

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

विषय Subject : Biology (041)

परीक्षा का दिन एवं तिथि
Day & Date of the Examination : Saturday, 17/03/12

उत्तर देने का माध्यम
Medium of answering the paper : English

प्रश्न पत्र के ऊपर लिखे कोड को दर्शाए
Write Code No. as written on the top
of the Question paper : 57/2

अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या
No. of supplementary answer-book(s) used

किसी शारीरिक अक्षमता से प्रभावित हो तो संबंधित वर्ग में ✓ का निशान लगाएँ।
If physically challenged, tick the category

B D H S C

B = दृष्टिहीन, D = मूक एवं बधिर, H = शारीरिक रूप से विकलांग, S = स्पास्टिक, C = डिस्लेक्सिक
B = Blind, D = Deaf & Dumb, H = Physically Handicapped, S = Spastic, C = Dyslexic

क्या लेखन - लिपिक उपलब्ध करवाया गया : हाँ / नहीं
Whether writer provided Yes/No No

एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।
Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters, write first 24 letters.

100

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कार्यालय उपयोग के लिए
Space for office use

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
SECONDARY EDUCATION, DELHI

LASS XII)

Q.No.	Marks	Q.No.	Marks
01	1	21	3
02	1	22	3
03	1	23	3
04	1	24	3
05	1	25	3
06	1	26	3
07	1	27	3
08	1	28	5
09	2	29	5
10	2	30	5
11	2	31	
12	2	32	
13	2	33	
14	2	34	
15	2	35	
16	2	36	
17	2	37	
18	2	38	
19	3		
20	3	40	
TOTAL Marks Q No. 1-29	34	TOTAL Marks Q No. 21-40	36

प्रश्न पत्र
केया है।

According to the
scheme.

हस्ताक्षर
Signature

Ashu

B

A. An

CBS

F.M

Grand Total Q.No.1-40
in figures

070

Total of Marks in words Seventy

2

1. Pollens grains of Vallisneria and other ~~aqu~~ water pollinated flower prevent themselves from settling by mucilaginous covering

2. (a) incomplete dominance

(b) Dominance

3. (a) Apis indica

(b) laghori

4. Some of the cyanobacteria have the ability to fix atmospheric ~~nitrogen~~ nitrogen into organic ~~sub~~ nutrients and thus help to increase the fertility of soil and therefore acting as a biofertilizer.
Eg. Nostoc, Anabena etc

5. When an ovum is fertilized by a sperm, chemical changes takes place in zona pellucida which prevent the entry of additional sperm into the ~~ova~~ ovum.

~~6. Acrosome is present at~~

6. Acrosome is a cap like structure present at the top of sperm head in human males.

It consists of enzymes like hyaluronidase which helps the sperm in fertilising the ovum by dissolving the wall of ovum facilitating sperm nucleus to enter the ovum.

7. Coelacanth or lobe fish were ~~fishes~~ first ~~the~~ fishes with strong fins and ~~had~~ they had the ability to come on land and go back in water thus, paving way to evolution of terrestrial animals.

8. Smoke produced by leaded petrol can inactivate the catalytic activity of catalytic converters and hence, it is advised to use unleaded petrol in vehicles fitted with catalytic converters.

SECTION-B

9. (a). Signal for parturition originates from the fully developed foetus and the placenta involving a complex neuroendocrine mechanism. This is also called foetal ejection reflex.

(b). Colostrum is a yellowish fluid/milk ~~product~~ produced in the body of mother during initial ~~few~~^{few} days of lactation and contains several antibodies of Ig-A type which is essential for developing immunity in the new born child.

10. (a). The human testis is located outside the abdominal cavity so as to provide a low temperature ($2-2.5^{\circ}\text{C}$ lower than the normal internal body temperature) which is required for spermatogenesis.

(b). In some organisms like honey bees, ~~over~~ ovum grows and matures into an ~~into~~ individual ~~or~~ even without fertilisation.

and these or thus these ~~same~~ animals are called parthenogenetic animals.

11. (a) ADA deficiency is caused due to deficiency of an enzyme adenosine deaminase (ADA) which arises due to deletion of a segment of DNA that codes for the enzyme ADA. This enzyme is involved in the immune system of our body.

