



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

Semester Ist

B.Sc.

B.C.A.

M.Sc.

Answer Booklet No.

39401

Theory Semester End
Examination

April/May 20

Nov./Dec. 20

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

Signature of the Room Supervisor with Date

Exam. Reg. No. 1 2 1 C Bt 0 0 6

Class : BSc-Ist Subject : Bio-technology Subject Code No. 122DSC01T-I-22

Paper :

11971016

CBG



121CBT006

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

UNIT-N

- 8 (c) Chromosomal Variations - Change in the structure and number of chromosome is called chromosomal Variations
- It is of two types -
- (1) Structural Variation - The change in structure of chromosome is called structural Variation.
- (a) Deletion - loss of segment of chromosome refers to Deletion. It occurs spontaneously or may be induced
- Terminal - loss of segment at the end of chromosome
Intercalary - loss of segment inbetween the chromosome.
- (b) Duplication - Occurrence of segment twice in the chromosome refers to duplication
- Intrachromosomal Duplication
- Tandem - The sequence of duplicated segment is same to that of original segment.
Reverse Tandem - The sequence of duplicated segment is reverse to that of original segment.
- Interchromosomal Duplication
- Displaced - The duplicated segment is integrated far away on same chromosome.
Translocated - The duplicated segment is integrated far away on different chromosome.
- (c) Inversion - Orientation of segment in reverse refers to inversion
- Paracentric - centromere is not included

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- Pericentric - Centromere is included
- (d) Translocation - Exchange of segment in such a way that it is integrated on same chromosome or different chromosome.
- Intrachromosomal - Intraradial - Exchange in same arm
Extraradial - Exchange in diff arm
- Interchromosomal - Fraternal - Exchange between homologous chromosome
Tertial - Exchange between non-homologous chromosome
- Reciprocal - Exchange of segment between non-homologous chromosome.
- Non-Reciprocal - Exchange of segment between non-homologous chromosome with reciprocal change
- (2) Numerical Variation - Change in the number of chromosome is called numerical variation.
- (a) Aneuploidy - Change in number of individual chromosome is Aneuploidy
- Hyperploidy - Increase in the number of chromosome
Hypoploidy - Decrease in the number of chromosome
- (b) Euploidy - Change in complete set of chromosome is Euploidy
- Monoploidy - Increase in one set of chromosome
Polyploidy - Increase in number of set of chromosome.

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8(b) Klinefelter's Syndrome - This is the genetic disorder caused due to one extra X chromosome in male. In this disorder male is born with extra X chromosome. $44+XXY$

It was first discovered by Dr Harry Klinefelter.

Symptoms - i) Taller than the average height

- (ii) Breast enlargement, breast cancer
- (iii) Infertile, reduce sex drive
- (iv) Small penis, low testosterone
- (v) Depression, Anxiety
- (vi) Weak bones, floppy muscles.
- (vii) Difficulty in talking and motor problems.

Diagnosis -

- (i) Hormone testing
- (ii) Karyotype Analysis and forming a karyogram.

Treatment -

There is no permanent cure for this but some medical treatments and therapies can be given to make their life easier

- (i) Testosterone replacement therapy to increase the production of male hormone testosterone
- (ii) Breast tissue removal to remove the extra tissue of breasts.
- (iii) Intra chromosomal sperm Injection artificial method for fertility.
- (iv) Mental therapies - so that they can be strong mentally.
- (v) Occupational therapies -

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8 (a)

Autosomes

Allosomes

- | | | |
|-------|--|--|
| (i) | Numbered chromosome are referred as autosomes | (i) sex chromosomes are referred as allosomes. |
| (ii) | In humans these are of 22 pairs | (ii) In human these are of one pair |
| (iii) | same in both males and females | (iii) Different in both males and female in male XY female XX |
| (iv) | Disorders caused due to mutation is called autosomal disorders | (iv) Disorders caused due to mutation is called allosomal disorders. |
| (v) | Not involved in sex determination | (v) They are involved in sex determination |

UNIT III

5 (c)

Complementary genes-

genes that are ~~independent~~ independent and in dominant they produce character but when they are brought together they complement each others character and produce new phenotype.

