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

विषय Subject : BIOLOGY

परीक्षा का दिन एवं तिथि
Day & Date of the Examination : FRIDAY 15-3-13

उत्तर देने का माध्यम
Medium of answering the paper : ENGLISH

प्रश्न पत्र के ऊपर लिखे कोड को दर्शाएं
Write Code No. as written on the Top of Question Paper : 57/1/2

अतिरिक्त उत्तर पुस्तिका (यों) की संख्या
No. of Supplementary answer-book(s) used :

दिव्यांग शारीरिक अवस्था : लागू हो तो संबंधित बॉक्स में ✓ का निशान लगाएं।
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

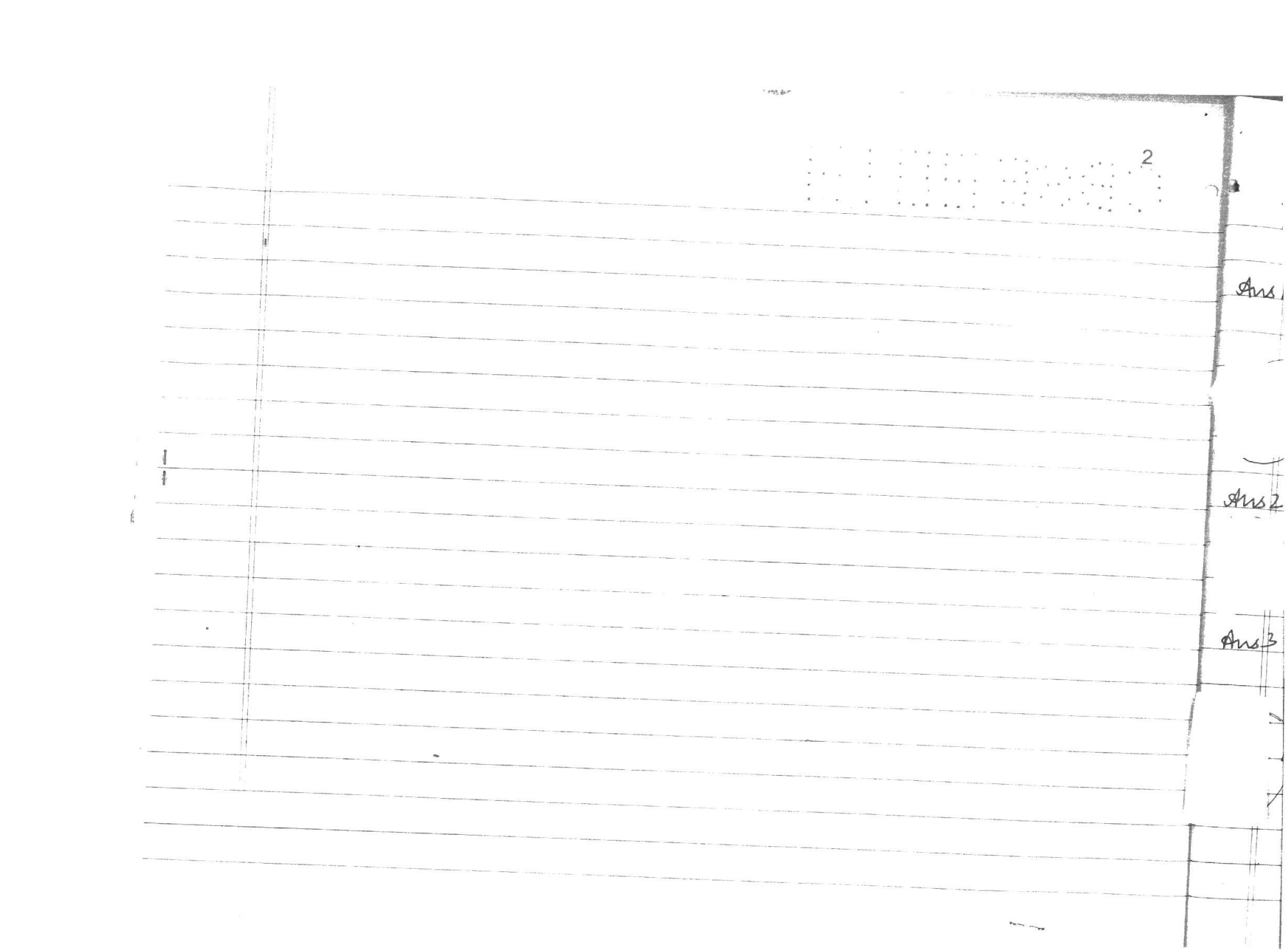
*एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।
Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters,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