(b) ADA deficiency can be treated by taking the immature lymphocytes from the bone marrow of patient and growing them in vitro and ~~in~~ introducing the gene for ADA in these cells by the use of a vector and then injecting these ~~cells~~ lymphocytes back into the body of patients. The vector used is generally a disarmed viral vector and the recipient cells are lymphocytes.

12. The bacterium Thermus aquaticus possesses Taq polymerase. This enzyme is a thermostable enzyme which ~~do~~ not ~~it~~ undergo denaturation even at high temperature above $98-100^{\circ}\text{C}$.

13. Cleistogamy is a flower which never opens and thus always perform self-pollination.
Advantage: It enables assured seed-set even in the absence of pollinators.

Disadvantage: Continued self pollination may lead to ~~increase~~ inbreeding depression.

14. ~~Dr~~ Ahmed Khan, a plastic sack manufacturer & along with the help of a college in ~~Bangto~~ Bangalore developed polyblend a powdered substance manufactured from ~~plac~~ waste plastic which when mixed with bitumen, are important ingredient for

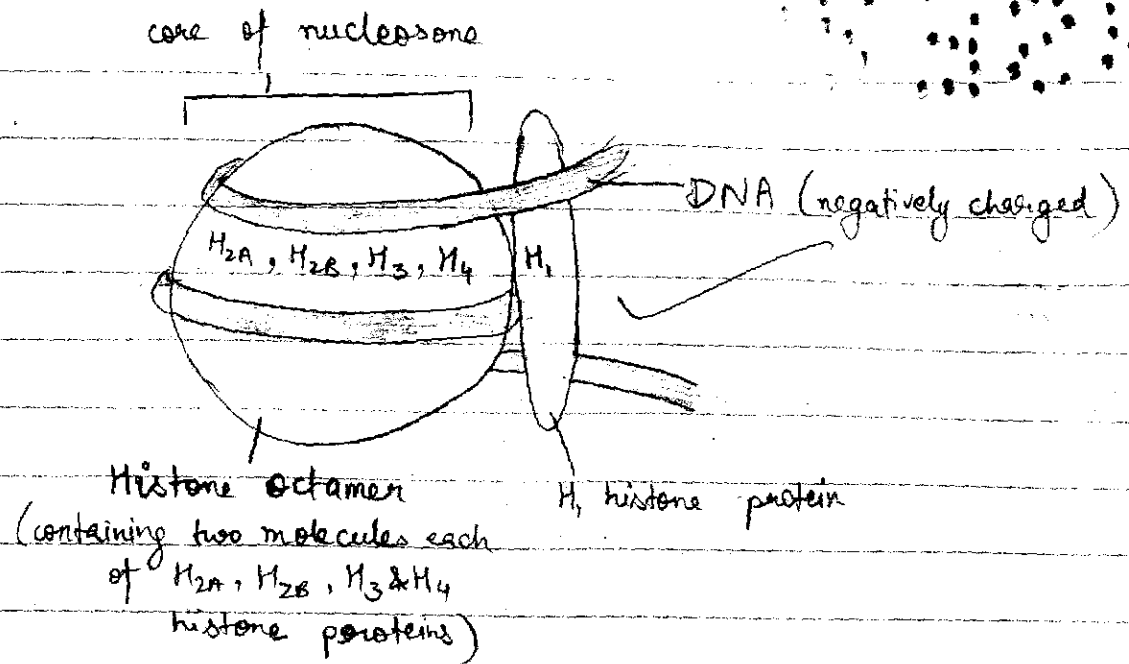
constructing roads increased the water repelling property of ~~the~~ ^{roads} and increased the average life time of roads by a multiple of three. Thus he ~~is~~ was successful in finding a solution to the ever-increasing problem of accumulating plastic waste.

15. (a) AIDS is caused by Human Immunodeficiency Virus (HIV) which belongs to a group of viruses called retroviruses. Retroviruses are those viruses which consists of ~~a~~ a RNA genome and transcribe into DNA in the host by the ~~pro~~ enzyme reverse transcriptase.

(b) HIV infection in humans is transmitted basically by the contact of body fluids of the infected ~~of~~ person and healthy person. It can be transmitted by:

- 1) Use of infected needles and syringes commonly used by intravenous drug abusers.
- 2) It can also be transmitted from an infected mother to the fetus.

16 (a)



NUCLEOSOME

(b). Histones are positively charged basic proteins which are rich in amino acids that contain ~~charged~~ positively charged side chain ~~residues~~ for example, arginine and lysine.