- * Dominant alleles don't express independently
- * Both the genes are required for its expression. They deviate from mendel's law and gives ratio 9:7

Ex When white flower of different varieties were crossed in F_1 hybrids all were purple in colour instead of white. When it is self crossed i.e. F_1 hybrids were self crossed the ratio

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obtained was 9 (Purple) : 7 (white)

Traits - Flower colour in Sweet pea.

Alleles - white colour flowers.

Parents - white colour \times white colour

Gametes $CcPp \times ccPP$



F₁

$CcPp$

(Purple flower colour)

Selfing
Gametes

$CcPp \times CcPp$



F₂

	Cp	Cp	Cp	Cp	
Cp	$CcPp$ (P)	$CcPp$ (P)	$CcPp$ (P)	$CcPp$ (P)	P - Purple W - white.
Cp	$CcPp$ (P)	$CcPp$ (W)	$CcPp$ (P)	$CcPp$ (W)	
Cp	$CcPp$ (P)	$CcPp$ (P)	$CcPp$ (W)	$CcPp$ (W)	
Cp	$CcPp$ (P)	$CcPp$ (W)	$CcPp$ (W)	$CcPp$ (W)	

Phenotype 9 (Purple) : 7 (white)

Genotypes $CcPP$ (1) $CcPp$ (1) $ccPP$ (1)
 $CcPp$ (4) $ccPp$ (2)
 $CcPP$ (2) $CcPp$ (2)
 $CcPp$ (2) $ccPP$ (1)

C refers to coloured factor (raw material)

P refers to pigmentation factor

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- * When only raw material factor was present but ^{pigmentation} coloured factor was absent CP the expression was white
- * When raw material factor was absent and only pigmentation factor was present CP the expression was white
- * When both raw material factor and pigmentation factor were present CP they complemented each other expression and produced purple in colour.

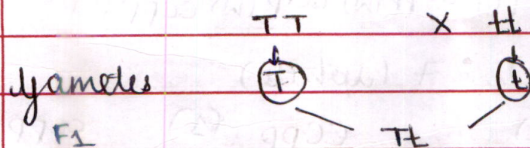
5 (b) Back cross -

When F₁ hybrids is crossed with either of its parents than it gives back cross.
It is used to determine genotype.
It is used for crop improvement.

Traits - stem height

Alleles - Tall and Dwarf

Parents - Tall Plant and Dwarf Plant

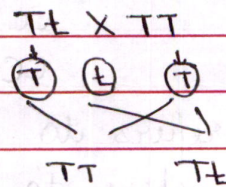


(heterozygous tall)

F₁ × homozygous dominant

Gametes

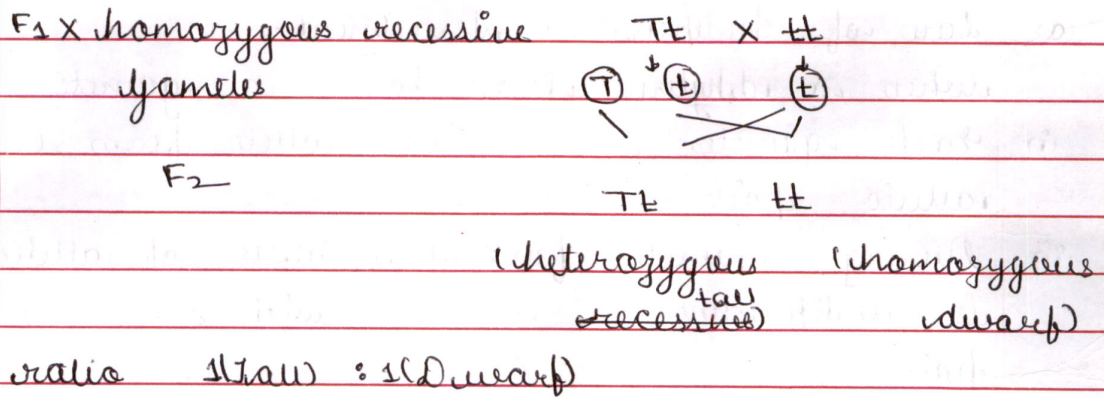
F₂



ratio 1:1.