कार्यालय उपयोग के लिए
Space for office use

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
Central Board of Secondary Education, Delhi

सीनियर स्कूल सर्टिफिकेट परीक्षा (कक्षा बारहवीं)
SENIOR SCHOOL CERTIFICATE EXAMINATION (CLASS XII)

प्रमाणित किया जाता है मैने/हमने इस उत्तर पुस्तिका का मूल्यांकन प्रश्न पत्र के समुचित सेट के अनुसार और पूर्ण रूप से मूल्यांकन पद्धति के अनुसार किया है।
Certified that I/We have evaluated this answer-book according to the correct set of question paper and strictly as per the marking scheme.


2
Ans
Ans 2
Ans 3

Ans 1 $NPP = GPP - RL$

NPP = net Primary productivity
GPP = gross primary productivity
RL = Respiratory loss

Ans 2 a) 50,000 strains of rice – Genetic biodiversity
b) Estuaries & alpines – Ecological biodiversity

Ans 3 Cellulase is needed for isolating genetic material from plant cells to breakdown the cell wall of plant cell made up of cellulose. Animal cells do not have a cell wall

Ans 4 MOET - Multiple ovulation embryo ~~technology~~ transfer.
This technique is used to increase the herd size in a short time.
The female cattle is administered with FSH like hormones to induce superovulation. As a result 6-8 eggs are produced at one time and they are recovered non surgically at 8-32 celled stage and put in a surrogate mother.

Ans 5 Homologous structures are-
(i) Vertebral heart
ii) Thorns in bougainvillea and tentrils of cucurbita.

Ans 6 DNA dependent DNA polymerase is the enzyme.
It polymerises the DNA strand only in 5'-3' direction. As a result continous and discontinous replication occurs

Ans 7 Sharing of injection needles between between two individuals can cause transmission of diseases like AIDS and Hepatitis-B. These diseases are fatal and incurable.

Ans 8 Tapetum is responsible for nourishment of pollen grains (male gametophyte). That's why malfunctioning tapetum often fails to produce viable male gametophyte.

Ans 9 In gene therapy, lymphocytes are extracted from the affected individual and cultured outside. ADA cDNA is inserted in the lymphocytes and they are then put back in the body. The cDNA is inserted with the help of retrovirus. Since lymphocytes are mortal, this cure is not permanent. If this therapy is done with bone marrow in embryonic stage, it can be a permanent.

Ans 10 1) PCR - Polymerase Chain Reaction

1) Used in early diagnosis of diseases like AIDS and cancer.

2) Amplification of DNA and ∴ used in DNA fingerprinting

ELISA - Enzyme linked Immuno Sorbent - assay

1) Early diagnosis of diseases using antigen-antibody interaction. Diagnose AIDS.

