केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
सीनियर स्कूल सर्टिफिकेट परीक्षा (कक्षा बारहवीं)
परीक्षार्थी प्रवेश–पत्र के अनुसार भरे

Subject : Biology

Date of the Examination : Monday, 14 March, 2011

Medium of answering the paper : English

Question Paper No. as written on the top of the question paper : 57/2

Additional answer-book(s) used : Nil

कोष्ठक में दिए गए उपयुक्त उत्तर के ✓ का निशान लगाएं।
Put a tick (✓) mark against the correct answer.

A B C D

Set A / Set B / Set C / Set D

Roll No. NC

परीक्षार्थी का हस्ताक्षर

Candidate's Signature

Note : Leave one box blank between each part of the Roll No. If candidate's Name exceeds 24 letters, write first 24 letters.

सीनियर स्कूल सर्टिफिकेट परीक्षा (कक्षा बारहवीं) केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली

SENIOR SCHOOL CERTIFICATE EXAMINATION (CLASS XII) CENTRAL BOARD OF SECONDARY EDUCATION, DELHI

प्रमाणित किया जाता है कि मैंने / हमने इस उत्तर-पुस्तिका का मूल्यांकन प्रश्न पत्र के समुचित सैट के अनुसार किया है।

Certified that I have evaluated this answer book according to the correct set of question paper.

Ans 1] Controlling is like a post-mortem of past activities. It analyses the deviations, what went right and what went wrong and indicates necessary corrective action. Therefore controlling is called a backward looking function.

Ans 2] Since it is not economical nor easy to control every aspect of the organisation, managers should focus on key result areas (KRA) which are critical for the success of the organisation. Only those deviations which go beyond the permissable limit should be attended to.

Example: Increase in labour cost by 5% is more desirable than 15% increase in postal charges.

Q4. Biofortification is a plant breeding programme which is aimed at increasing the nutritional quality of the crops by increasing,

(i) Protein content & quality
(ii) Vitamin content
(iii) Oil & fats content
(iv) Micronutrient & mineral content

Their importance is that they help to cope up with 'hidden hunger' because of poor nutritional content.

Q5. Human embryo get implanted as blastocyst which consist of trophoblast & inner cell mass.

Q6 Dryopithecus

Q7. Algal bloom are harmful because:

(i) They deleteriously decrease the quality of water by decreasing O_2.
(ii) They induce fish mortality
(iii) They impart characteristic colour & foul odour to the lake.

Q8.

Net primary productivity	Gross Primary Productivity
It is the amount of biomass produced by the producers or the first trophic in a given area in a given period of time subtracting the respiratory losses	It is the total amount of biomass produced by the primary producers or first trophic level in a given area in a given period of time

NPP = GPP - R

∴ Net primary producity is the gross primary productivity minus respiratory losses.

Q9. Bioactive molecules are the molecules which are biochemically active and hence are used for various commercial & non-commercial purposes. These molecules are generally of biological (microbiological generally) origin.

Eg: • Cyclosporin A extracted from Trichoderma polysporum (fungi) is used as immunosuppressive agents for the patients who have undergone organ transplant.
• Statins produced by Monascus purpureus (yeast) used as a blood-cholesterol lowering agent.

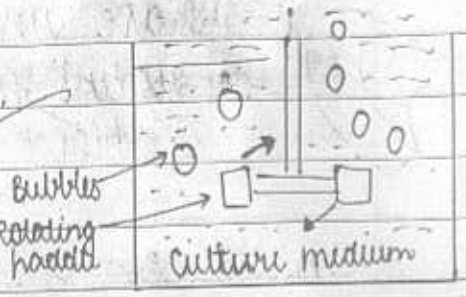
Q10. Importance of Biodiversity in agriculture:
- Greater biodiversity means greater no. of plant-pollinator-ss and hence often leads to greater productivity.
- Species diversity maintains an ecological balance, hence keeping the populations of insects and pest under control, often resulting in higher productivity.
- Greater diversity leads to lesser variability in the ecosystem services hence developing an environment resistant and 'resilient' agricultural society (of crop plants) hence enhancing the productivity.
- ~~Yield~~ Biodiversity often leads to greater mineral enrichment of soil because of the presence a large variety of organism acting as bio fertilisers.