(homozygous tall) (heterozygous tall)

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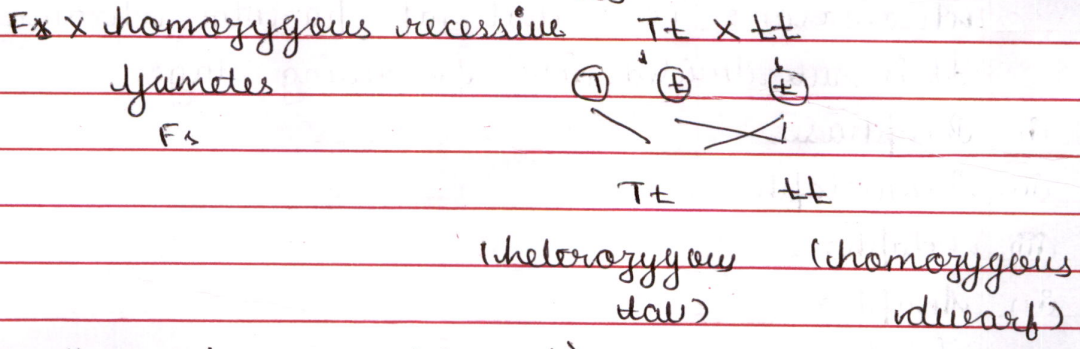
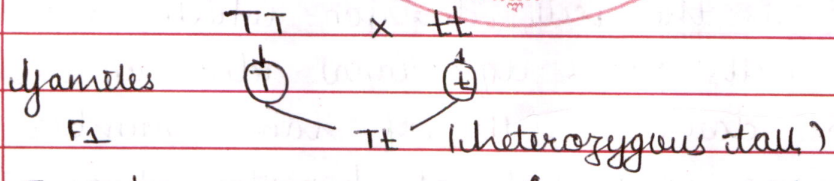
Test cross - when F_1 hybrid is crossed with homozygous recessive parent then it gives test cross

It is used to determine genotypic expression
It is used to produce desirable characters and is used in yield

Trails - stem height

Alleles - Tall Plant and Dwarf Plant

Parents - Tall \times Dwarf



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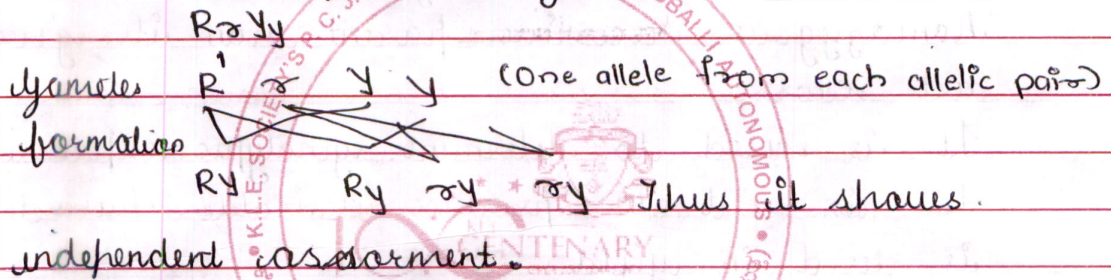
5 (a) Law of Independent Assortment -

When a dihybrid cross forms a gamete

(i) Each gamete receives one allele from each allelic pair

(ii) During gamete formation, one allele of allelic pair is independent to combine with remaining allelic pair.

Ex When heterozygous Round shaped and yellow colour seed form a gamete



independent assortment.