Ans 11 Sources of e-wastes are -

a) parts of computers, television.

b) parts of air conditioners, heaters and other electronic items.

c) mobile phones

Ways of disposal are - 1) Recycling

2) Landfills

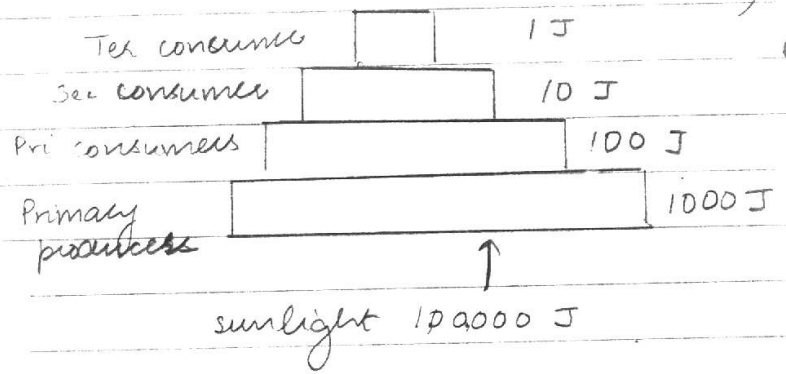
3) Incineration

Ans 12. 1) Flow of energy is unidirectional

2) Whenever energy is passed on from one ~~trophic~~ level to the other trophic level some of it is lost as heat by the organism.

3) Therefore only a ~~small~~ fraction of energy is passed to the next trophic level.

eg -



4) 10% energy is lost at every trophic level.

Ans 13 Rate of loss of heat depends on the surface area. More the surface area of organism more will be the heat loss. Since small animals have more surface area as compared to their volume, heat loss is more. Moreover ~~the~~ thermoregulation is an energitically expensive process that small animals cannot afford.

Ans 14 a) In ~~flowers~~ plants like Commelina, viola and oxalis the flowers are closed in. The anthers and stigma are not exposed and placed very close to each other. This ensures autogamy.

b) Advantage: Assured seed set even in the absence of pollinators.

Disadvantage: Repeated self pollination will cause no variations and finally lead to inbreeding depression.

Ans 15. Chorionic villi appear in humans during the foetal life when they are present inside the mother's womb. The blastocyst after it is implanted in the endometrium develops chorionic villi around it. Chorionic villi along with maternal tissue ~~tissue~~ forms placenta and helps in transportation of oxygen, carbon dioxide, nutrition and excretory wastes.

Ans 16

Parents Tt × Tt

Gametes T t T t

F1 progeny

	T	t
T	TT	Tt
t	Tt	tt

Phenotypic ratio = 3 : 1

3 Tall, 1 dwarf

Genotypic ratio = 1 : 2 : 1

Ans 17 a) Antibody = IgE
Chemicals = Histamine and serotonin released from mast cells.

b) Antihistamines, Steroids

Ans 18 ~~a) when a gene is inserted inside the ampicillin~~
a) Put E.coli in ampicillin containing medium.
If the E.coli is transformed it will survive in the medium as it has ampicillin resistant gene.
But if E.coli has not been transformed it will die in the medium

b) Ampicillin resistant gene act as <u>selectable marker</u> in above case and help us to separate transformants from non transformants

Ans 19 a) The fruit juices are made clears by substances like protease and pectinase released by microbes.

b) → Trichoderma polysporum = Cyclosporin A (It is an immunosuppressor)
→ Monascus Purpureus = statins (Responsible for lowering blood cholestrol level).

Ans 20 a) Transgenic animals are so called because they have been modified by insertion of recombinant DNA. Desirable traits have been introduced in them to produce products and services beneficial for humans

b) i) Vaccine safety: Transgenic ~~any~~ animals are developed to make and test various vaccines on them. for eg. vaccines for polio, pox, typhoid, tuberculosis after being made are first tested on animals like mouse for their safety & to check if they do not cause any side effects or harmful for health.

eg- Mice is being used as transgenic animal to test safety of polio vaccine.

(ii) Biological product: Rosie cow has been developed whose milk is rich in α-lactalbumins. It is a human milk protein and concentration of this protein in Rosie cow's milk is much more.

α-1-antitrypsin has been developed for treatment of emphysema. Transgenic animals are used to produce many products useful for humans

Ans 21 Algal bloom destroy the quality of fresh water body by-

1) They consume the dissolved oxygen from the water bodies and thus killing the aquatic like

2) Some algal blooms are also toxic to the health of humans

3) They spread all over the lake, the lake develops a foul smell and green colour. The water becomes polluted

4) Algal blooms develop in water due to increase in concentration of nutrients inside the water.