Thus biodiversity leads to • lesser year to year variation in biomass production

P.T.O

• higher plant productivity

Q11. Bioreactor is a "stirred type bioreactor".



Purpose

- Stirred type bioreactor provides a continuous culture medium such that host cells enters into an exponential phase of growth
- They have "agitator" and "oxygen delivery system", dramatically increasing surface area for absorption of O_2 by creation of bubbles.
- They also have a pH control system, temperature control system, foam control system for the efficient growth of the 'recombinant' cells under optimum conditions of temperature, pH & pressure.
- They also have sampling ports through which the culture media could be regularly taken out for checking.

Thus, the function of the bioreactor is to provide optimum conditions for the 'recombinant proteins' to get expressed in the 'heterologous host'.

Q12. → Gametes produced are always haploid.

→ In case of haploid parents, gametes produced are through mitotic cell division

→ In case of diploid parents, gametes produced are through meiotic cell division (reduction division).

∴ Thus the cell division involved depends greatly on the ploidy of the parent.

Q13. 'Lactational Amenorrhea' is a natural contraceptive method which is based upon the fact that ovulation doesnot occurs in the initial period of lactation (upto 6 months) due to which no menstrual cycle occurs.
Hence, 'copulation' during this period would not lead to 'conception'

Q 15. 'S' is represented by the formula,

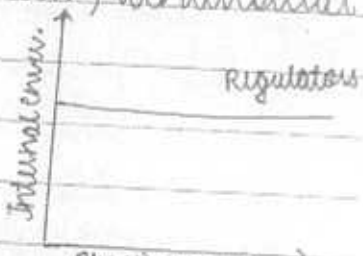
$S = cA^z$ ✓ where S = species richness
c = intercept
A = area of exploration
z = Regression constant,

This graph was obtained by 'Alexander von Thumbshout'
during his outdoor experiments where he concluded that,

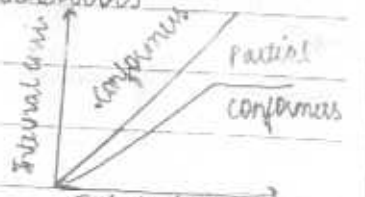
- Species richness increases with the area of exploration. ✓
- This increase is seen upto a certain limit and after some time the plot between S and A become nearly constant (i.e species richness stop changing with increase in area). ✓
- Thus the plot obtained is a 'rectangular hyperbola'. ✓

Q16. Responses to abiotic factors:

(i) Regulate:
It is a type of response in which the internal environment of the individual remains more or less constant by physical, behavioural or morphological means.
Eg: Humans.



(ii) Conform:
It is a type of response in which the internal environment of the organism continually changes along with the external environment because of the inability of organisms to maintain homeostasis.
Eg: Lizards and other Ectotherms.



(iii) Migrate:
This is a type of response to a very short span of stressful environment in which organism move to another place in search of favourable conditions & return later on. Eg: Siberian birds.

(iv) Suspend: It is a type of response in which organisms enter into a

state of inactivation during stressful conditions.
Eg: Diapause (zooplanktons), Hibernation, Aestivation, etc.

Q17 • 'Rosie' is a 'transgenic' cow obtained after genetic engineering.
• It is different from normal cows as it produces more nutritionally enriched milk which is rich in 'human alpha lactalbumin'.

Q18. VNTR - Variable number of Tandem Repeats

VNTR's	PROBE
• These are short stretches of DNA which repeated in the human genome several times and help us to differentiate between DNA profiles to individuals because of different extent of repetition or different base pairs.	• These are the synthesized complementary DNA sequences corresponding to VNTR's which are allowed to hybridize with VNTR's during fingerprinting.

Q19. Baculoviruses belong to the genus 'Nucleopolyhedrovirus'.

Role:

- These are the pathogens that infect 'anthropods' and 'insects'.
- They are very much useful in developing a 'species-specific', 'narrow insecticidal application' by attacking targeted pests only.
- They decrease are reliance on chemical pesticide by acting as biocontrol agents and hence contribute to Integrated Pest Management (IPM) programme.

