



I

BOTANY

1. Emasculation
2. R - Respiration losses
3. Restriction Enzymes
4. Rosie

II

5.
 - a - plumule
 - b - cotyledons
 - c - Radicle
 - d - Root cap.

6) Self incompatibility is a genetic mechanism and prevents self pollen (from the same flower or other flowers of the same plant) from fertilising the ovules by inhibiting pollen germination or pollen tube growth in the pistil.

7) Temperature and soil moisture are the most important climatic factors that regulate decomposition through their effects on the activities

of soil microbes. Warm and moist environment favour decomposition whereas low temperature and anaerobiosis inhibits decomposition resulting in build up of organic materials.

8. a) The DNA fragments can be separated by a technique known as gel electrophoresis. Since DNA fragments are negatively charged molecule they can be separated by forcing them to move towards the anode under an electric field through a medium.
- b) Agarose.

9 a) Micro-injection : Recombinant DNA is directly injected into the nucleus of an animal cell.

b) Biolistics or gene gun : In case of plants cells are bombarded with high velocity microparticles of gold or tungsten coated with DNA in a method known as Biolistics.

10. a) N = population density at time t
 r = intrinsic rate of natural increase
 K = carrying capacity.

b) in nature a given habitat has enough resources to support a maximum possible number, beyond which no further growth is possible. Let us call this limit as nature's carrying capacity.

11) Gause's competition exclusion principle states that two closely related species competing for the same resources cannot co-exist indefinitely and the competitively inferior one will be eliminated eventually.

12) a - The amount of Biomass or organic matter produced per unit area over a time period by plants during photosynthesis.

b - Primary productivity depend on the plant species inhabiting a particular area. It also depends on a variety of environmental factors, availability of nutrients and photosynthetic capacity of plants.

13. a) Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as transgenic animals.

b) 1. Normal physiology and development

2. Study of disease

3. To obtain biological products

4. Vaccine safety

5. Chemical safety testing

(any two)

- 14) Ist Trophic level - Tree
2nd Trophic level - cow
3rd Trophic level - wolf
4th Trophic level - Lion

- 15) a - GEAC - Genetic Engineering Approval Committee
b - GEAC will make decisions regarding the validity of GM research and the safety of introducing GM organisms for public services.

III

- 16) i a - Natality
b - Immigration

ii Mortality : Number of deaths in the population during a given period.

17. a) Transfer of pollen grain from anther to stigma of a pistil

b) Flowers are large, colourful, Fragrant and rich in nectar, When the flowers are small a number of flowers are clustered in to an inflorescence. (any four)

18) a) PCR - polymerase chain reaction.

b) Denaturation
Annealing
Extension

c) Small chemically synthesised oligonucleotides that are complementary to the regions of DNA.

19) a - Gene therapy is a collection of method that allows correction of a gene defect that has been diagnosed in a child/embryo. Here genes are inserted into a person's cells and tissues to treat disease.

b) Adenosine deaminase enzyme is crucial for the immune system to function. The disorder is caused due to the deletion of the gene for adenosine deaminase.

c) Bone marrow transplantation
Enzyme replacement therapy
gene therapy.

I ZOOLOGY

1 - a) Mice live

b) Mice die

2. Species area relationship

3. a - Ovulation

b - Ampullary region or Ampullary isthmic junction

4. Incomplete dominance

5. IUD's, others are Natural or Traditional method.

II 6) a) ART : Assisted Reproductive Technologies.

b) IVF (Test tube baby programme)

GIFT

ICSI

AI

(any two)

7. a - phenyl ketonuria

b - Haemophilia.

8. a - affected female

b - Mating between relatives (consanguineous mating)

c - Male

d - Sex unspecified.

9. BAC - Bacterial Artificial chromosome

mRNA $\rightarrow$ protein : Translation.

10. 1) Making blood safe from HIV

2) Use of disposable needles and syringes

3) Use of condoms

4) Avoid sex with multiple or unknown partners

5) Promoting regular check-ups for HIV in susceptible populations. (any two)

11) a) A - Trophoblast

B - Inner cell mass

b) A - Trophoblast helps for the attachment
of blastocyst in to endometrium of uterus.

B - Inner cell mass get differentiated as embryo.

12) a - Turner's Syndrome

b - Females are sterile as ovaries are
rudimentary / lack of other secondary
sexual characters.

c - $44A + XX$

d - Down's Syndrome

13) Australopithecines $\rightarrow$ Homo habilis $\rightarrow$

Homo erectus $\rightarrow$ Neanderthal man.