17. Organisms causing ringworms: Microsporum, Trichophyton, Epidermophyton

Diagnostic symptoms: 1) appearance of dry ~~to~~ and scaly lesions
2) intense itching

These organisms ~~are usually~~ usually thrive in groins (such as under arms) and also in hairs, beard, ~~roots~~ nails and between the fingers.

These organisms are fungal organisms which grow under moist and warm conditions which are ~~are~~ very well available in ~~these~~ the above mentioned body parts

18. Brood parasitism is a condition where a bird lays eggs in the nests of other bird and let the other bird incubate them. ~~During~~ ~~the process of~~ A classical example of which can be ~~seen~~ seen when Cuckoo bird lays egg in the nest of crow and ~~in the process~~ during the period of evolution, eggs of cuckoo bird has begun to resemble with the eggs of crow in colour, shape and size.

Section - D

28. (a) Tourists visiting Rohtang Pass or Mansarovar face oxygen deficiency due to low atmospheric pressure at high altitudes. But this problem gets acclimatised within few days because of the following changes in the body to ~~can~~ overcome oxygen deficiency;

- 1) increased RBC production, ✓
- 2) reduced binding efficiency of haemoglobin, and
- 3) increased breathing rate. ✓

(b) Small animals have large body surface area in comparison to their size and, hence, suffers from loss of body heat at a much faster rate. That is why, ~~small~~ small animals are not found in polar regions.

29. Frederick Griffith performed experiments on Streptococcus pneumoniae, a bacteria responsible for causing ~~pneumonia~~ pneumonia and mice.

He observed that the bacteria produces two colonies:

- 1). R-strain : or rough colonies which are non-virulent
- 2). S-strain : or smooth colonies which are virulent and cause death of mice

He observed that S-cells are virulent due to production of a smooth polysaccharide coat which is absent in R-cells.

He performed following experiments:

Mice + R-cell bacteria \longrightarrow Mice lived ✓

Mice + S-cell bacteria \longrightarrow Mice died ✓

Then he kill S celled bacteria by heating which cause denaturation of its genetic material and then injected in mice:

Mice + heat killed S-cells \longrightarrow Mice lived ✓

Now, he injected mice with heat killed S-cells and non virulent R-cells:

Mice + heat killed S-cells + R-cells \longrightarrow Mice died ✓

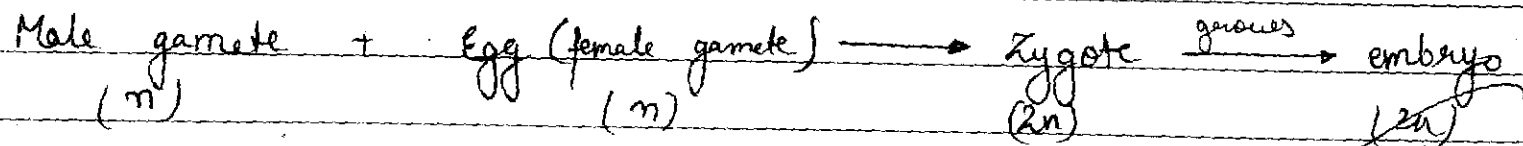
Then he recovered living S-cells from the dead mice.

Then he concluded that some ~~transforming principle~~ had been transferred from heat killed S-cell to living R-cells which enabled R-cells to ~~produce~~ secrete polysaccharide coat and become virulent.

Biochemical & nature of Griffith's transforming principle was unknown at that time but it was later proved to be DNA.

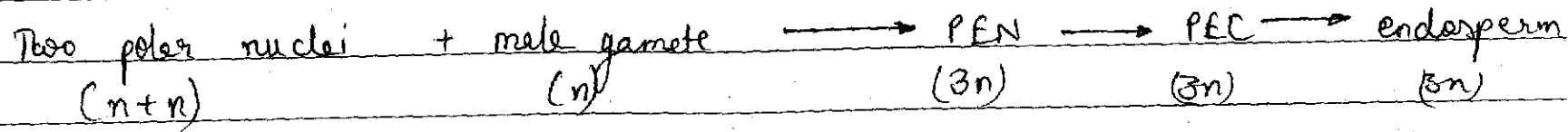
30. (a). At the time of fertilization, pollen tube brings two male gametes and the following two processes takes place in the embryo sac:

1) Syngamy: It is the fusion of ^{haploid} male and female gamete to form a diploid zygote which further develops to form embryo.