Baculovirus —attacks→ targeted pests (maintaining ecological balance by not harming non targeted ones)

Q20. (i) Consequences of failure of precipitator:

(i) It would result in the release of smoke particles alongwith the non harmful gases

(ii) Smoke particles being very small are deeply inhaled inside our lungs causing serious respiratory ailments like bronchitis, emphysema, etc according to observation of Central Pollution Control Board (CPCB).

(ii) Methods for reducing vehicular pollution:

(i) Use of catalytic Convertor

(ii) Use of unleaded and low sulphur petrol diesel.

(iii) Using of CNG inspite of petrol as
- It can't be easily siphoned, adulterated
- It is efficient
- It is pollution free.

(iv) Phasing out of old vehicles and following various vehicular norms like Euro-II, Bharat Stage-II in cities & towns.

9.21 Technology that has successfully increased herd size of cattle in short time is MOET (Multiple Ovulation Embryo Transfer technologies).

Procedure

- Selection of superior cow (cow that produces more milk per lactation).
- Selected superior cow is administered on the doses of

ESH leading to superovulation:

- Superovulation leads to production of 6-8 eggs inspite of single egg during 'oestrus' cycle.
- Superior cow is inseminated either artificially or by mating it with elite bull/ superior bull.
- Egg are fertilised by the semen and zygote are allowed to developed until they reach 8-32 cell stage.
- Embryo at 8-32 cell stage are obtained non surgically and then are implanted in the surrogate mothers for their growth.
- Meanwhile, the superovulated mother is prepared for another cycle of superovulation.

Q23. (a) Salmonella typhi (a bacterium)

(b) Widal Test

(c) Pathogen gain entry through 'contaminated food & water'
Diagnostic symptoms are:

- sustained high fever
- abdominal pain
- constipation
- severe headache
- fatigue & malaise
- loss of apetite.

In severe cases, it may lead to intestinal perforations.

Q24.

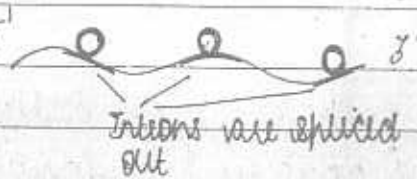
(i) Enzyme - DNA dependant RNA polymerase II.

(ii) Need of undergoing changes:

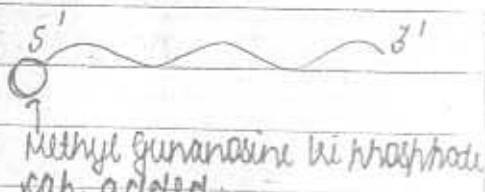
- It contains intervening non coding DNA sequences.
- for efficient translation.

Changes:

Splicing:
(Removal of introns - non coding sequences).



Capping:
(A methyl guanosine triphosphate cap is added at the 5' end)



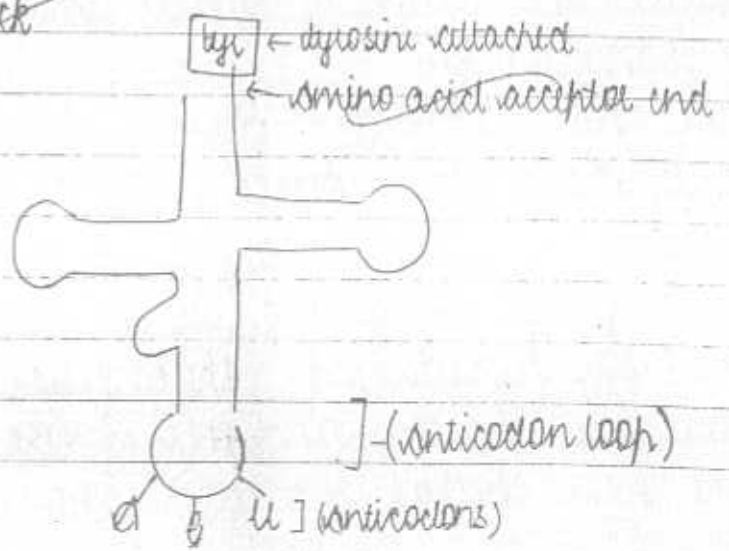
Tailing:
(A poly adenylate tail is added at 3' end)

Changes take place inside the nucleus of the cell.

