Class-XII

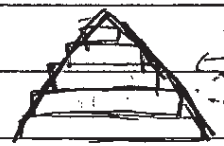
Biology(044)

Section A

-1

b) The given age pyramid represents expanding population.

→ In this pyramid the number of individuals at base that is pre reproductive individuals are greater than reproductive ~~popul~~ individuals which are further greater than post reproductive individuals thus it represents expanding population & pyramidal shaped age pyramid



← expanding population

2 Two symptoms are:

① Running nose
② Watery eyes
③ Sneezing.

→ The given situation represent allergy which is exaggerated response of our body to certain antigens called allergens.

→ In this situation body starts producing IgE antibodies and there is secretion of histamine (vasodilator) & serotonin (vasoconstrictor)

by the mast cells.

i) a) Cannabis sativa

ii) b) Cannabinoids are obtained from leaves, flowers tops and resins of Cannabis sativa plant.

iii) Cannabinoids affect the cardiovascular system of our body and bind to cannabinoid receptors present in brain.

4 Flocs are the mesh like structures formed by bacterias and fungal filaments during secondary treatment of sewage water.

4

⇒ Biochemical oxygen demand is amount of oxygen required by bacteria to oxidise organic waste in one litre of sewage.

• Thus these flocs helps in reducing BOD of sewage water and make it less polluted so that it can be sent back to rivers.

5	In situ conservation	Ex situ conservation
⇒	This is approach of conservation of endangered plants & animals in their own natural habitat.	This is approach of conservation of endangered plants & animals outside their habitat in places which are maintained by humans.
⇒	It is relatively cheaper method	It is relatively costlier method
⇒	It cannot protect Flora & Fauna from biotic & abiotic factors.	It protects Flora & Fauna from abiotic & biotic factors
⇒	eg: National parks, wildlife sanctuaries, Biosphere reserves	eg: Zoological parks, botanical gardens, seed banks, cryopreservation