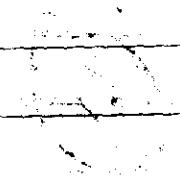
Syngamy is ~~also~~ also called generative fertilisation

2) Triple fusion: The other male gamete moves to the ~~the~~ central cell to fuse with the two polar nuclei to form ~~prime~~ a triploid primary endosperm nucleus (PEN) which grows to form primary endosperm cell (PEC) and which divide mitotically to form endosperm.

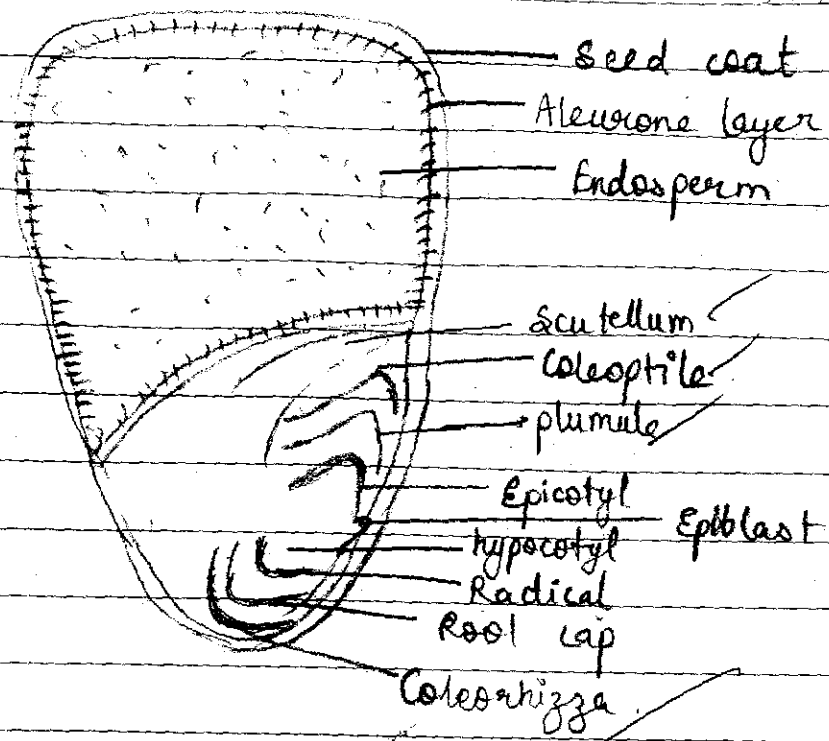


Endosperm ~~is not~~ provide nutrition to the developing embryo. Thus triple fusion is also called vegetative fertilisation.

Since, this process involves two types of fertilisation, it is referred to as double fertilisation.



(6).



LS. of Maize seed
(A typical Endospermous monocot plant).

Section-C

19.

Pesisperm

1. Pesisperm is the remnant of nucellus in some seeds.
2. It is a diploid structure.
3. It is present outside the seed.
4. Only ~~few~~ few ~~species~~ plants have pesisperm.

Eg. Black pepper

Endosperm

1. Endosperm is a nutritive tissue formed ~~during~~ after triple fusion.
2. It is a triploid structure.
3. It is present inside the seed.
4. It is formed in every sexually reproducing flowering plant.

Eg. Maize

20.

Industrial melanism ~~is~~ shows the effect of ^{industrial} ~~industrial~~ pollution on the ~~pop~~ population of moth on a nearby tree.

Before industrialisation, ~~the~~ number of white coloured moth is ~~more~~ ^{more} than the dark coloured moths on a tree which condition is reversed after industrialisation. Before industrialisation, ~~the~~ light coloured lichens used to grow on trees and therefore moth predators could not spot white moths ^{easily} and thus ~~the~~ dark moths are lesser in population. But ~~after~~ ~~the~~ due to industrial pollution, lichens could not grow on trees and now it became difficult to spot dark ~~the~~ moths on the dark background of stem bark and thus population of white moths become less than that of dark moths. Thus, this process is termed as industrial melanism.

Thus, industrial ~~melan~~ melanism supported ~~the~~ Darwin's theory of natural selection that as natural conditions changes, the organism which is more fit for the environment survives better than the other.

