



K.L.E. SOCIETY'S
P. C. JABIN SCIENCE COLLEGE
HUBBALLI
AUTONOMOUS

Semester Ist

B.Sc.



B.C.A.

M.Sc.

Answer Booklet No.

45887

Theory Semester End
Examination

April/May 20

Nov./Dec. 20

Certified that the entries made by the candidate
are found to be correct.

[Signature] 26/3/22

Signature of the Room Supervisor with Date

Exam. Reg. No.

1 2 1 B 2 0 0 2

Class : BSc-Ist Subject : Zoology Subject Code No.

Paper :

11841001

CGID



121BZ002

IMPORTANT INSTRUCTIONS TO CANDIDATES

- 1) On the cover page of answer book compulsorily mention your Register Number, Subject, Course Code and required information.
- 2) Don't write your name or mark any signs, such answer scripts shall not be assessed and punished.
- 3) Write your answer from 1st page and don't leave any blank pages and blank space in between.
- 4) Last page is meant for rough work and on completion put cross mark (x)
- 5) The candidates are informed strictly to write their answer only with black ink & write on both sides of the answers sheets.

IMPORTANT INSTRUCTIONS TO CANDIDATES

- 6) Please mention the Question number in the margin. Answer's without Question number & also with wrong question number shall not be valued.
 - 7) The students are informed to take compulsorily the signature of the room supervisor with date on the answer book.
 - 8) The candidate should be present 20 minutes before the commencement of the examination. After that no students will be allowed in the examination hall.
 - 9) Use of any electronic gadgets in the examination hall is strictly prohibited.
 - 10) After the last warning bell, no candidate is allowed to leave his/her seat.
 - 11) Indulging in different ways and using different means that lead to malpractice is prohibited.
 - 12) Don't fold the answers sheets & keep the answer sheets clean.
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ಉತ್ತರವನ್ನು ಇಲ್ಲಿಂದ ಆರಂಭಿಸಿ
START WRITING ANSWER FROM HERE BELOW

2 a) Two functions of Lysosomes :-

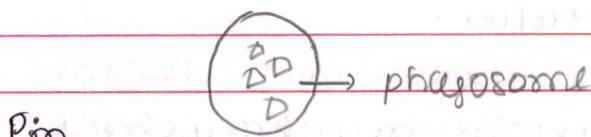
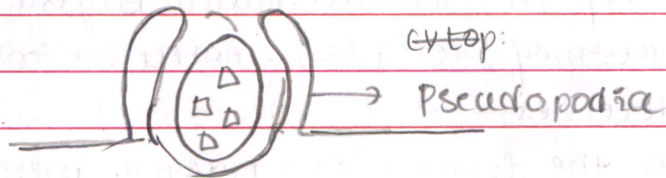
- Lysosomes help in Intracellular Digestion, that is breakdown of complex molecules into simple molecules.
- They help in the formation plasma membrane and other organelles.

b) Process of endocytosis in eukaryotes :-

- Endocytosis it is a process of intake of food or other molecules by formation of pseudopodia.
- It is same mechanism as that of Immune System of body i.e. fighting against foreign materials when enter the body.
- There are two types of endocytosis.
 - a) Phagocytosis - cell eating
 - b) Pinocytosis - cell drinking.
- Phagocytosis
it is the "cell eating" process
when the materials come from outside the plasma membrane, they engulf them by forming pseudopodia like structures.
- mechanism :- when the molecules come and bind to receptive site it activates the production of pseudopodia
this pseudopodia engulfs the material and pinches off.

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These are utilised for - internal usage purpose.



Pin

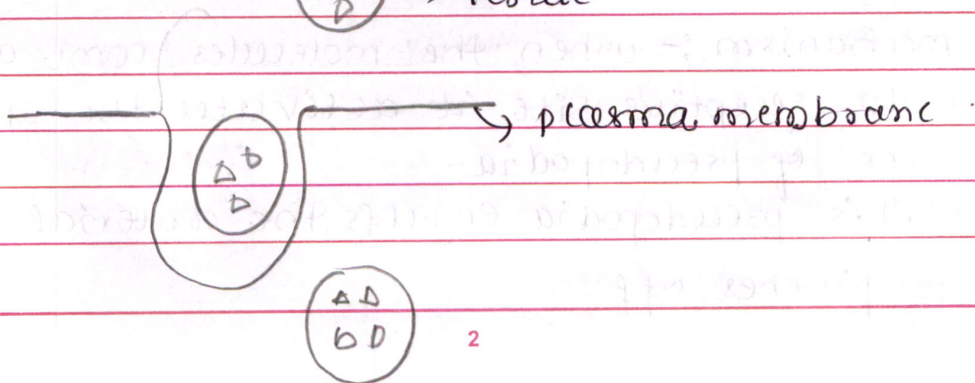
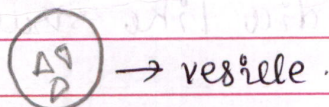
Pinocytosis is

- This is called cell drinking process.
- The plasma membrane when needed pinches the water or other liquid substances in the form of vesicles.