Q25.

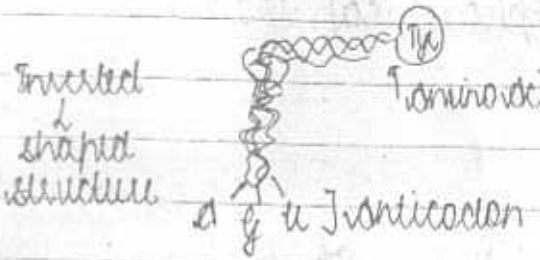
(a) Francis Crick

(b)



Clover leaf structure of t-RNA.

(c) Actual structure is an 'inverted L' shaped structure.



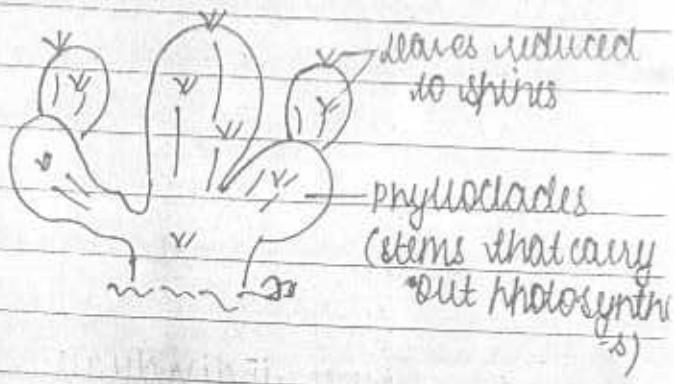
---

§26. Animals adaptation:

- Some have the ability to concentrate the urine and hence reduce the volume of water excreted out in excreta. Eg 'Kangaroo Rat'
- Some animals have internal fat oxidation system producing water as a by product, hence coping up with scarcity of water. Eg: 'Kangaroo Rat'
- Some adapt themselves by the help of behavioural means. Eg: 'Desert lizard'
- Some dig burrows and enter inside the earth crust.
- Some have special structures where water is stored. Eg: Hump in camels.

Plant adaptation:

- Some of the plants have their leaves covered with waxy layer call cuticle to prevent water loss.
- Some have stomata lined in deep pits.
- Most of them have adapted to CAM photosynthetic pathway due to which their stomatal pores remains sunken during most time during day.
- Some of them have modified leaves in form of spines which reduce water loss while photosynthesis is carried out by green coloured flattened stems called 'phylloclades'. Eg: Opuntia.



Opuntia

27. Natural Selection Theory:

Postulates are as follows:

- Natural resources are limited, hence the population of various communities remain fairly constant, though there are certain season fluctuations.
- No two organisms in a population are similar 'identical' because of variations, though there maybe certain similarities.
- Theoretically, if the natural resources are unlimited, the population would realise fully its innate potential to reproduce hence growing exponentially as seen in the case of bacterial populations.
- But naturally the resources are limited and hence the organisms compete for their natural resources. The organisms which are better adapted are able to survive well and hence reproduce over the rest of others which are less adapted.