- 14) A B
- physical barriers - Skin
- physiological barrier - Acid in stomach
- cellular barrier - PMNL
- Cytokine barrier - Interferon

- 15) a - Hardy - Weinberg principle.
- b - Gene migration or gene flow
- Genetic drift
- Mutation
- Genetic recombination
- Natural selection (any three)

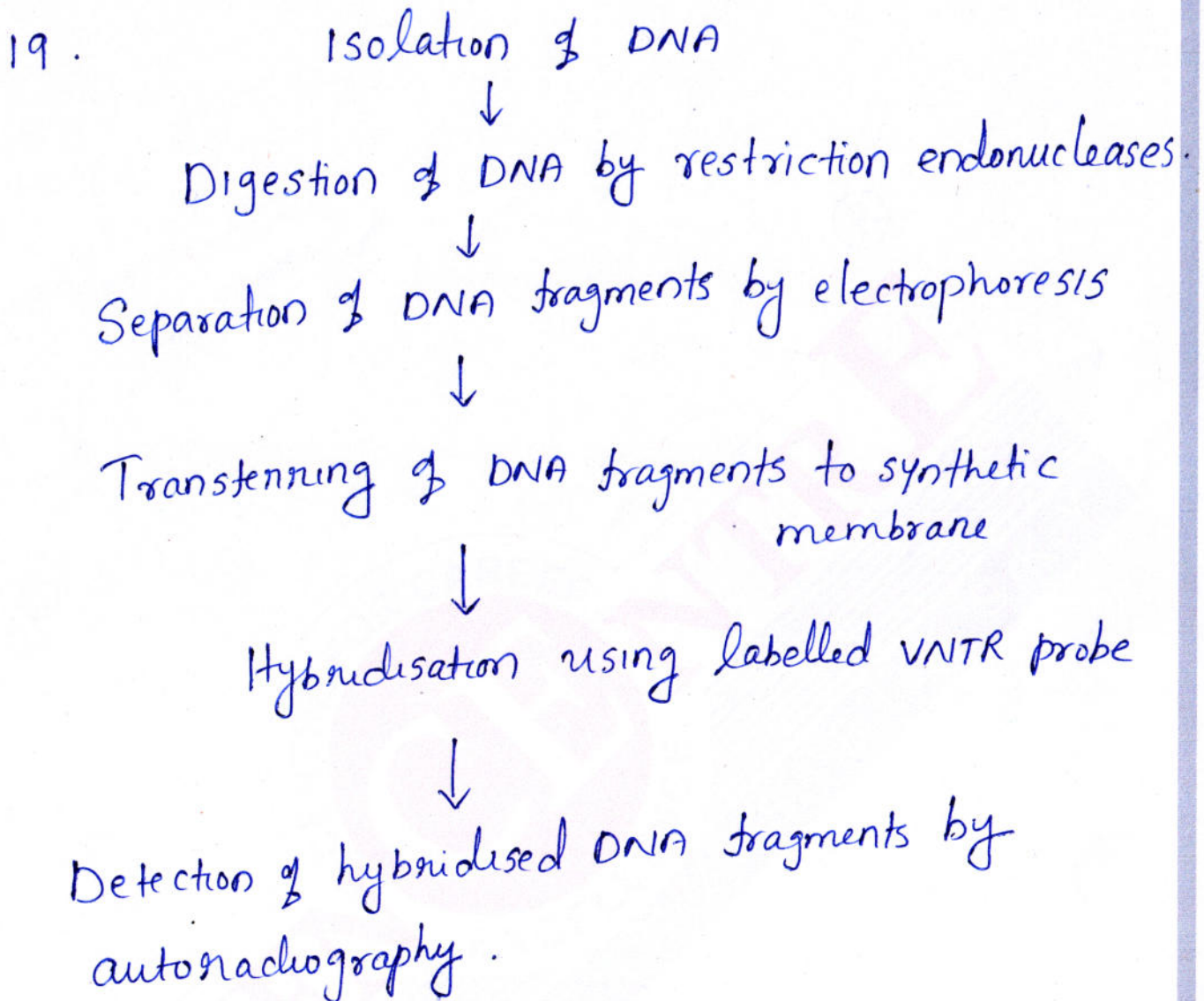
- 16) a - Streptokinase
- b - Trichoderma polysporum
- c - Immuno suppressive agent
- d - Statins.

III

- 17) a) 1) Habitat loss and fragmentation
2) Over-exploitation
3) Alien species invasions
4) Co-extinction

- b) Zoological park
Botanical garden
Seed bank
Cryopreservation (any two)

- 18) a) Tubectomy
b) Vasectomy
c) Cu-T
Cu-7
Multiload 375 (any two)



20. a) Nucleosome
- b) A - DNA
- B - Histone octamer.