Mech. Here the vesicles come and binds to the receptive site of plasma membrane.

- the formation of pseudopodia is absent here instead the vesicles fuses at the membrane site.

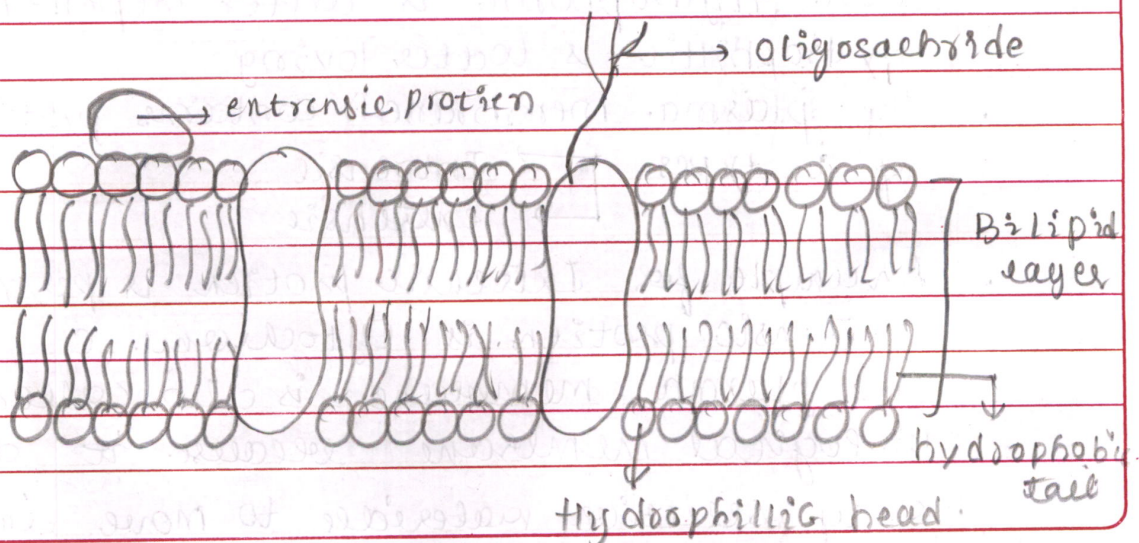
- The materials move inside the membrane.



c) Fluid Mosaic model of plasma membrane

- This model was proposed by Singer and Nicolson.
- They are present inside the cell in Eukaryotes. But in prokaryotes they are located outside the cell.
- The composition of cell membrane is made up of lipid 20-30%, carbohydrate 5-10%, proteins 60-75%.
- This composition doesn't remain same in all cell.
- In B.B.C the protein - 50% lipid - 40% constitute the cell membrane.
- The cell membrane or plasma membrane is quasi fluid in nature.
- The proteins are present on the cell membrane in as the floating icebergs on the oceans.
- The plasma membrane is made of hydrophobic & hydrophilic ends.
- where hydrophobic is water repellent & hydrophilic is water loving.
- The plasma membrane contains protein of 2 types
 - ↳ Intrinsic
 - ↳ extrinsic
- Example for intrinsic protein is permease, extrinsic protein is cytochrome c.
- The plasma membrane is also called as biological membrane because it allows only selective materials to move inside.

- They are trilaminar \rightarrow i.e. two lipid layers with one protein layer
- The carbohydrates are present in the form of oligosaccharide and they are restricted to outer surface
- The plasma membrane is dipotential
- plasma membrane is selectively permeable
- plasma membrane performs many functions
- endocytosis: engulfing of food materials from outside the surface
- exocytosis: the packaged materials from the cell are sent into the site of action
- Osmosis: movement of molecules from the region of lower concentration to the region of higher concentration
- active and passive transport are also done by them



3. (a) Types of RNA are

1) mRNA → This is messenger RNA and it carries message to form protein

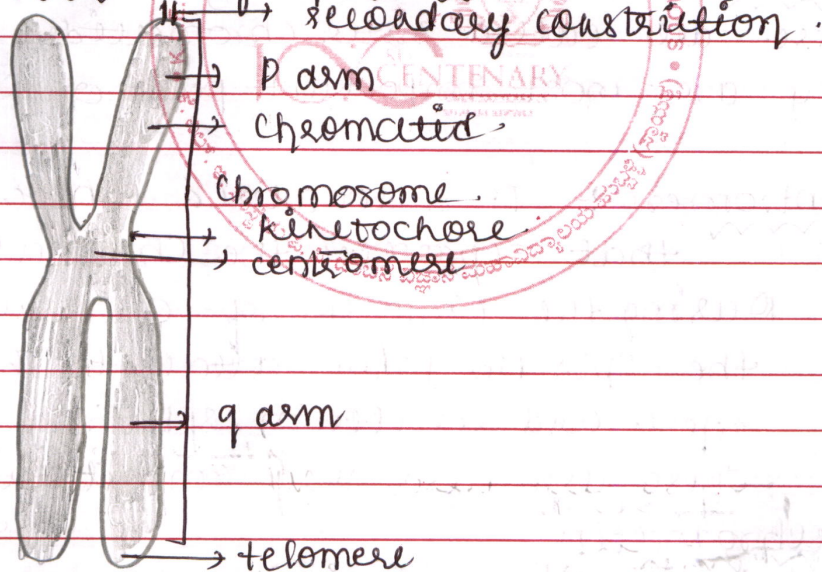
2) r-RNA → ribosomal RNA.

it is type of RNA helps in synthesis of protein.

