage, D-Forest
- 5) A. Rock minerals B. Weathering C. Decomposition

3 marks

- |   |   |
|---|---|
| 1) CARBON CYCLE                                     | PHOSPHORUS CYCLE                                    |
| 1. Reservoir exists in atmosphere                   | 1.Reservoir exists in earth's crust                 |
| 2. Considerable inputs of carbon through rain fall. | 2.Negligible inputs of phosphorus through rainfall. |

3. Evident gaseous exchange between Organism and organism and environment takes place negligible.

3. Gaseous exchange between environment is extremely

- 2) 1. Purify air and water
2. Mitigate droughts and floods
3. cycle nutrients
4. Generate fertile soils
5. Provide wide life habitat
6. Pollinate flowers
7. Provide aesthetic, cultural and spiritual values

**1 mark**

- 1) a) Genetic diversity      b) Species diversity

2 marks

- 1) a) Angiosperms  
b) Algae  
c) Fungi  
d) Mosses

- 2) Latitudinal gradients in biodiversity.

Biodiversity decreases as latitude increases .

Biodiversity decreases as one move from tropics to equator.]

- 3) Yes,

It may lead to co-extinction of species

In the case of a co-evolved plant-Pollinator

Mutualism where extinction of one invariably

Leads to the extinction of the other

- 4) Animals have greater mobility

Animals migrate to different environmental conditions and undergo adaptation

- 5) Ex-situ conservation

They are preserved in viable and fertile condition for long periods using cryopreservation techniques.

- 6) Amazon forests have the greatest biodiversity in the world and harbour a large number of plant species which release large amount of oxygen into the atmosphere.

- 7) National parks- in situ- It is the practice of protecting the endangered species in their natural habitats either by protecting or by defending the species from predators.

Zoological parks- ex situ- the threatened species are taken out from their natural habitat and placed in special setting and given protection and special care.

- 8) i) High level of species richness

ii) High degree of endemism

9. These are examples of Alien species invasions. They threaten the indigenous species & lead to their extinction.

3marks

1) i) The conventional taxonomic methods are not sufficient for identifying these microbial species

ii) Many of the species cannot be cultured under laboratory conditions.

iii) Biochemical and molecular biology techniques would put their diversity into millions.

2) 0.2 is obtained in studies regardless of the taxonomic group or the region

1.2 is obtained if species area relationship is analysed among very large areas like the entire continents.

3) According to the hypothesis proposed by Paul Ehrlich the "vivet popper hypothesis" each species is essential in the balance of nature. If one is lost that much imbalance is caused in the ecosystem.

## **CHAPTER 16 ENVIRONMENTAL ISSUES**

**ANSWERS:**1 mark

- 1) Eutrophication due to growth of algal bloom. 1
- 2) Fish-eating birds 1
- 3) Poor maintenance of the electrostatic Precipitator.
- 4) High concentration of DDT disturb calcium metabolism in birds which causes thinning of egg shell. 1
- 5) Lead inactivates catalyst 1
- 6) Microorganism present in domestic sewage break down organic substances present in the sewage. 1
- 2 marks

1) Catalytic converter has platinum palladium and rhodium as catalyst to reduce emission of poisonous gases. As the exhaust passes through the converter unburnt hydrocarbon are converted into CO<sub>2</sub> and water and carbon monoxide; nitric oxide are changed in to CO<sub>2</sub> and nitrogen gas.

- 2) a) DDT in the body interferes with the calcium metabolism, resulting in thinning of egg shell & their premature breaking ultimately leading to a decline in bird population 1+1
- b) Biomagnification
- 3) a) Lead in the petrol inactivates the catalyst 1+1
- b) Unburnt hydrocarbons are released which increases the air pollution.

4) Particulate pollutants inhaled deep into the lungs cause irritation, inflammation, damage to the lungs, & premature death.

- 5) a = CO<sub>2</sub> = 60%  
 b = methane = 20%  
 c = CFC'S = 14%  
 d-N<sub>2</sub>O = 06%

- 6) a) Algal bloom resulting in depletion of oxygen  $\frac{1}{2} \times 4 = 2$   
 1+ 1

b) Eutrophication.

- 7) A-BOD 1+1

B-Dissolved oxygen

8) Bio magnification - (accumulation of DDT in the body of bird) disturbs the metabolism of calcium - thin egg shell

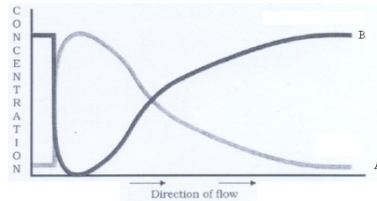
-Premature hatching - decline in population

9) b-snow blindness cataract-High dose of UV-B  
D-Polyblend-solve plastic pollution.

10) a) The amount of garbage generation specially in the metros has increased so much that these sites are getting filled too.

b) Also there is a damage of seepage of chemicals etc from these land fills polluting the underground water resources

11) P.NO 274 fig 16.3



3 marks

1) Global warming due to the increase in conc. of green house gases

It can be checked by. (Any 2)

- i) Growing more trees (afforestation)
- ii) Reduce the use of fossil Fuel
- iii) Prevent deforestation

2) Integrated organic farming is a cyclical zero waste procedure\_

a) Waste products from one process are cycled in as nutrients for the other process.

b) There is no need for chemical fertilizers as cattle excreta are used as manure.

c) Crop waste is used to create compost, which is used as manure to generate electricity.

3) Human excreta are also recycled into manure which reduces the use of chemical fertilizers.

5marks

1) A) a- collection plate

b- Dirty air

c-discharge corona

d-Clean air

2

B) i) The electrode wires are maintained in several thousand volts, which produces corona that releases electron. 1

ii) Those electrons attach a dust giving negative charge.  $\frac{1}{2}$

iii) The collecting plates attract the charged dust particles  $\frac{1}{2}$

C) The electrostatic precipitator removes the particulate matter where as the scrubber removes the gases like SO<sub>2</sub>. 1