6 Both the organisms act as biofertilisers

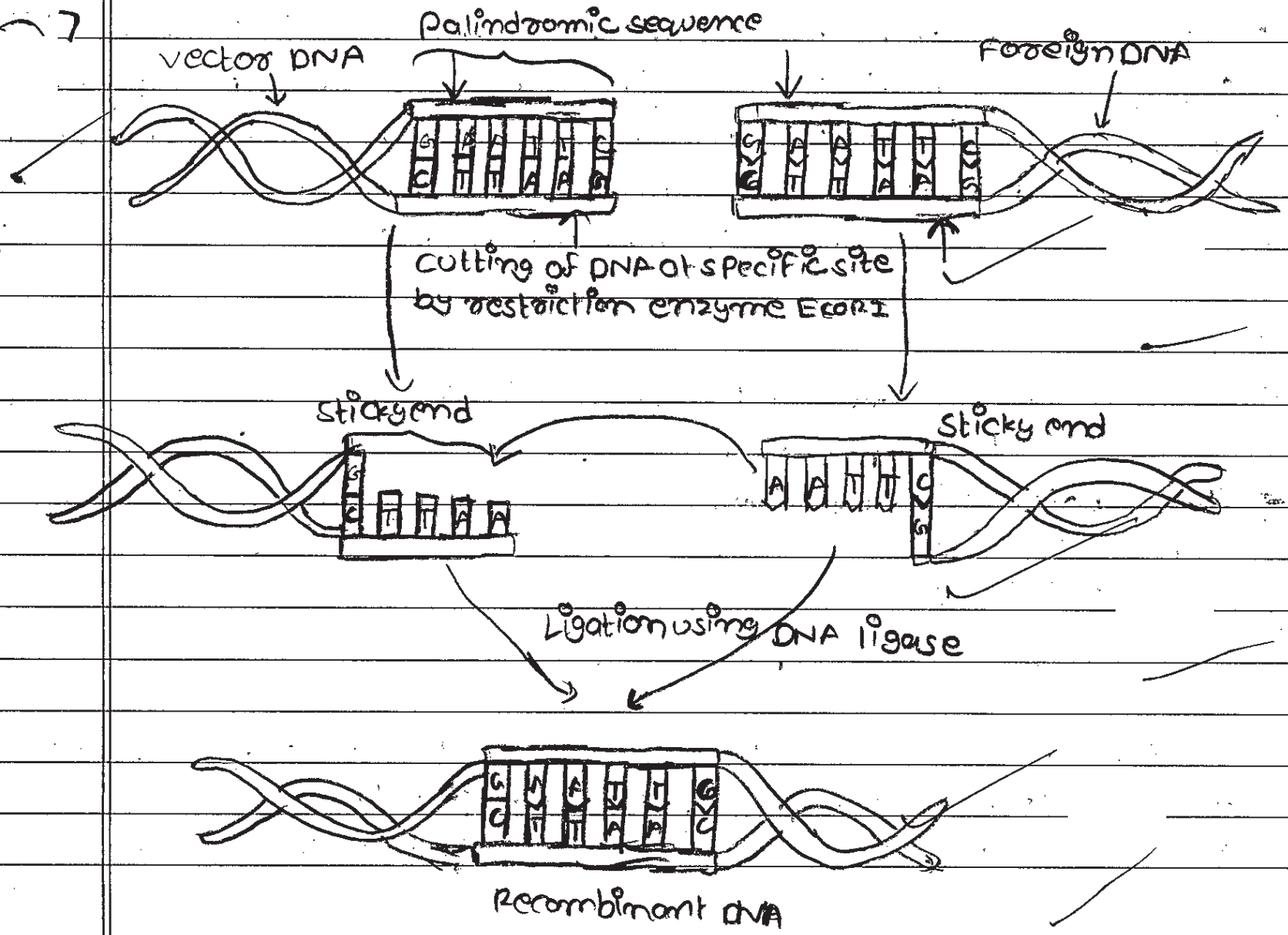
i) Rhizobium

- It is a type of bacteria which forms symbiotic association with roots of mainly leguminous plants and fixes atmospheric nitrogen into nitrites and nitrates which can be absorbed by plants and in turn tal helps & food from plants
- ⇒ Thus it reduces reliance on chemical fertilisers

ii) Anabena

- ⇒ It is a type of ~~bacteria~~ cyanobacteria which fixes atmospheric nitrogen into absorbable forms.
- ⇒ Thus both of them improves soil fertility by increasing nitrogen content in soil.

Section B


Palindromic sequence
vector DNA
Foreign DNA
Cutting of DNA at specific site
by restriction enzyme EcoRI
Sticky end
Sticky end
Ligation using DNA ligase
Recombinant DNA

8

a) The inference is "species richness increases on increasing explored area but only upto a certain limit"

b) S → species richness
A → Area explored
Z → slope of line (Regression coefficient)
C → y intercept.

9

a)
i) Anode → (S)
ii) Smallest/lightest DNA → (R)
iii) Agarose gel → (T)

b) The process of extracting out DNA by cutting Agarose gel and isolating DNA from it is called elution.
→ Elution is important to extract & isolate DNA in purest form

8

as they are seperated using electric field

10

(a) Contact inhibition is property of normal cells in which when growing cells touch each other then they stop their growth thus it leads to differentiation & maturation of cells.

→ However cancerous cells lose property of contact inhibition and don't stop their growth thus leading to generation of mass of cells called tumour cells

→ Cancerous cells actively compete for nutrients which leads to death of normal cell.

(b) Using of α-interferons is a type of Immunotherapy which helps in curing cancer. During cancer our body's immune system is not active and thus cancerous cells continue

forming tumours.

→ α-Interferons activates the immune system and helps in destroying tumour.

11. Cry proteins are the toxic proteins coded by cry genes present in Bacteria Bacillus thuringiensis.

→ Thus it acts as a biopesticide

→ For eg. BT cotton is pest resistant crop.

- When an insect comes and attacks Bt cotton it ingest the cells having cry genes which have produced Cry proteins in inactive form.
- When insect ingest the cry proteins, due to alkaline pH of gut of insect Cry proteins activate and stick to midgut of insects and starts formation of pores.
- This leads to swelling of gut and ultimately death of insect thus it act as biopesticide.

10

12

a) Co-extinction is a part of 'evil quartet' which leads to loss of biodiversity

→ This concept states that whenever a species in an ecosystem gets extinct the other organisms dependent directly or indirectly ultimately gets extinct.

→ For eg.

① If a fish in aquatic ecosystem gets extinct then the parasites dependent on fish will ultimately get extinct due to absence of host.

② Plant-pollinators relationship : For eg. there is mutualism between Fig tree and wasps.

· If wasps get extinct then there will be no scope for cross pollination for Fig tree and thus ultimately Fig will get extinct & vice versa If Fig species will get extinct then wasp will not get place to lay eggs & feed their larvae thus wasps will get extinct.

Section C

13.

(b)

i) The disease for which gene therapy was used for first time is for Adenosine Deaminase deficiency (ADA deficiency) or SCIDC severe combined Immuno peficiency).

ii) Enzyme replacement therapy is used to cure the disease

1. Lymphocytes from blood of patients are ~~not~~ extracted and cultured in laboratory.
2. ADA c-DNA (Complimentary DNA) containg gene for ADA is inserted to lymphocytes using retroviral agents.
3. lymphocytes are injected back to patient. ~~thus~~ ~~lymphocytes~~ ~~cell~~ ~~produ~~

→ This therapy is not a permoment cure because lymphocyte of human are not immortal thus they die after sometime & patient ~~ca~~ requires ~~another~~ periodic injections of lymphocyte

iii) The permanent cure for disease is to extract DNA coding for Adenosine deaminase enzyme from bone marrow and inserting it in embryo stage of the child.