3) t-RNA → transfer RNA.

it is type of RNA helps in transferring of message from nucleus to region of cytoplasm.

(b) Structure of chromosome



- Chromosome was the name given by Alexander Flemming
- Chroma - means color and soma means body
these are coloured bodies
- Genes are hereditary material present inside or unit of

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Chromosome

- Chromosome are thread like structure and they get condensed during the cell division
- Chromosome are very important for transfer of genetic material to next generation because gene are present in them
- Structure of Chromosome mainly contains
 - Chromatids
 - centromere
 - Kinetochore
 - Secondary constriction
 - Euchromatin
 - Heterochromatin
- Chromatids are the two longitudinal arranged these are called sister chromatids
- They are most important part of chromosome
- Centromere :- It is localised centre part that separates the chromatids.
During the time the of cell division the spindle fibre attach to the centromere and results in splitting.
• These are also very important parts
- Euchromatin
These are lightly stained part of chromosome they are loosely packed
They are transcriptionally active.
- Heterochromatin
These are darkly stained, tightly packed region of chromosome
• They are not transcriptionally active

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DNA :- It is the Genetic material present inside the chromosome

They have the ability to give rise to new individuals.

Shape The shape of chromosome vary because during anaphase the splitting of chromosome takes place.

The splitted chromosome can be either

a) metacentric

b) submetacentric

c) acrocentric

d) telocentric

This classification is based on location of centromere

Telomere :- This are present at terminal end of chromosome

They are highly stable.

c) Mitosis & Meiosis.

Mitosis :- This is type of cell division in which equational division takes place that is mother cell gives rise to offspring containing $(2n)$ chromosome condition.

Mitosis takes place in the "somatic cells" i.e. body cells to maintain growth, to heal the wound etc

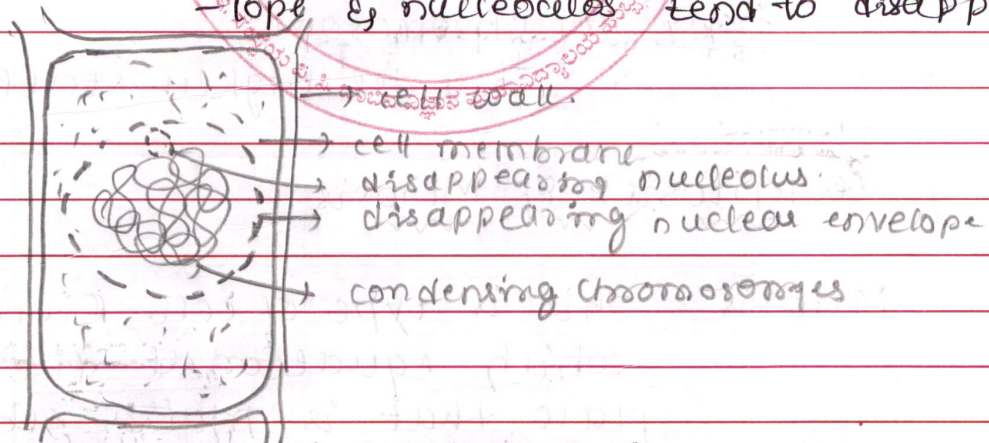
It also happens in germ cells while conveating

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from primary spermatocyte to secondary spermatocyte & primary oocyte to secondary oocyte

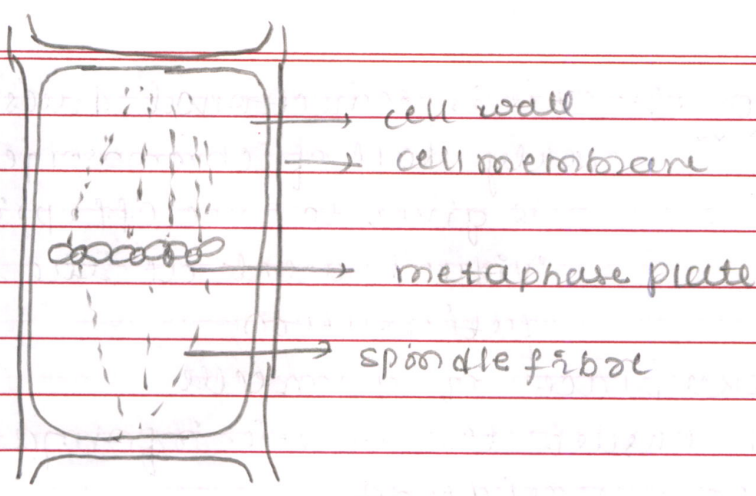
- They are divided into
↳ cytokinesis
↳ karyokinesis
- cytokinesis is division of cell and karyokinesis is division of nucleus
- Mitosis involves
Prophase
metaphase
Anaphase
telophase.