UNIT - II

3 (c) Mitosis is the cell division which occurs in somatic cell. It is equational division resulting in two daughter cells of same number of chromosome as that of parental chromosome. It is subdivided into following stages

(i) Prophase

(ii) Prometaphase

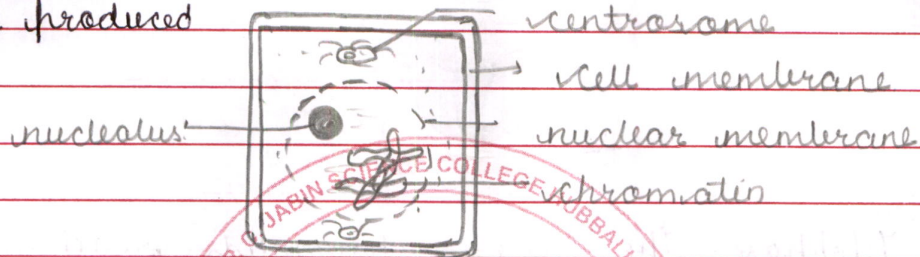
(iii) Metaphase

(iv) Anaphase

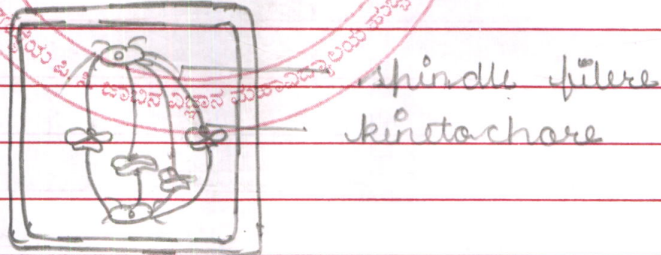
(v) Telophase

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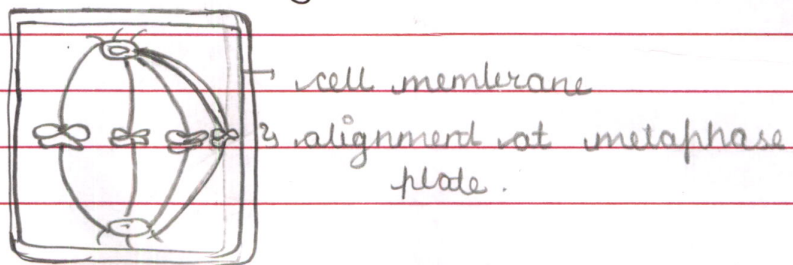
- (i) Prophase - In this phase chromatin fibres get condensed forming the structures of chromosome. here cohesin is temporarily removed so that chromatin fibres get disengage then reoccur. centrosome starts moving to opposite poles and spindle fibres are produced



- (ii) Prometaphase - In this phase fragmentation of nuclear membrane takes place so that centrosome can get space. nucleolus starts disappearing. spindle fibres get attached to centromere of chromosome. cohesin is not removed.

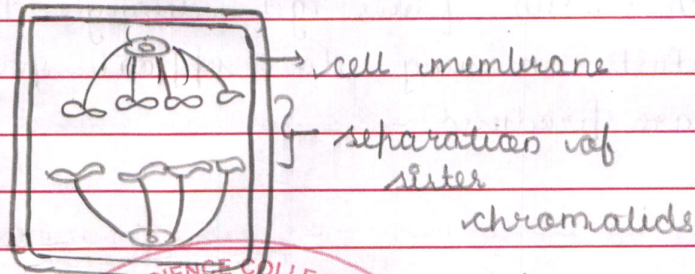


- (iii) Metaphase - In this phase the centromere of chromosome gets align at the centre and they form metaphase plate. chromosome is clearly visible at this stage.

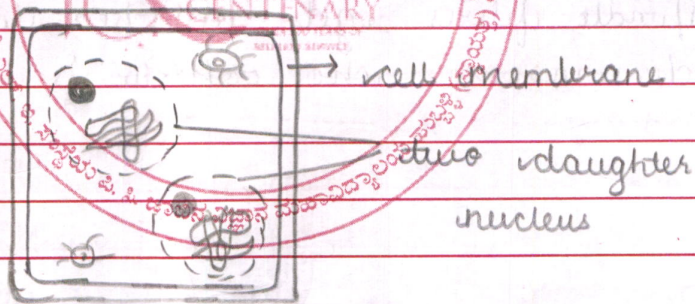


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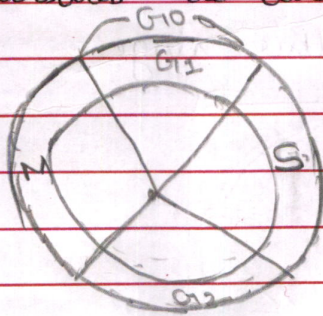
(iv) Anaphase - The sister chromatids get separated as cohesin is removed by the enzyme protease separase. They start moving to the opposite poles.