Here, before industrialisation white moths are better adapted towards nature but after industrialisation ~~the~~ dark coloured moths were more fit towards the changed environmental conditions.

- 2) 1) The DNA molecule consists of two strands of polynucleotide chain which have antiparallel polarity, i.e., one ~~the~~ strand has polarity $5' \rightarrow 3'$ and the other has $3' \rightarrow 5'$.
- 2) The two ~~strand~~ strands of DNA are joined together by hydrogen bonds between purines and pyrimidines. Adenine always pairs with Thymine by 2 hydrogen bonds and guanine always pairs with cytosine by 3 hydrogen bonds.
- 3) The paired polynucleotide chain is coiled in a right handed fashion where pitch of helix is 34 \AA and distance between two consecutive base pairs is 3.4 \AA .
- 4) The backbone of DNA double helix is formed by sugars and phosphates where bases are ~~not~~ projecting inwards.

23. (a). RNA i (or RNA interference) is used to develop nematode resistance in tobacco plant. It involves following steps:

- 1). Disease causing gene was identified and isolated from the nematode Meloidogyne incognita and is incorporated into the genome of tobacco plant with the help of a suitable vector.
- 2). It is introduced in tobacco plant in such a way that both sense and antisense ~~the~~ mRNA is produced. These RNAs being complementary get paired to form a double stranded RNA.
- 3). This dsRNA induce RNA i in the tobacco plant which neutralise the m-RNA of the nematode during actual infection. Thus, nematode is unable to live such a transgenic host and, therefore, the tobacco plant become resistant to the pest.

RNA i is a strategy of cellular defence in all eukaryotic organism which involve silencing of disease causing m-RNA ~~by~~ ~~pd~~ and preventing it from expression.

(b) The vector used for introducing ~~the~~ nematode specific gene in tobacco plant is Agrobacterium tumefaciens.

24. When ~~there~~ a gene exists in more than two allelic forms, the phenomenon is called multiple allelism.

When two alleles of a gene are not dominant over each other and expresses ~~themselves~~ themselves independent of the presence or absence of other then, the phenomenon is called co-dominance.

Both these phenomena ~~are~~ can be easily explained on the basis of ABO blood grouping in humans. The blood groups in human is controlled by the gene I which exist in three allelic forms; I^A , I^B and i . This, it show multiple allelism.

I^A and I^B codes of a glycoprotein that protudes from the surface of RBCs while i does not codes for ~~any protein~~ anything.

Therefore, I^A and I^B are co-dominant ~~are~~ over each other ~~while~~ ^{both} are dominant over i .

When both I^A and I^B comes together in an individual, both the types of glycoproteins are produced and hence the blood group becomes AB.

By these three alleles, give possibilities of genotype occurs:

$I^A I^A$ }
 $I^A i$ } → blood group A

$I^B I^B$ }
 $I^B i$ } → blood group B

$I^A I^B$ } → blood group AB

$i i$ } → blood group O

- b) (i) $I^A i$ → A blood group ✓
 (ii) $i i$ → O blood group ✓

25. (a). Population density of a habitat can be measured in various ways such as:

1. Number: Counting the number of individual is the most easiest ~~one~~ method in most of the ~~so~~ cases. But it become insignificant in some cases like ~~a~~ number of phytoplanktons in a lake etc.

2. Biomass: It is mass of ~~living~~ organic matter in an ecosystem. It is the most adequate ~~and~~ and appropriate ~~with~~ measure for determining population density.

3. Guessing by comparing statistics: ~~Both~~ ~~Both~~ Consider the case to determining population density of fishes in a lake. In this case both the above mentioned ~~a~~ methods fails and, hence ~~can be~~ this can be done by comparing the number of fishes caught in a ~~single~~ single trap. The one giving more number per trap has higher population density.

This can also be done by examining faecal deposits and pug marks as done in national parks and sanctuaries for counting the number of tigers.

(b) Studying the population density of an organism can help us to know whether the species is growing or declining.

In case of declining species, appropriate measure could be taken in order to compensate the loss.

In case of growing species, appropriate measures could be taken to control the population if it crosses the sustainable level.