Ans 22 a) A single outcross is sufficient to overcome inbreeding depression. In this two animals are mated which belong to same breed but do not have any common ancestor for 4-6 generations.

~~Cross breeding can also be used if in which animals of different b~~

The basic purpose is to mate two animals which are not closely related to each other

b) 1) Inbreeding helps in development of pure lines
2) It exposes the harmful recessive traits which can be eliminated by selection.
3) It helps us to select desirable traits and eliminate undesirable traits.
4) Helps to maintain homozygosity so that characters do not segregate in next generations

(c) Improved breed of cattle is jersey.

Ans 23 Mutualism (+,+) - In this relationship both the organisms are benefitted. ~~eg = Sea anemone~~

eg - 1) mycorhiza - Interaction between fungi and roots of higher plants. Fungi absorbs phosphorus and other nutrients from soil for plant whereas plants provide food and shelter to fungus.

2) Interaction of flowers and pollinators - Wasp lays its eggs inside ovary of fig plant and also uses the seeds of fig fruit to feed its larva. In return wasp pollinates the flowers of fig.

Commensalism - In this one species is benefitted but other species is neither harmed nor benefitted.
(+,0)

eg - Sea anemone & clown fish. - The clown fish takes shelter inside sea anemone as it protects it from aquatic animals due to stinging tentacles.
But Sea anemone is neither harmed nor benefitted.

Ans 25 a) In multiple allelism a character is controlled by ~~two~~ three or more alleles.

Since ABO blood group has three alleles - I^A, I^B and i, it is considered a good example of multiple allelism.

b)

Genotype of mother = $I^A I^A$

Genotype of father = $I^B I^B$

Parents $I^A I^A$ × $I^B I^B$

Gametes I^A I^B

F_1 progeny $I^A I^B$

Blood group of the child will be AB.
This is due to co-dominance

I^A and I^B produce slightly different type of sugar on RBC membrane.
When I^A and I^B are present together both types of sugars will be made on RBCs. That's why the blood group is AB.

Ans 26 Effect of anthropogenic action on organic evolution can be explained by many examples.

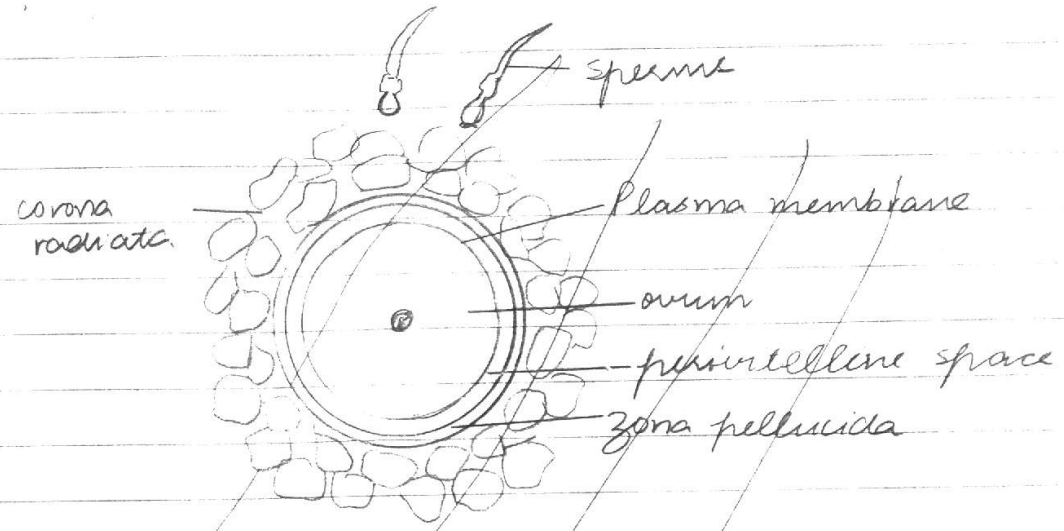
① Use of chemicals like mosquito repellants, pesticides and fungicide has enabled the selection of mosquito and pest species that are better adaptive to the environment. Due to anthropogenic action the rate of evolution has increased and as a result in a very short time new species have evolved that can resist the chemicals