- Prophase :- condensation of chromosome begins and the cell organelles, nuclear envelope & nucleolus tend to disappear

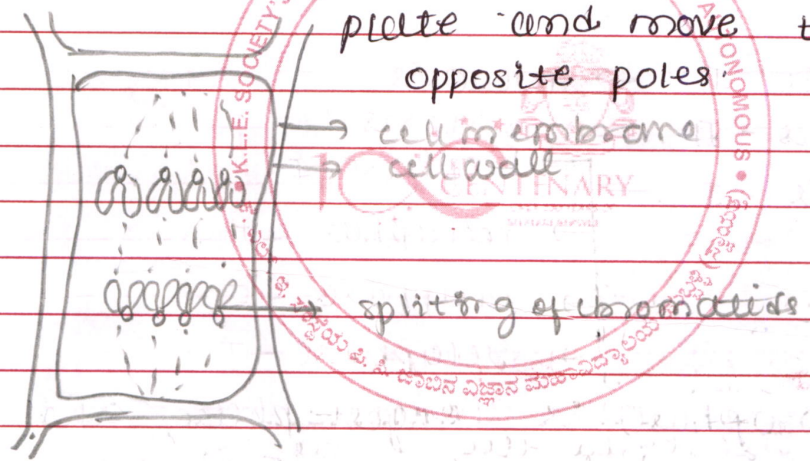


- metaphase :- The condensation of chromosome complete; the chromatids are visible
• slowly the spindle fibres attach to the centromere
• The chromosomes are arranged at metaphase plate

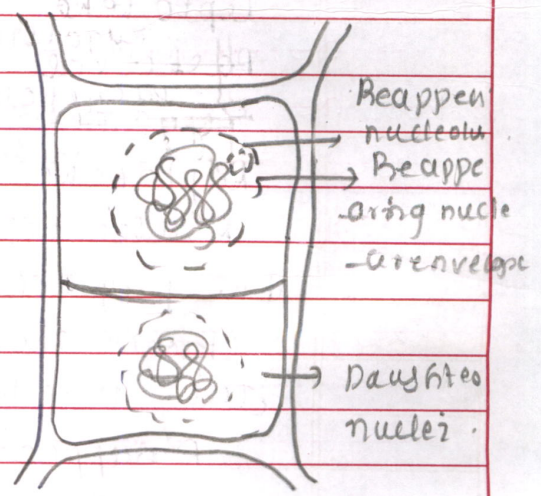
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e. Anaphase :- At this phase, the splitting of chromatids from the metaphase plate and move towards the opposite poles.



Telophase :-
at this phase the two poles the chromatids turn to the chromosomes of daughter nuclei and reappearance of the nuclear envelope & other organelles.



Meiosis :- This is reductional division because only half of chromosome set (n) is given to the offspring by individual parent at the time of fertilization

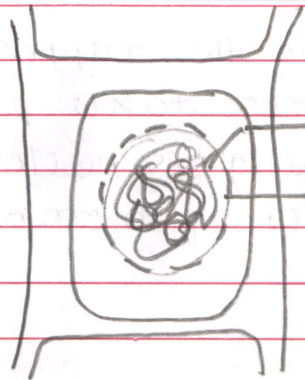
- take place in germ cells.
- It ensure the genetic information allow variation
- variation itself need to survival of individual

Meiosis - I. → meiosis
Meiosis - II. → mitosis
Meiosis - I. → Prophase - I.
→ Metaphase - I.
→ Anaphase - I.
→ Telophase - I

- The prophase is longest phase and it is again mad contains 5 stages
Leptotene → compaction of chromosomes
zygotene → Pairing of sister chromatide
Pachytene → Synapsis. (crossing over).
Diplotene → Chiasmata
Diakinesis →

- In prophase the condensation of chromosome begin at the same time the nucleolus & nuclear envelope disappear.