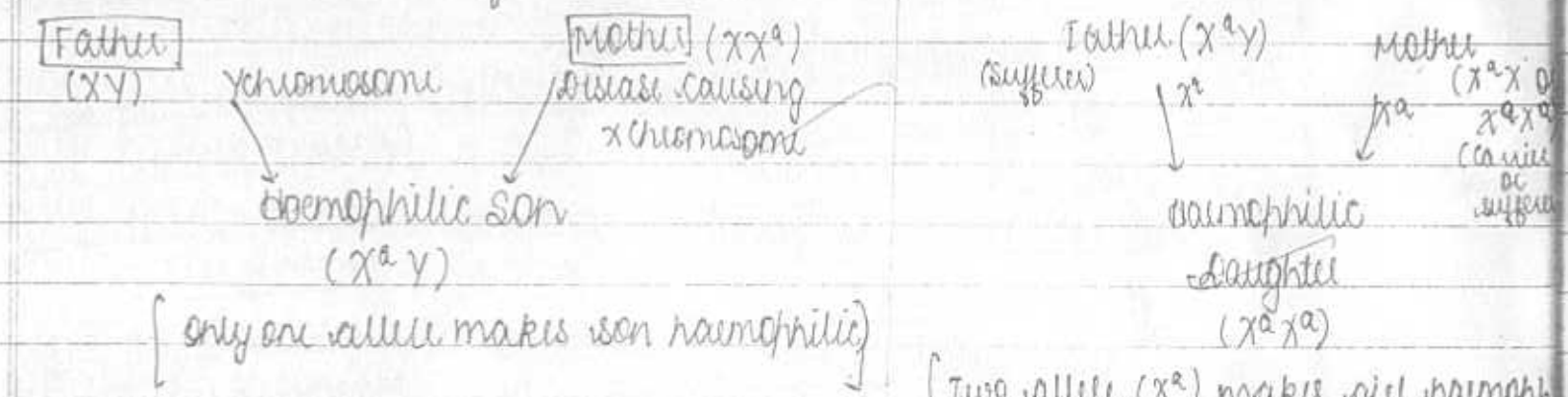
Hence individuals which are better adapted are selected by nature and survive & their better than less adapted ones.

- Examples of Natural Selection could be easily seen in the case of
  - Industrial Melanism : where the population of melanised moth increased dramatically due to the coverage of the tree barks by soot & smoke.
  - Antibiotic resistance that developed in bacterial colonies because of evolution through anthropogenic action.
- Branching descent refers to equate survival and diversification of an ancestral stock into more diverse forms because of the adaptability of organisms to different environment condition.
- Examples of Branching descent:
  - Development of so many type of finches (Darwin finches) with diverse variety of beaks because of difference in foraging patterns
  - Development (Divergent Evolution) of Marsupials in Australia.

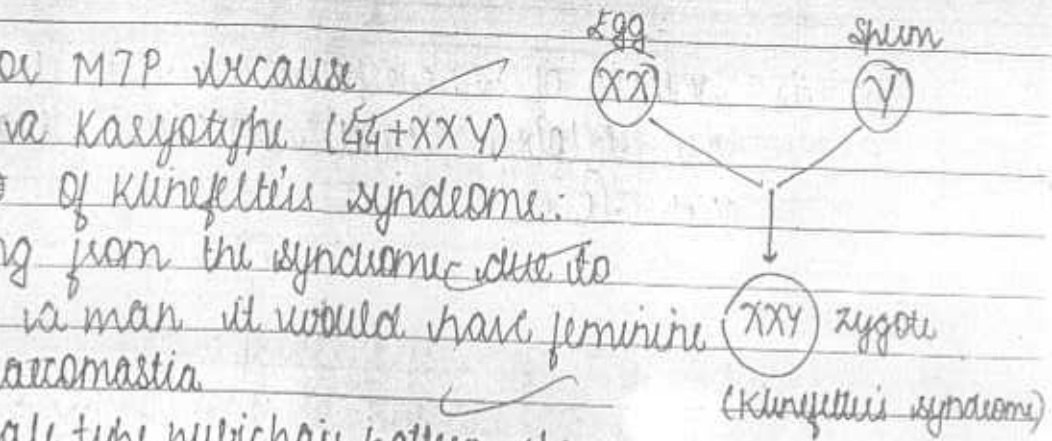
Q28. recessive

(a) • Haemophilia is sex linked disorder transferred to the progeny because of defective allele of X chromosome.

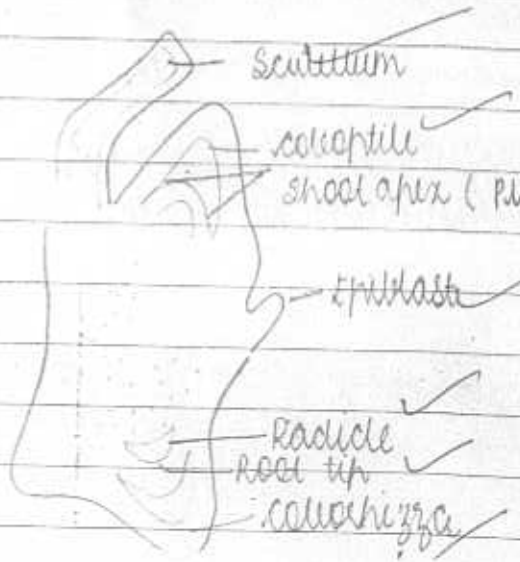
• Since males have to inherit only one X chromosome from their mother, they are more prone to this disease while females require ~~one~~ defective allele ~~X~~ carry 2 defective allele carrying X chromosome (X^a) therefore for them to be sufferer her father must be sufferer and mother atleast a carrier for the disease.