② Use of antibiotics have increased the rate of evolution of bacteria and virus. Among many species of bacteria due to some chance event a mutation occurred in few individuals. Due to selection using antibiotics those individual who have got resistive properties got selected and produced a large no of progeny.

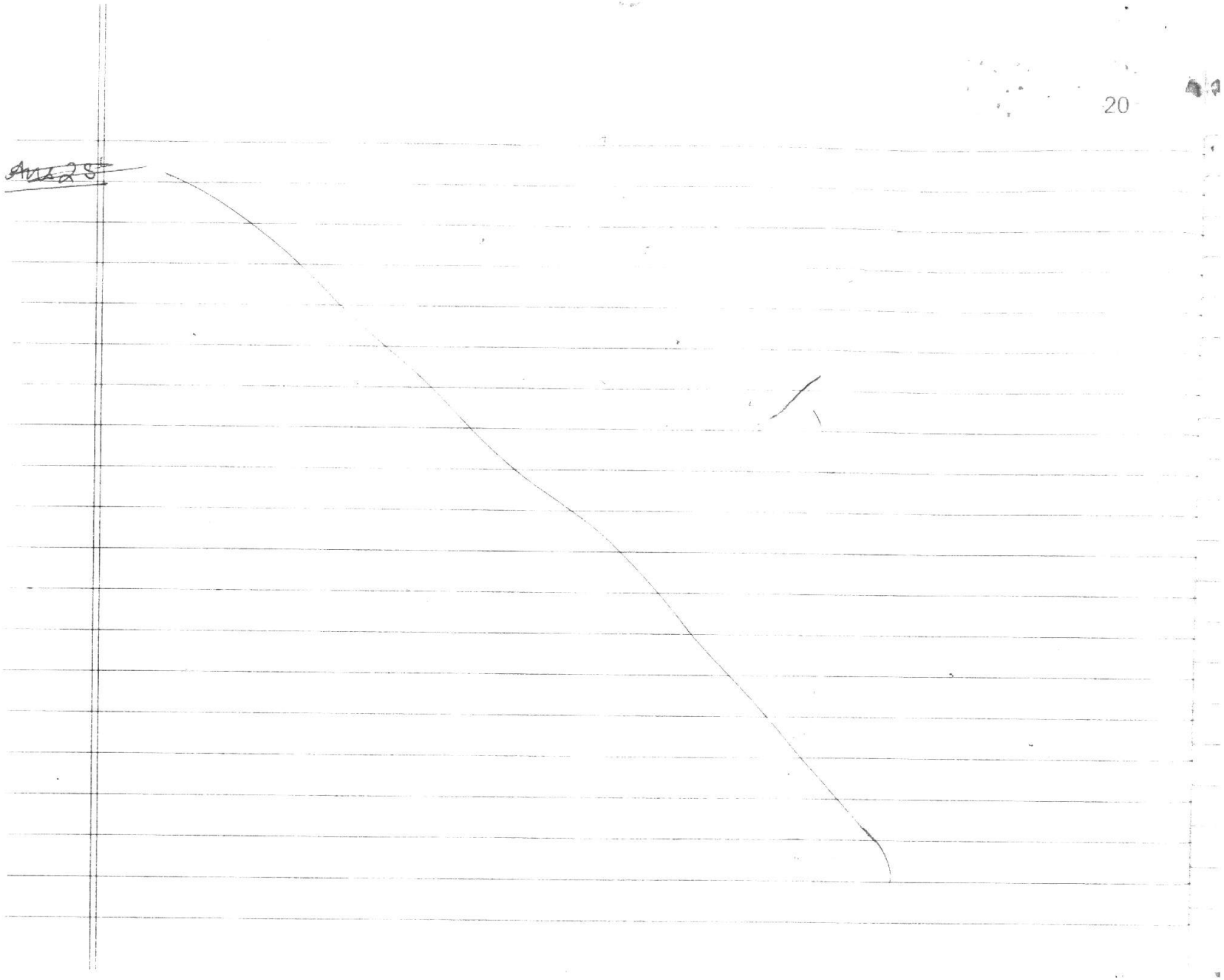
③ artificial selection of various species of cabbage and cauliflower lead to the formation of ~~soon~~ species like kale, brocolli, red cabbage etc.