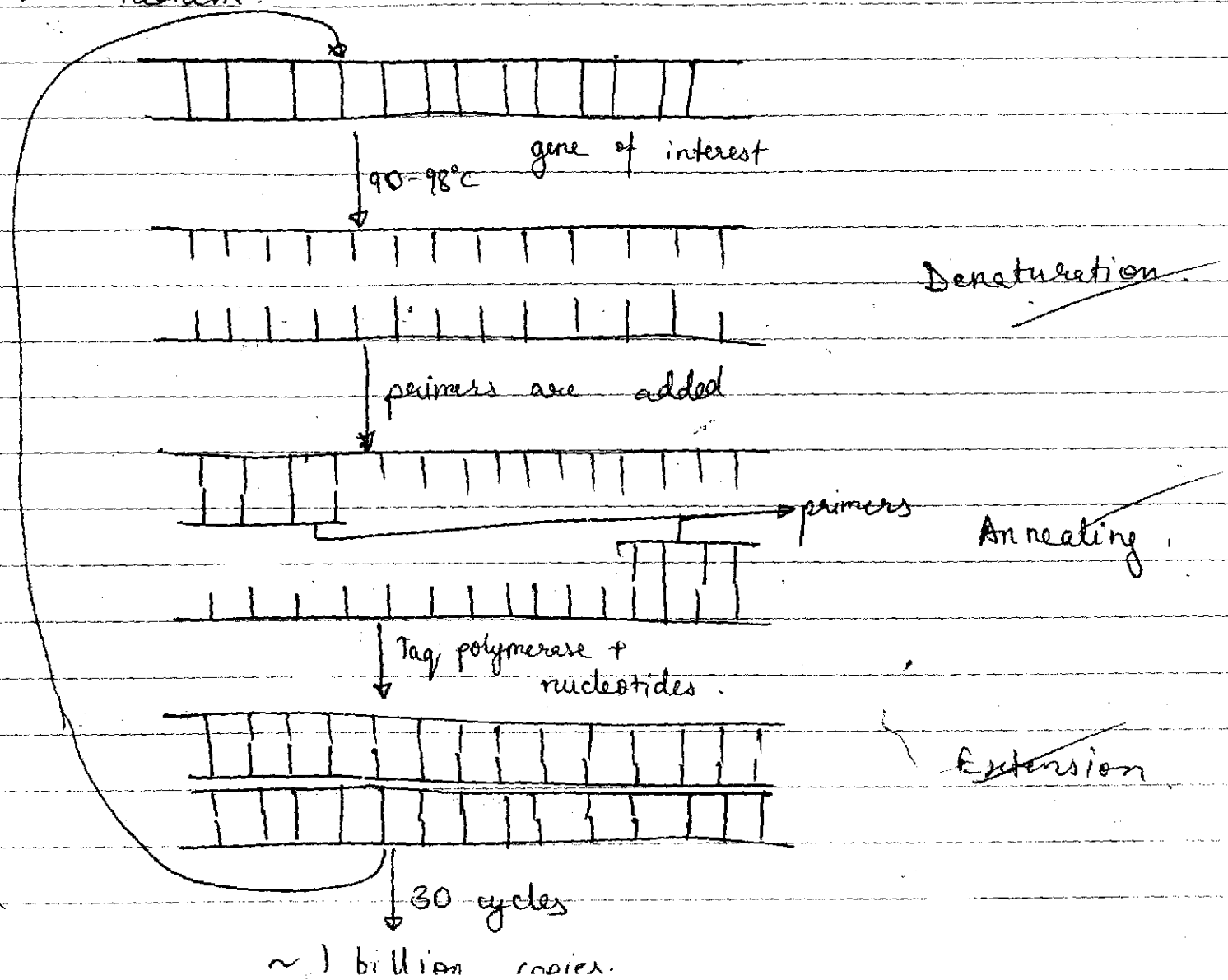
26. Polymerase Chain Reaction (PCR) is a technique to increase the number of gene of interest with the help of two sets of primers and polymerase enzyme. Polymerase enzyme used for PCR is a thermo stable enzyme, Taq polymerase obtained from *Thermus aquaticus*, a bacteria.

PCR involves three steps:

1) Denaturation: Heating the gene of interest upto 98°C cause ~~the~~ denaturation of DNA and ~~the~~ the two strands separate.

2) Annealing: Then the two sets of primers are added which bind to appropriate complementary segment of DNA strands.

3.) Extension : is the polymerisation of nucleotide chain by the enzyme Taq polymerase using the nucleotides provided in the medium.