(b)
- Women is advised for MTP because the zygote formed has a karyotype (44+XXY)
- Zygote is a sufferer of Klinefelter's syndrome.
- It would be suffering from the syndrome due to which inspite of being a man it would have feminine characters like: (i) gynaecomastia
  (ii) female type pubichair pattern, etc
  and would be sterile.
- To avoid this, she undergoes MTP.

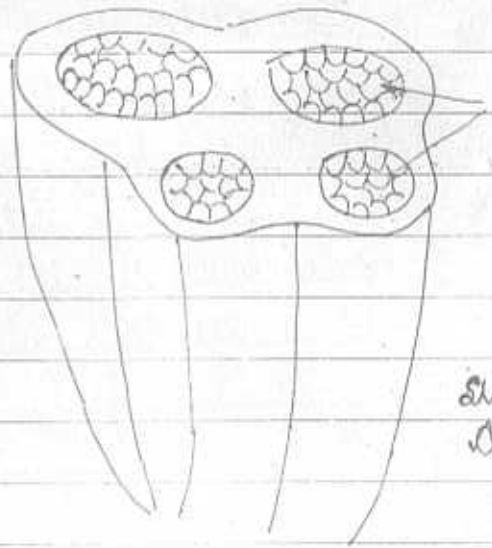


Q.29.
(a)



L.S. of EMBRYO of Grass

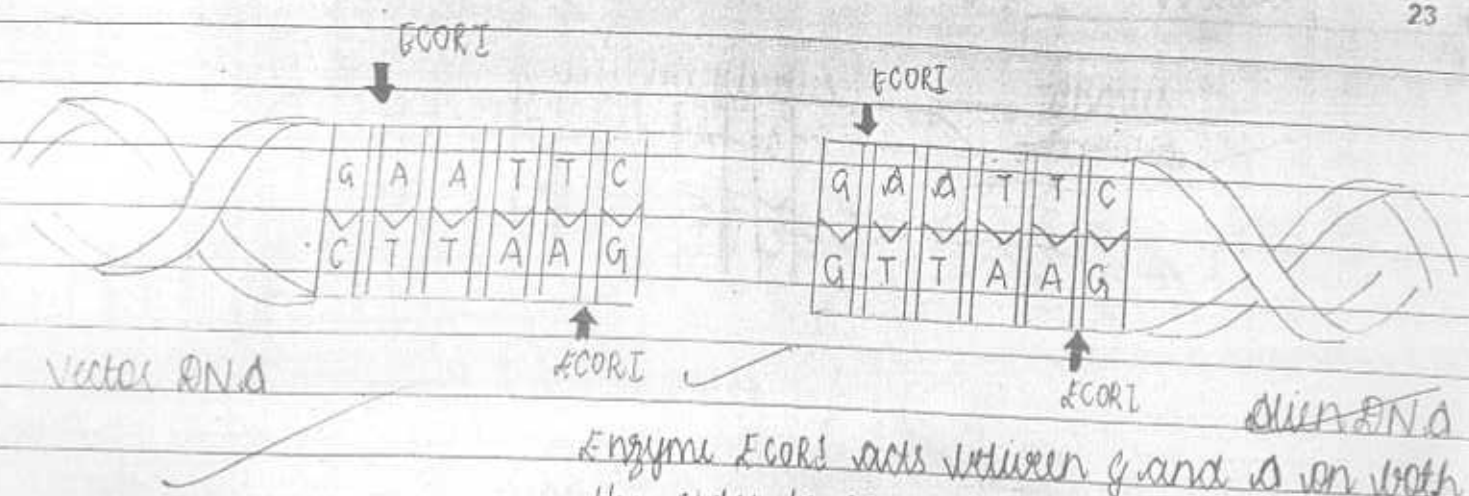
(b) (i) Anthers of angiosperms are described dithecous because they are bilobed and contains two theca / microsporangia in each lobe.