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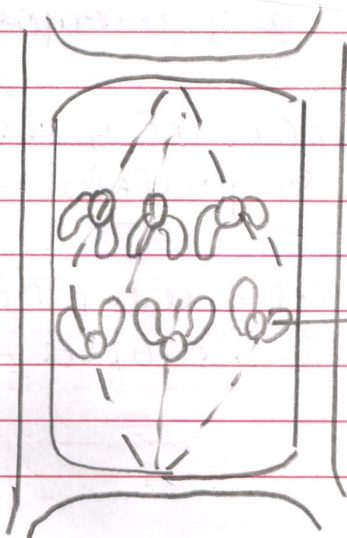
Condensation of chromosomes,
disappearing nuclear envelope

- Metaphase - I. ∴ The chromatid arrange at the equatorial plate and spindle fibre attach to the centromere,



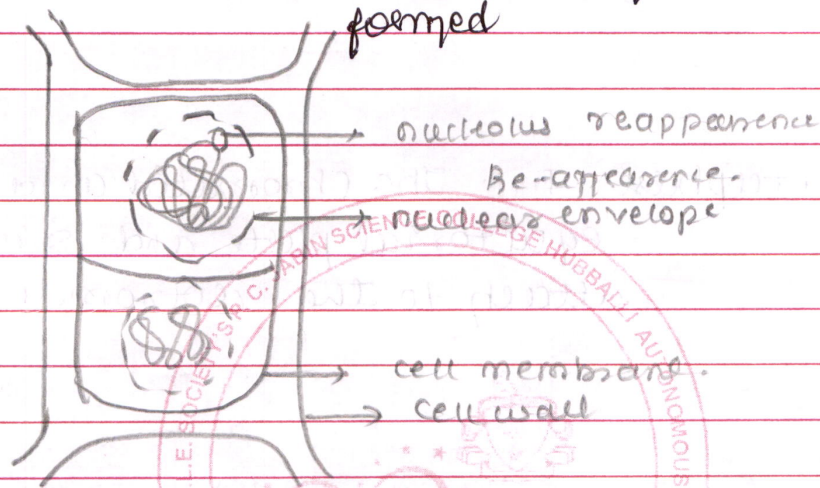
spindle fibre
chromosomes at
metaphase plate

- Anaphase - I. ∴ The splitting of ^{non sister. atids} chromosomes takes place and chromatids that move to the opposite poles become the nuclei of daughter cell.



separation of sister
chromatids

Telophase I:- Here again the reappearance of chromosome takes place and two daughter nuclei with haploid set of chromosome are formed



Meiosis - II

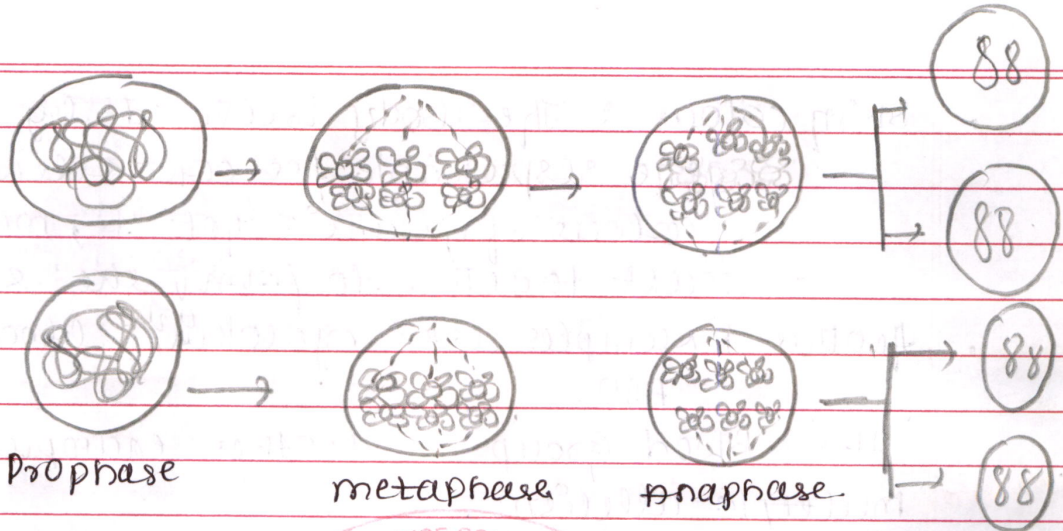
Here the mitosis takes place the usual 4 stages again. Prophase → condensation
Metaphase → alignment of chromosome at equatorial plate

Anaphase → the splitting of chromosome to the opposite poles

Telophase → the reappearance of chrom nucleolus & nuclear membrane

at last 4 daughter cells are produced which complete the cytokinesis after karyokinesis

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→ Results in 4 Haploid cells daughter cells.

5a) any two sex limited characters.

- female mammary gland producing milk, even though secreting cells are in both of them they milk are only expressed in female.
- The development of mustache in male, even though the genes for expression are present on both it is only expressed in male.

b) multiple allelism

- Multiple allelism is many single gene controls single character.
- The multiple allelism is an example for Intra allelic gene interaction.
- That is interaction between allelic form of same gene.

- Skin colour : The body is covered by skin, the gene responsible for controlling the colour of gene is not 1, many allele interact together to form the skin colour.
- Another examples are eye colour, ^{give} blood group.

- 'ABO' Blood Group is another example for multiple allelism.