27. (a) For improving success rate of production of desired hybrids and herd size of cattle a programme called Multiple Ovulation Embryo Transfer (MOET) technology is used.

$\frac{1}{2}$

(b) For carrying MOET for cows the steps are taken:

1) Cow is administered with a hormone, with FSH like activity, which induce follicular maturation and cause super ovulation, i.e., production of 6-8 ovum ~~at~~ in one cycle.

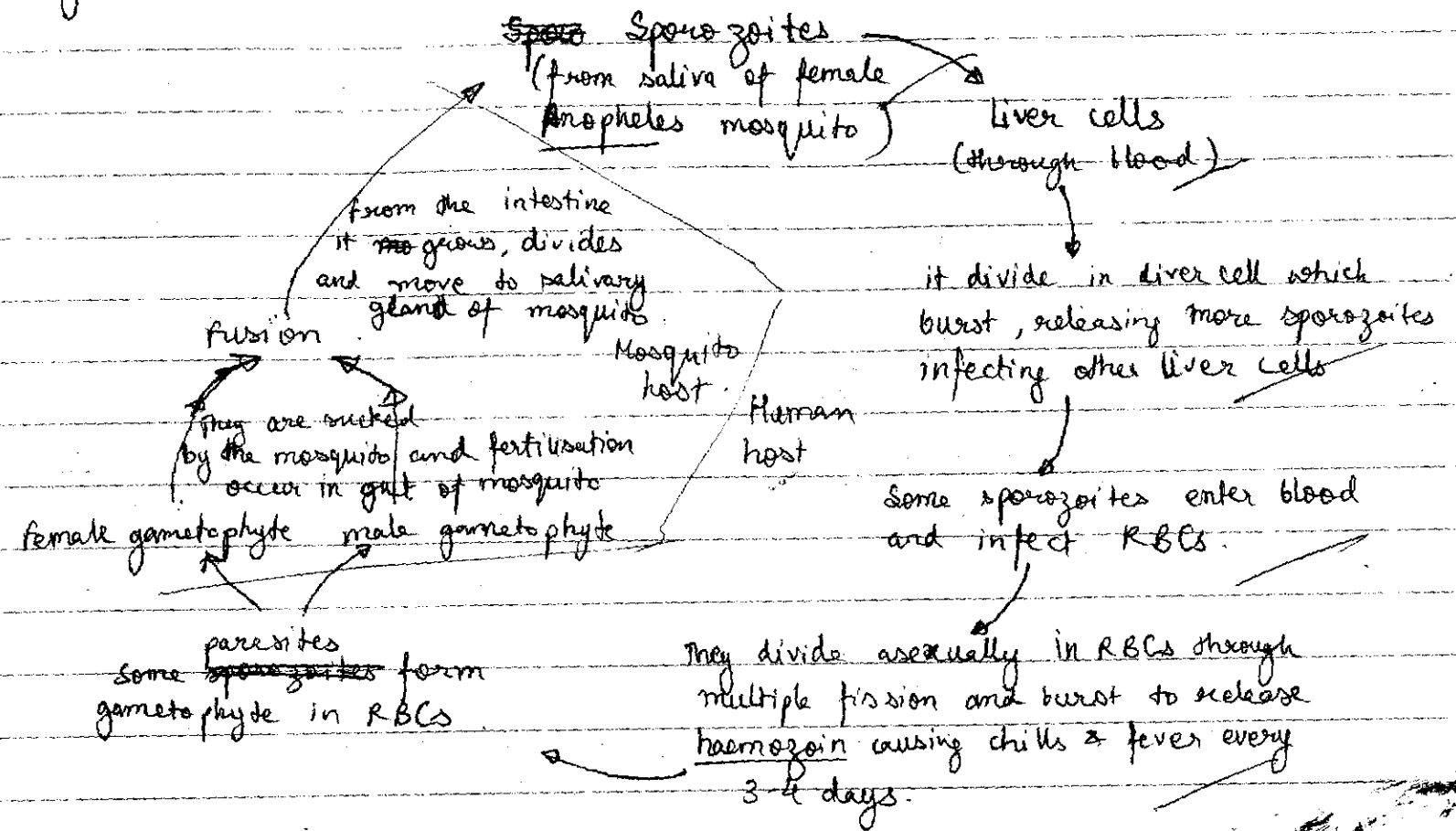
2) Then the cow is mated with a superior bull or artificially inseminated.