(v) Telophase - The sister chromatids reach the poles spindle fibres get removed nucleolus start appearing nuclear membrane starts forming. In some cell it may lead to cytokinesis.



3 (b) cell cycle is the sequence of events that takes place during cell division of ^{end of} one nuclear division to the start of other.



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Cell cycle includes

(i) Interphase - It is phase where cell spends most of its life. It is divided into 3 subphases

* G_1 phase - Also known as first growth phase where synthesis of RNA, proteins, enzymes, nutrients & growth of cell takes place.

* S phase - Also known as synthesis phase where replication of DNA and duplication of centrosome takes place.

* G_2 phase - Also known as second growth phase where growth of cell, synthesis of RNA, protein, enzymes continues.

(ii) M phase - It is the cell division phase. It is divided into

* Karyokinesis - Nuclear division takes place.

* Cytokinesis - Cell division takes place.

→ When cell is not undergoing cell division then from G_1 phase it goes to G_0 phase called as rest phase.

→ Cell cycle plays imp role in cell division. It gives time at which cell is in what phase.

→ Cell cycle works on certain protein called cyclin, enzyme cyclin dependent kinase and complexes anaphase promoting cell complex.

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3 (a) Based on the sequence chromosome is divided into

(i) Homologous chromosome - The chromosome having same gene sequence is called homologous chromosome

(ii) Non-Homologous chromosome - The chromosome having different gene sequence is called non-homologous chromosome.