④ Industrial melanism: Earlier white moth used to live on trees in England as trees were covered with lichen. The tree bark were whitish in colour and white moth could easily camouflage in that environment. But due to industrialisation, trees got covered with black soot, as a result melanised moth got selected as now they could not be detected by prey.

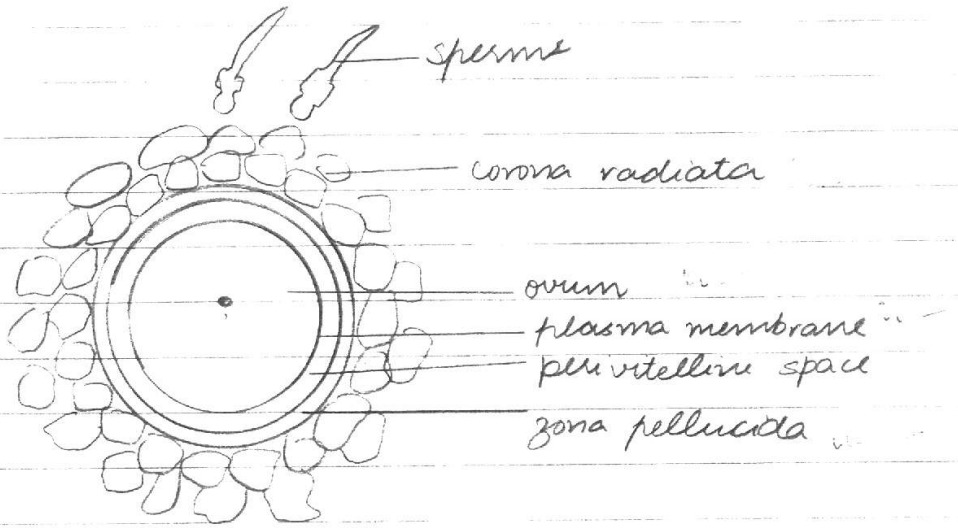
Ans 27 a).



b) Zona Pellucida forms the covering of ovum.
~~The sperm~~ Once a sperm has entered inside ovum, the zona pellucida gets blocked and prevent the entry of any further sperm.



Ans 27 a)



b) Zona pellucida forms covering of an ovum. As soon as a sperm enters inside ovum zona pellucida gets blocked and prevent the entry of any ~~further~~ more sperms. This ensures that ovum is fertilized only by a ~~single~~ sperm.

Ans 28 a) Plant breeding is a method of developing plants having desirable traits like disease resistance, resistance against environmental disturbances like drought and water stress, high yield and improved quality.

Two steps are
a) Hybridisation
b) Artificial selection

(b) There are many desirable traits which are difficult to be found in wild relatives. Traits like disease resistance can be induced by mutation using rays like gamma radiations. They causes change in DNA structure which results in a plant having all desirable characteristics

eg- Mung beans have been mutated to have resistance against Yellow mosaic virus and powdery mildew.

c) Breeding programs like biofortification has helped in improving public nutritional health.
In biofortification plants are grown which have higher amount of vitamins, minerals, proteins and good quality ~~fats~~ and healthy fats.
The following traits have been introduced
1) Mineral content
2) Vitamin content
3) Protein content & quality
4) Fat/oil content & quality.