- 'i' is i-glycogen, which codes for 3 different types of blood group that is,

$$i^A i \rightarrow A$$

$$i^B i \rightarrow B$$

$$i^A i^B \rightarrow AB$$

- Here $i^A i^B \rightarrow AB$ where two allele are interacting to express one blood group hence. Interaction of 2 allele leads to phenotype of individual, where 2 or more allele genes are involved in giving blood group AB.

- ABO blood group the 'AB' is dominant over 'O' blood group and hence this becomes an example of multiple allelism.

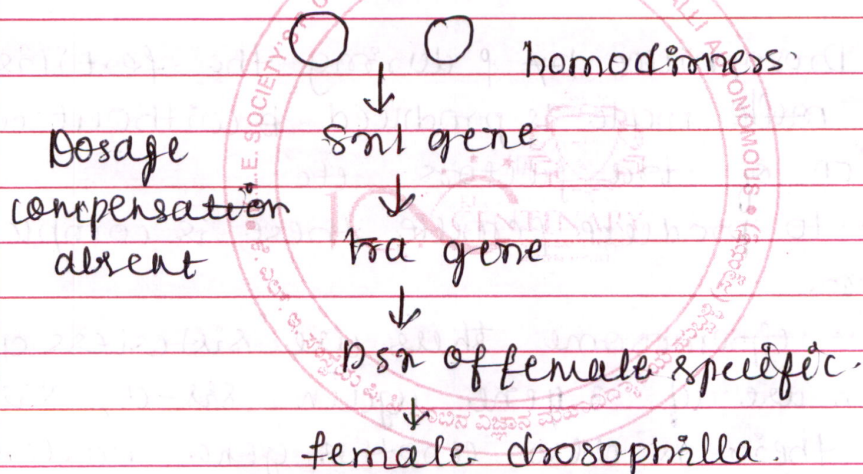
c) Sex Determination mechanism is drosophila

- Sex determination is process of identification on sex of individual whether it is male, female, hermaphrodite.

- In *Drosophilla* the sex is determined by the $n:A$ ratio
- That is ratio of autosome to the sex chromosome.
- We can simply say that if $X:A$ ratio is 1 then it is female *Drosophilla*, when the $n:A$ ratio is 0.5 it is male *Drosophilla*.
- But when we see the mechanism of sex determination of *Drosophilla* it is quite complex.
- In *Drosophilla* by default during the fertilisation the male is produced without any activation of tra factors etc.
- But to produce female there is complex mechanism.
- On 'X' chromosome there are "sisterless genes" which are of 3 types again *sis-a*, *sis-b*, *sis-c*.
- And there is also another gene called Dead pan gene (Dnd gene).
- If the *sis* gene autodimerise they form homodimers, if they - Dnd gene - autodimerise to produce heterodimers then.
- The *sis* genes are called numerator whereas Dnd genes are called denominator.
- Now when $X:A$ ratio is 1 then female is produced, "female have 2 X chromosomes that is presence of more *sis* genes & less number of Dnd gene.
- They form homodimers and they result in

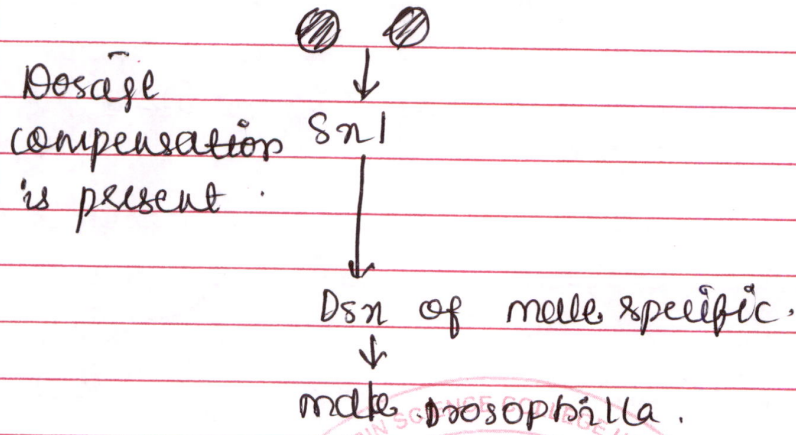
- *sn1* gene is produced called sex lethal gene.
- This *sn1*-gene act as transcribing factor to produce "tra-gene".
- This tra gene act as transcribing factor and results in formation of *Dsn1* gene. Double sex lethal gene of female specific.
- This in turn produce female *Drosophila*.

n:A ratio 1



- To produce male or sex determination ^{in male} *Drosophila*
- In male there are more ~~tra~~ *tra* gene and less number of *sn1* gene which results in formation of heterodimers
- This heterodimers in turn produce *sn1*-gene. Due to the dosage compensation the tra gene is not produced.
- Directly the *Dsn1* of male specific is produced
- so the n:A ratio is 0.5.