3) The embryos are ~~here~~ recovered at 8 celled stage non surgically. And the embryos are ~~transf~~ transferred to surrogate mother and the cows are again ready for another cycle of super super ovulation.

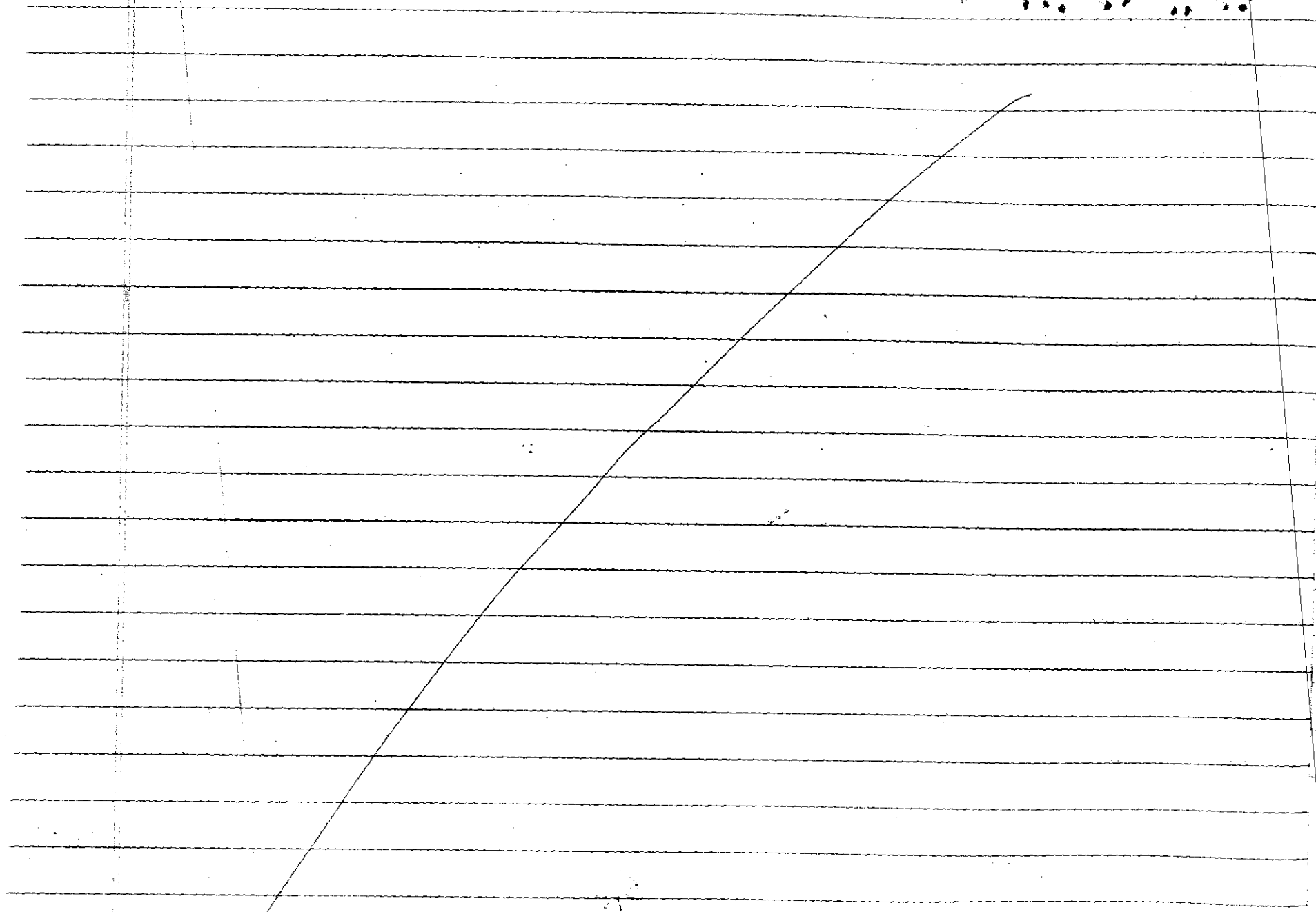
✓

$\frac{2}{2}$

22 Malarial parasite (Plasmodium) infect human body at sporozoite stage of its life cycle.



(Life cycle of Plasmodium)



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