Based on the position of centromere it is divided into

(i) Metacentric

(ii) Sub-Metacentric

(iii) Telocentric

(iv) Acentric



UNIT-I

1 (a) Cell theory was discovered by

* Matthias Scheliden

* Theodore Schwann

Modern cell theory was given by

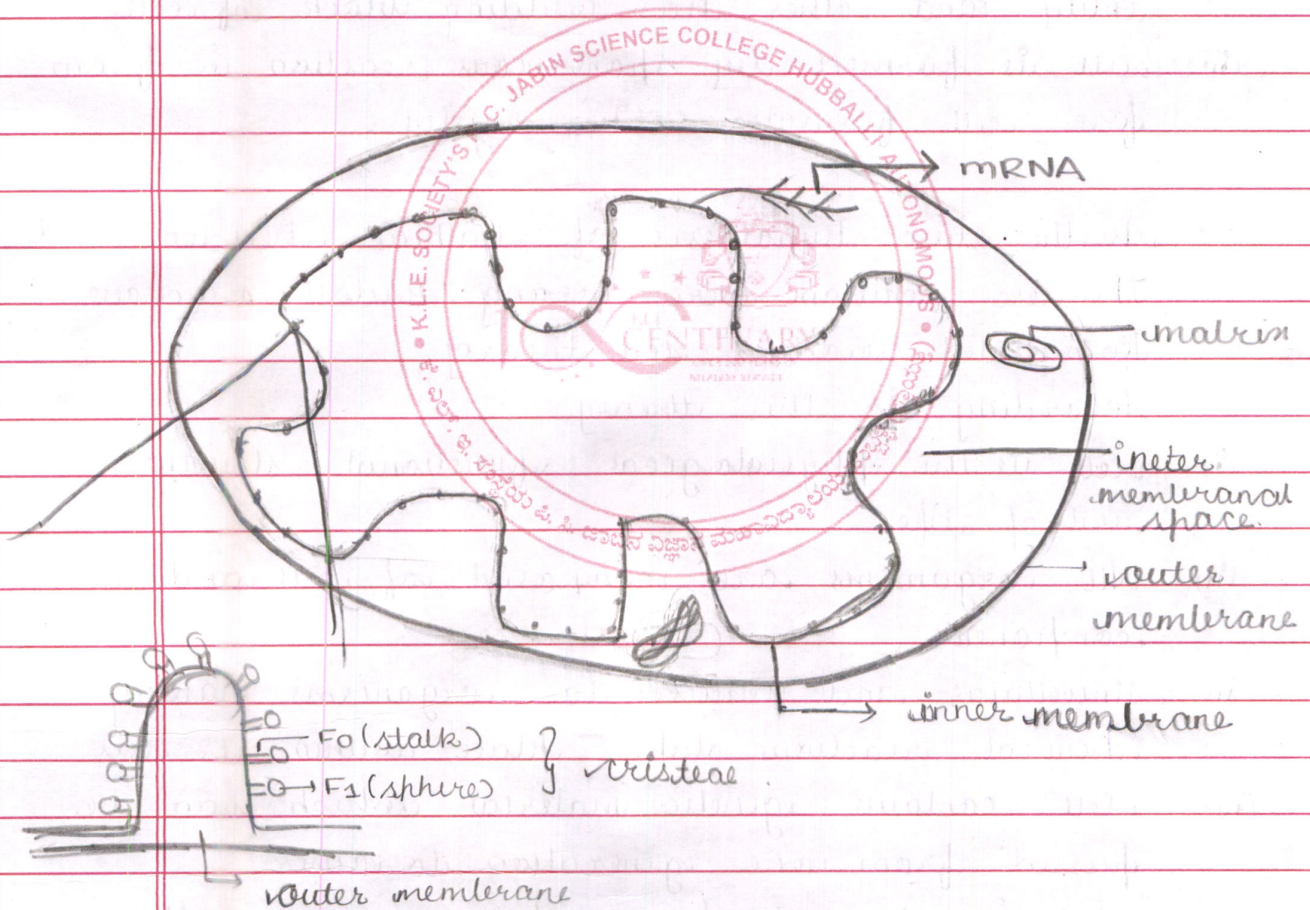
Rudolf Virchow.

- 1 (b) → Matthias Scheldien discovered that plant cell is composed of different cell
- Theodore Schwann formulated that all animals are composed of cell and their components.
- Then both of them formulated cell theory
- (i) cell is the physiological, functional unit of life
 - (ii) cell has dual existence one has distinct entity and other has building block of cell.
 - (iii) cell is formed by spontaneous reaction i.e. from free cell formation like crystals.
- As the two hypothesis of Matthias Scheldien and Theodore Schwann were wrong. Rudolf Virchow formulated modern cell theory.
- According to this theory
- (i) cell is the physiological, functional, structural unit of life
 - (ii) All organisms are composed of cell and its components.
 - (iii) Unicellular and Multicellular organisms having chemical reactions takes place within the cell.
 - (iv) cell contains genetic material which can be passed from one generation to other
 - (v) cell is formed from pre-existing cells.

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1 (c) Mitochondria is the power house of cell which is bean in shaped.

- It was considered as invaded bacteria which built friendly relationship with cell.
- Richard Atman named it has diplast due to its structure has land granite.
- Benda later on named it has mitochondria.



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Mitochondria is the double membrane structure.
It consists of

(i) Outer membrane-

It is made of enzyme and co-enzymes. It allows the transport of all molecules like enzymes, co-enzymes, proteins, minerals, nucleic acids etc. Thus it is permeable to all type of molecules.

(ii) Inner membrane-

It consists of enzymes co-enzymes which are used in electron transport chain. It also consists enzyme protease and permease which is used for ATP synthesis. It consist finger like projection called cristae which has ATP synthetase enzyme and used for ATP synthesis. It is impermeable to almost all molecules including water.

(iii) Intermembranal space-

The space between inner membrane and outer membrane is called inter membranal space.

It is of two types Peripheral space

Intercristal space

Space between inner and outer membrane is peripheral space

space between cristae and outer membrane is intercristal membrane.

(iv) Matrix - It is the granules of waste products.