$n:A$ ratio is $0:5 \rightarrow$ male *Drosophila*



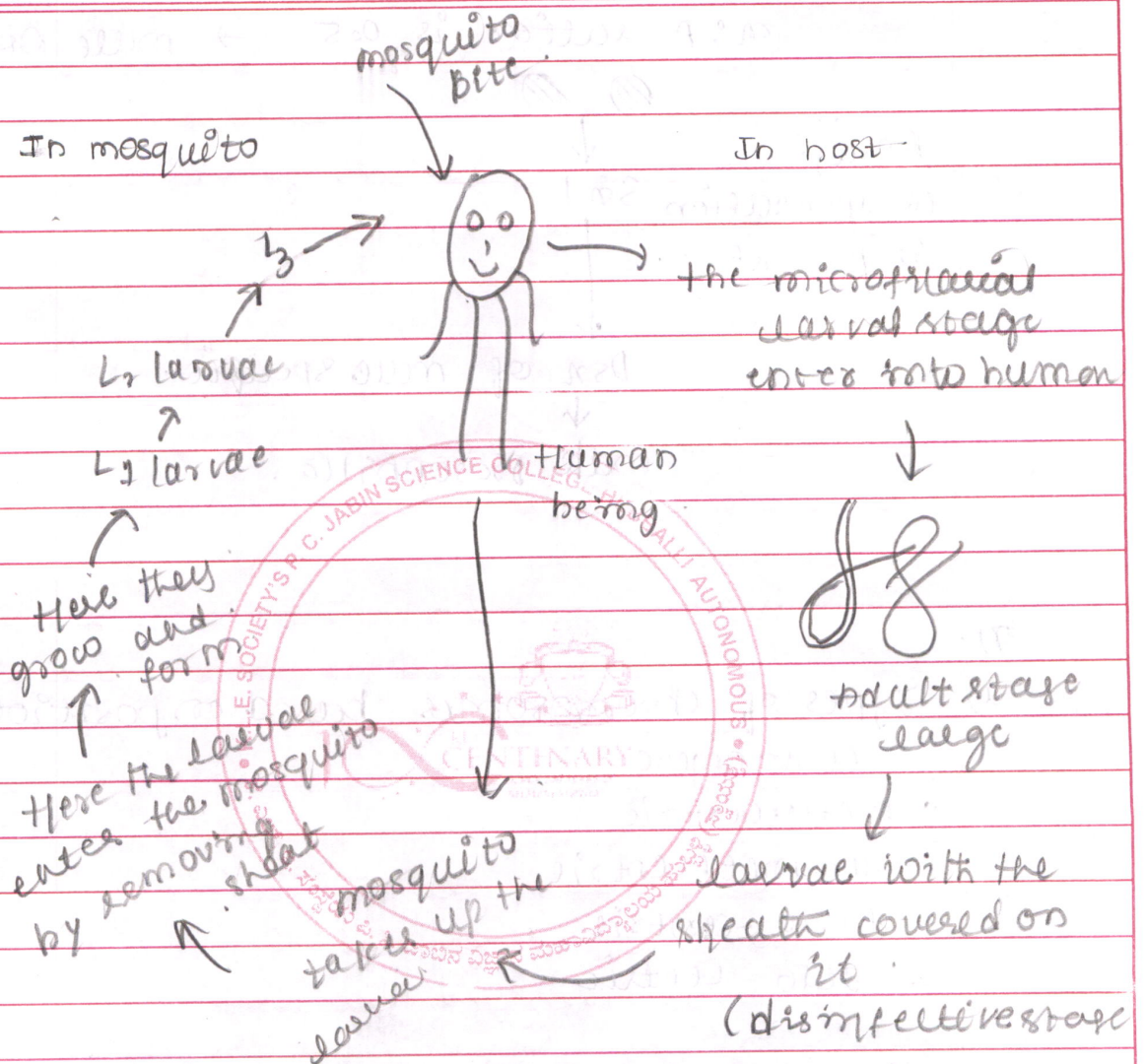
7)

- a) Types of chromosomes based on position of centromere
- meta centric
 - sub meta centric
 - Acro - centric
 - Telo - centric

(b) Life cycle of *Wuchereria*

- *Wuchereria* is filarial nematode which causes filariasis.
- It requires 2 host to complete the life cycle.
Definitive - human
Indefinitive - female mosquito (*Aedes*, *Culex*, *Anopheles*)
- The life cycle begins when the mosquito ingest the infective stage larvae in human being

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In Human Being

- when the mosquito bites the human the larval stage enters into the body and soon after entering the body they move to the lymph nodes.
- they do not grow here and they do not cause any infection but they stay for about 2 years 2 months in human being.
- The larvae are ~~biocultural~~ diurnal during the day to time they seared deep inside

but during the night times they come to periphery so that it was easy for the mosquito to take them back.

Once they take the mosquito larvae covered with sheath back then the half of lifecycle in human being completes.

- In mosquito - Indefinite host
- Soon after entering the mosquito body the larvae remove its sheath.
- It moves deeper into cuticle cells, covered by epidermis.
- There they start growing large and L_1 larval stage they form sausage like structure with flaps on them.
- They grow larger and larger now they turn into L_2 larval stage.
- Now these larvae get distributed through out the body of mosquito except germ cells.
- The larval stage migrate to head and proboscis gland parts of mosquito.
- Once the mosquito bite the human being again the life cycle begins.