eg ① Atlas 66 has high amount of protein. It is a modified variety of ~~sict~~ wheat.
② Maize rich in tryptophan and lysine
③ Iron fortified rice has been developed which has five times as much iron as any rice variety.
④ Vitamin A enriched spinach, pumpkin and carrots.
⑤ Single cell protein also used to produce large amount of protein using Methylophilus methylotropus

Ans 29. a) Thalassemia is a mendelian ~~disorder~~ autosomal recessive disorder. It is caused due to deletion or mutation of gene in any of the α or β chain of haemoglobin which results in decreased rate of synthesis of haemoglobin chain. As a result haemoglobin becomes depicted and result in anemia which is a common symptom of this disease.

(b) Since Thalassemia is an autosomal recessive it will only be caused if both the parents are heterozygous for this condition and act as carriers. A homozygous mother could not alone cause this disease as people suffering from this disease are not viable upto later stage of life.

Genotype of both parents will be Aa

Aa × Aa

~~Aa~~ ∅

A	a	A	a
AA	Aa	(aa)	Aa

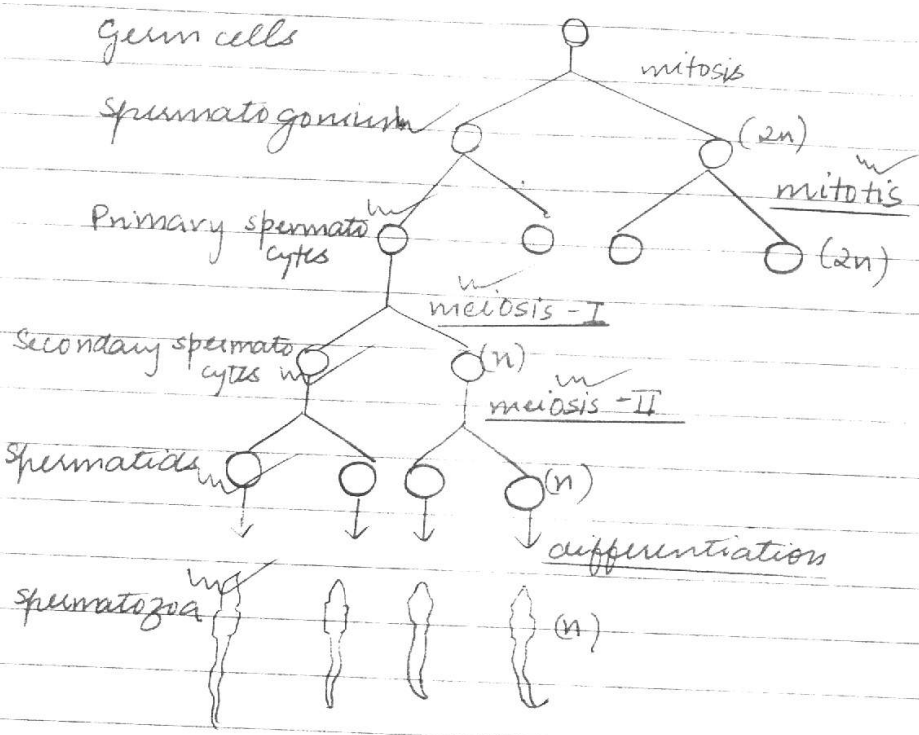
→ Child suffering from thalassemia

Therefore not only mothers but father is also responsible for this disease.

(c) Values are- respect for women, equality, not to blame women for every disease of their child father could also be responsible, treat women properly and with dignity.