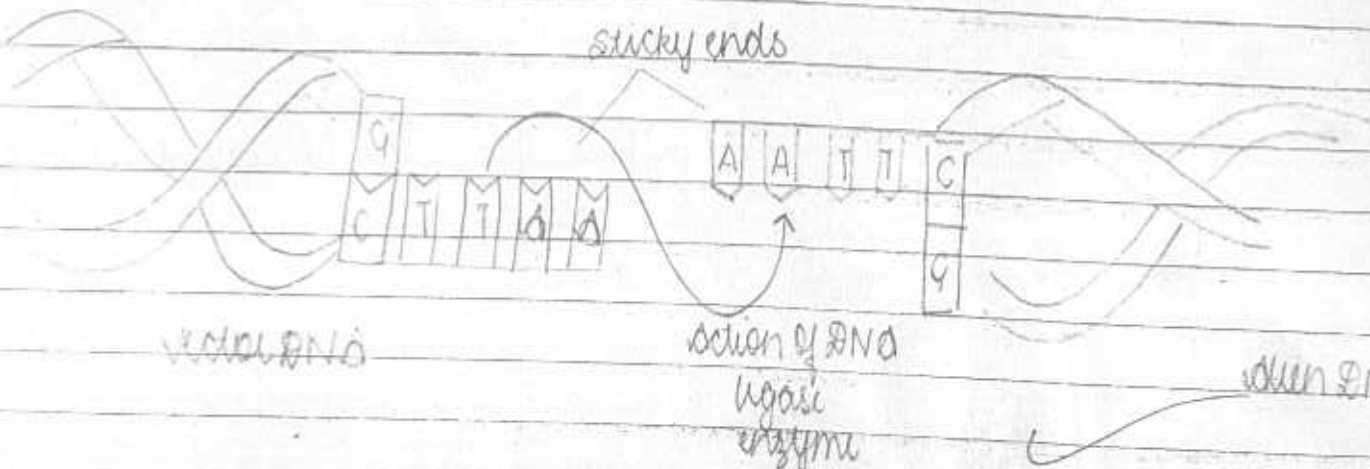
section of angiospermic anther

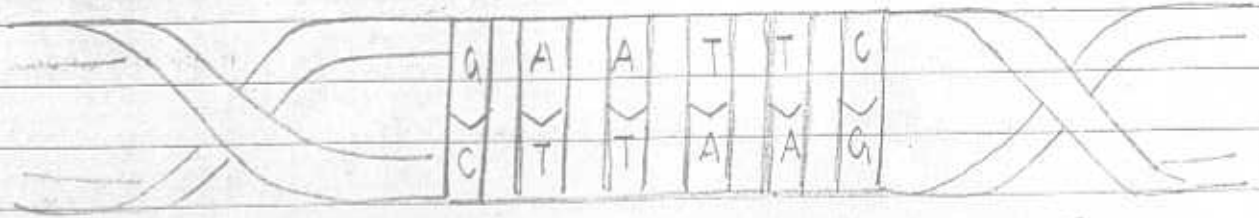
(ii) Hybrid seeds are need to be produced year after year because of 'segregation of the characters' when they are re-sown.

Q30.



Enzyme EcoRI acts between G and A on both the sides to generate complementary sticky ends on both DNA