Symptoms

- They usually do not show symptoms in early stages but later on the symptoms become very chronic.
- Swelling of lymphatic node
- Swelling of breast & other genital areas

c) (1) transmission & control measure for malaria.

→ mode of transmission : By the bite of female anophelous mosquito.

control measure
~ ~ ~ ~ ~

- Individual when entering the place full of mosquito should use insect repellent
- Use the mosquito net to prevent the bite of mosquito
- Daily morning the mosquito are more active so one should wear full sleeves
- The stagnant water in front of house should be removed as they are favourite places of mosquito to lair and breed.
- The introducing of Gambusia fish can also be helpful because they prevent the entry by feeding on larvae of mosquito
- Mosquito usually come when there is dark places so ventilation is required to pt

(2) Hepatitis :-
~ ~ ~

Mode of transmission.

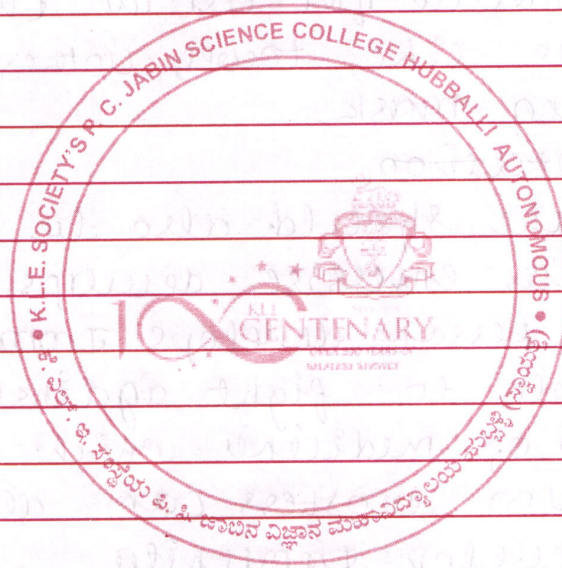
a) can be either due to contamination of food and water.

- b) Transfusion of blood
- c) through the needles
- d) use of infected syringes etc.

Controlling measure

- The proper sanitation and is required because it is viral disease
- One should not use the infected persons things like, towel, clothes, kerchief etc. wearing mask.
- Sanitation
- Hygiene should also be maintained
- Regular exercise develops immunity when person develops immunity he will be able to fight against any disease
- Some of medicines which are called immune boosters can also be used to develop immunity
- Should avoid contact with infected person
- They should maintain a distance with infected person.
- The one who is suffering from this viral disease should quarantine themselves
- They should wear the mask regularly and utensils and materials used by them

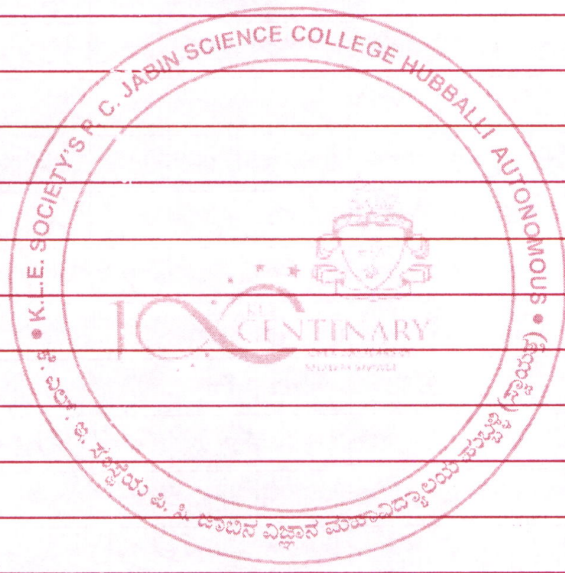
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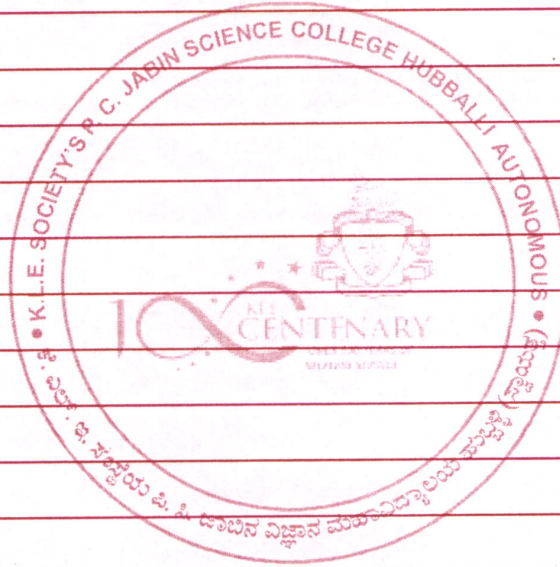
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