Ans 30 (a)

After Puberty



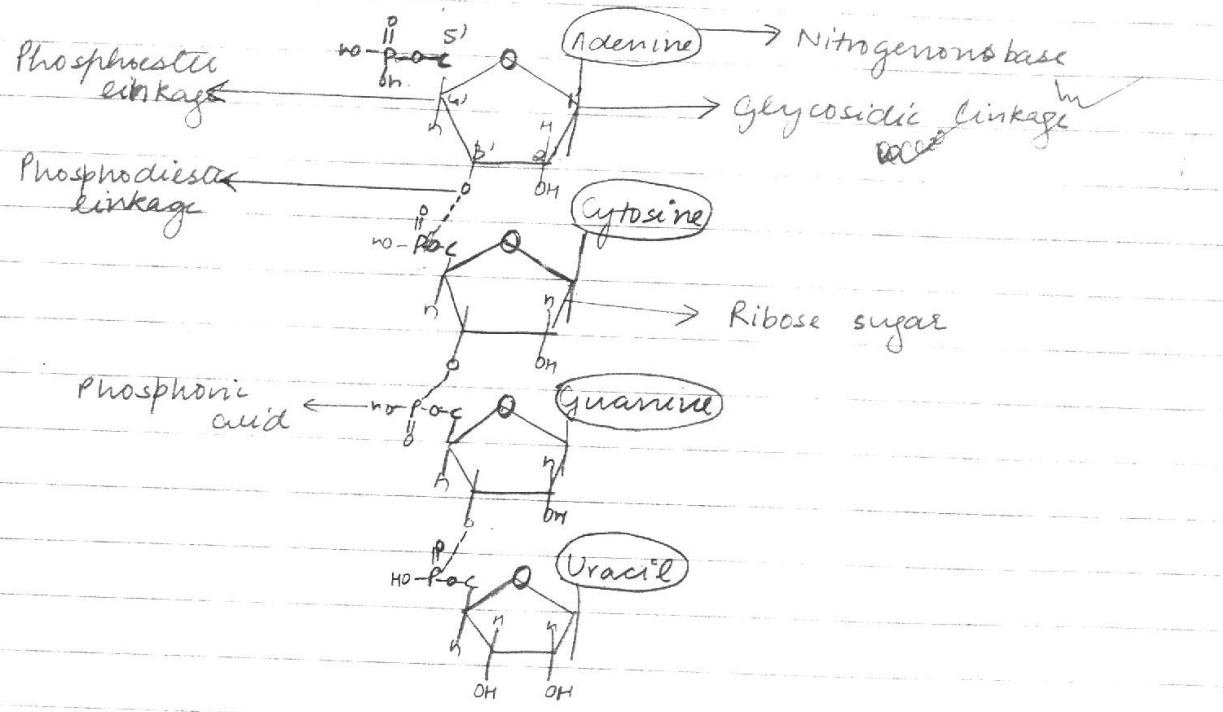
Spermatogenesis is a process of formation of sperms from germ cells. It occurs in seminiferous tubules of testes. The germ cells divide to form spermatogonium. The spermatogonia mitotically divide to form diploid primary spermatocytes. These then undergo first meiosis division to form haploid secondary spermatocytes. They undergo second meiotic division to form spermatids. The maturation of spermatids to form sperms is called as spermiogenesis. The sperm's heads are imbedded inside the sertoli cells for nourishment. The process of releasing of sperms from seminiferous tubule is called as spermiation.

(b) Difference

Spermatogenesis	Oogenesis
① The process starts at puberty	The oogonium are formed to primary oocyte in foetal life only.
② 4 equal sperms are formed	One large ovum & 2 polar bodies are formed

(3) The 2 meiosis occur simultaneously	The meiosis do not occur simultaneously
(4) It occurs in testes	It occur in ovaries

Ans 24



1. The nucleotides in RNA consist of ribose sugar, nitrogenous basis (adenine, ~~thymine~~, guranine, cytosine and Uracil) and phosphonic acid attached at 5' carbon by phosphoester linkage
2. The nucleotides join by 3'-5' phosphodiester linkage.
3. RNA is a very unstable structure due to presence of -OH group at 2' site.
4. RNA generally exist as a single stranded structure.
5. The nitrogenous basics are attached by 1'-3 glycosidic linkage.