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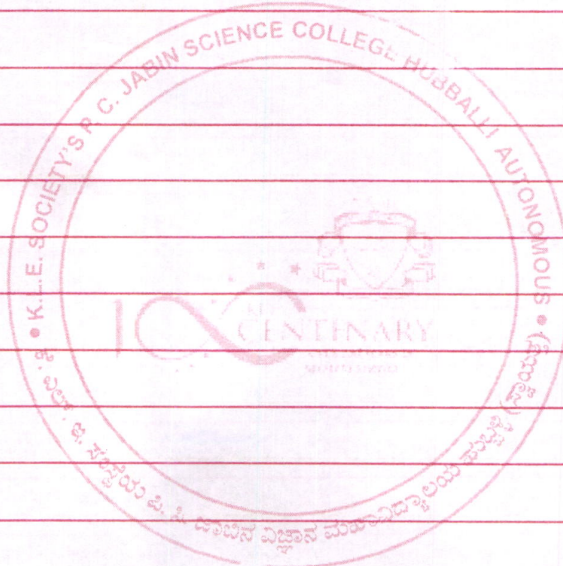
Functions -

- (i) It helps in ATP production
- (ii) When we intake nutrients it goes to mitochondria in the form of charged particles, there it takes O_2 and produces ATP called as oxidative phosphorylation
- (iii) It stores Ca^{2+} ions
- (iv) It produces heat.
- (v) It contains enzyme that detoxify ammonia.