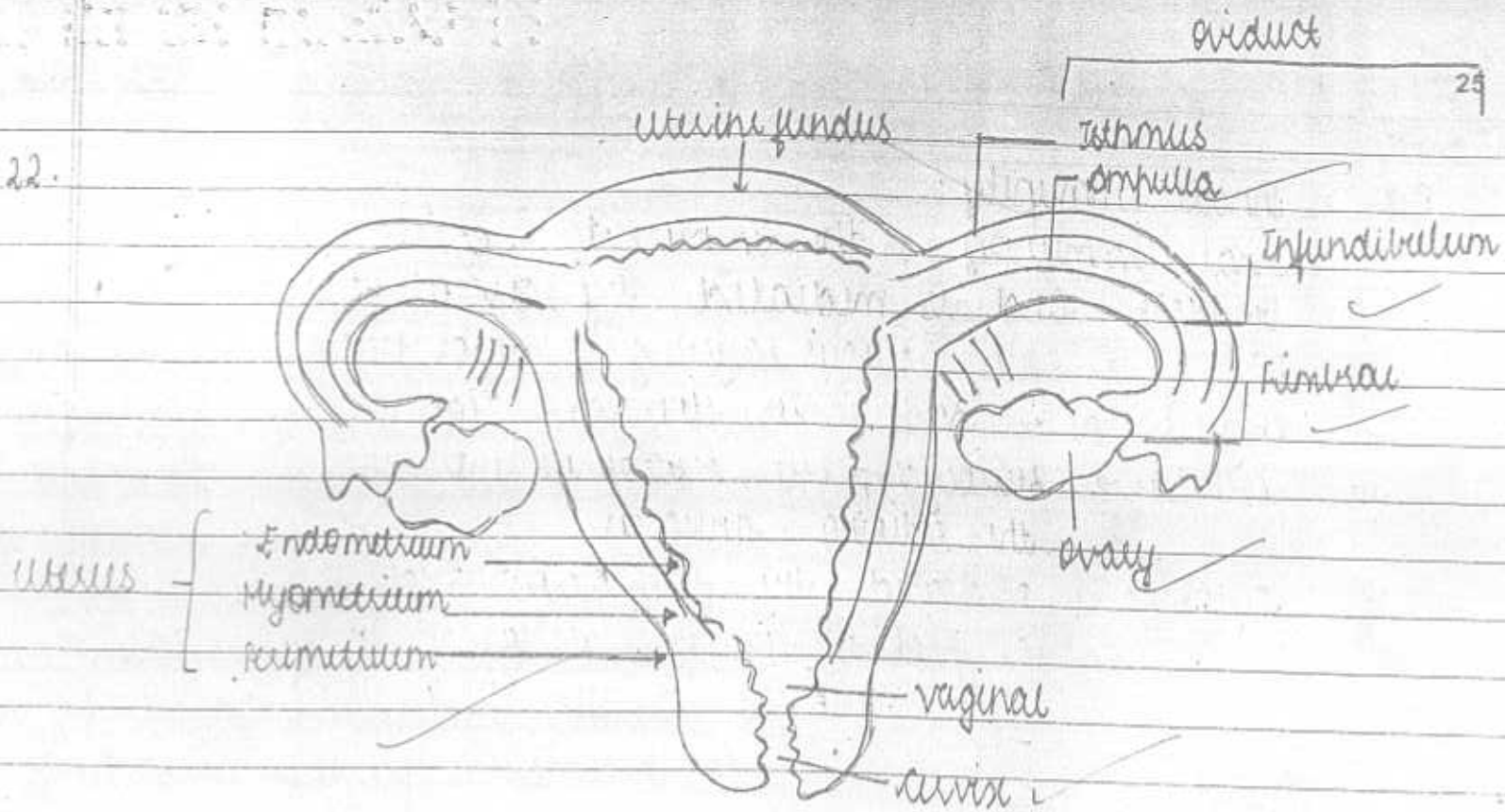




Recombinant DNA after the action of ligase enzyme

(b) Technique used for seperating DNA fragments - gel electrophoresis.

Q.22.



Reproductive System
(human female)

Q13. Innate immunity:

Innate immunity is the immunity which present in a baby by birth and is mediated by several barriers:

(i) Physical → Skin & Mucus layering of major tracts
(ii) Physiological → acid in our stomach, Tears and saliva (in mouth).
(iii) Cellular → Leucocytes, PMNL neutrophils, monocytes that phagocytes the entering antigen
(iv) Cytokine → Mediated by interferons which are special immunogenic ~~proteins~~ proteins released by viral infected cells to prevent its further spreading.

Passive immunity:

It is a type of immunity developed in our body when our body is directly provided by immunogenic proteins (antibodies)

- Some antibodies travel through maternal blood via placenta to each fetus
- Immunogenic proteins are also provided in form of colostrum full of (IgA)