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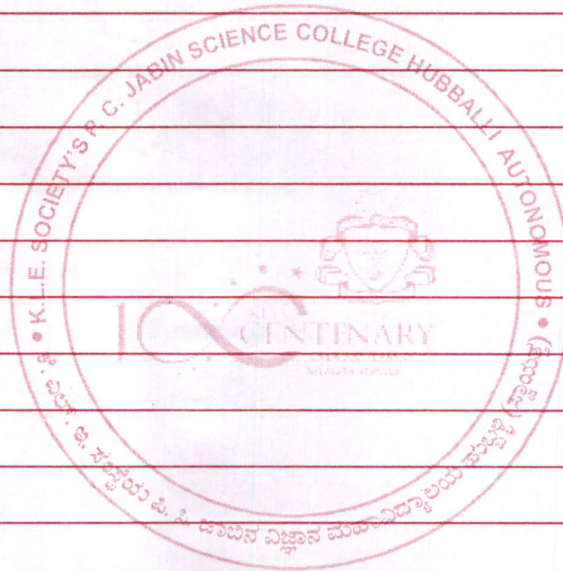
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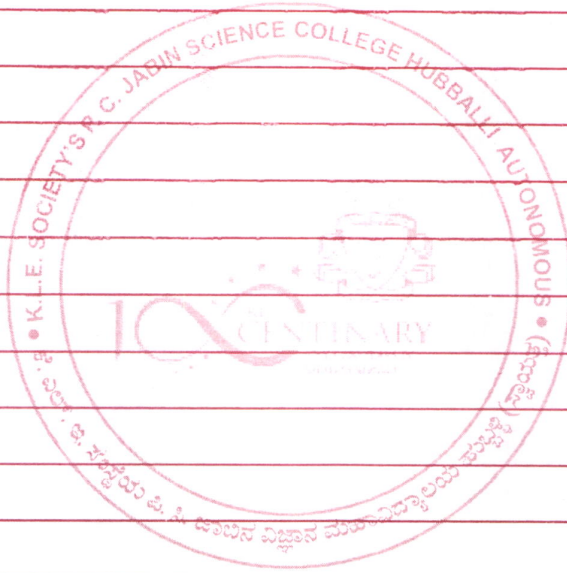
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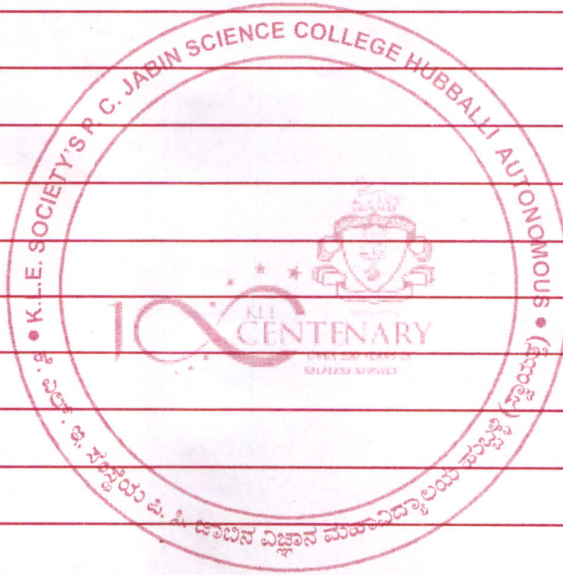
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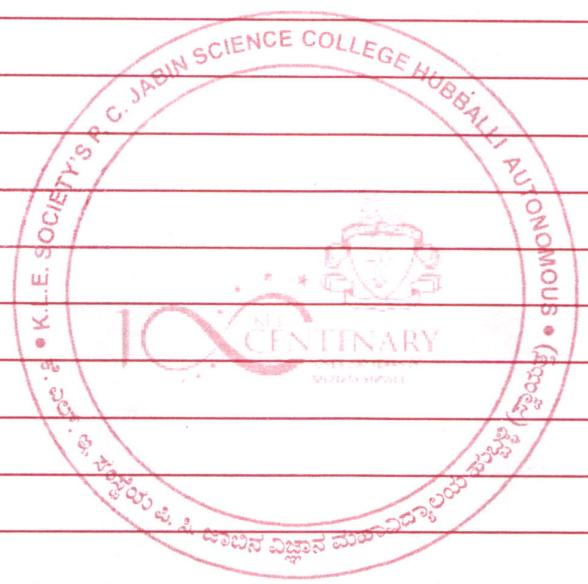
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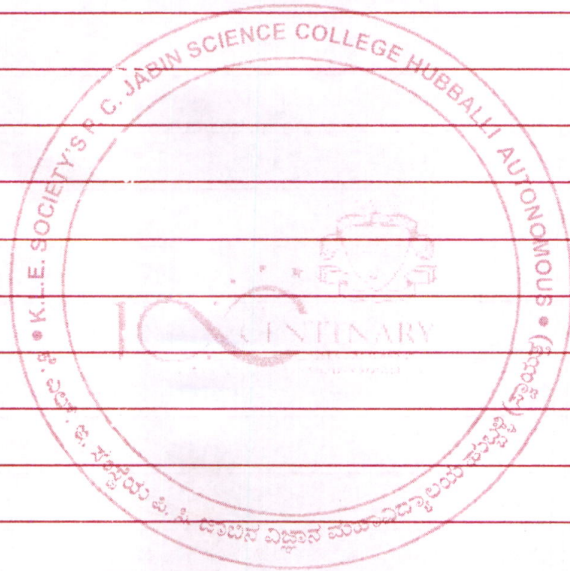
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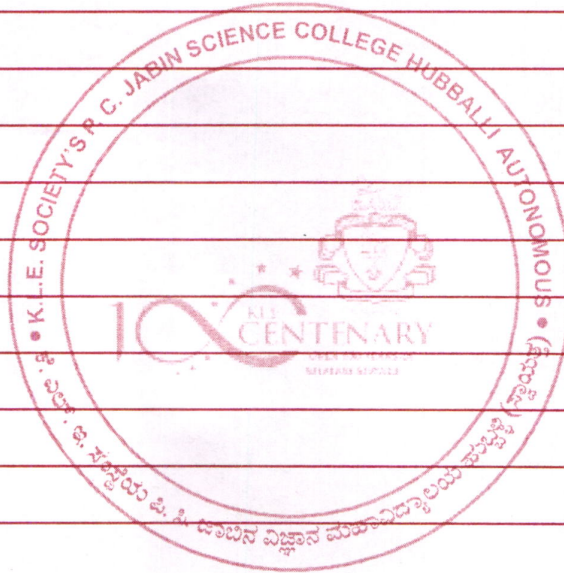
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