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<i>DEPERTMENT</i>	<i>BS. MICROBIOLOGY</i>
<i>MID TERM ASSISGNMENT MICROBIOLOGY</i>	<i>(SUMMER . 2020) (BS.</i>
<i>COURSE TITLE</i>	<i>FUNDAMENTAL GENETICS</i>
<i>INSTRUCTOR</i>	<i>MR. FAZLI MAIN</i>
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Mid- Term assignment (summer- 2020) (Bs–MICROBIOLOGY)

**Course Title: Fundamental genetics instructor : Mr.
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Q No:1 Fill in the BLANKS.

- 1) *A portion of a DNA molecule that specifies a single functional unit is called **GENE***

- 2) **HUMAN GENETICS** *Is the study of inheritance as it occurs in human beings.*

- 3) *The passing on of traits from parents to their offspring, either through asexual reproduction or sexual reproduction is known as **HEREDITY***

- 4) *In 1933 **THOMAS MORGAN** received the Nobel prize for linkages mapping.*

- 5) **GENOTYPE** *Is genetic makeup of an organism.*

6) **GENETIC VARIATION** Means that biological systems individuals and populations are different over space.

7) The word "allele" is short form of **ALLELOMORPH**

8) **TRAITS** Means the characteristic exhibited by a special.
For example Blue eyes

9) The point where the two chromatide touch is known as **CENTROMERE**

10) **MEDICAL GENETICS** Is the branch of medicine that involves the diagnosis and management of hereditary disorders.

QNo2 : write a short note on the following

1)What is chromosome?

Ans : In the nucleus of each cell DNA molecule is packaged into thread like structure called chromosome.

Each chromosome is made up of DNA tightly coiled many times around proteins called histones that support its structure

FOR EXAMPLE: The “X” and Y” gene that determines whether you will be a boy or a girl is an example of chromosome.

FUNCTION

A chromosome is an organized structure of DNA and proteins that is found in nucleus of the cells. It is single piece of coiled DNA containing many genes, regulatory elements and other nucleotide sequences.

Chromosome also contains DNA bound proteins, which serve to package the DNA and control its control its functions.

IMPORTANCE

Without such a packaging, DNA molecule would be too long to fit inside cells chromosome are a key part of the process that ensures DNA is accurately copied and distributed in the vast majority of cells division.

2) The DNA Era

Ans: The Avery – MacLeod- McCarthy experiment isolates DNA as the genetic material at that time called transforming principle.1944

1950: Erwin Chargaff determined the pairing method of nitrogenous bases. Chargaff and his team studied the DNA from multiple organisms and found three things also known as Chargaff's rules

First the concentration of the pyrimidines are always found in the same amount as one another.

Qno 3 The Genomics Era

Ans .1976: yeast genes Expressed in E.coli for the first time.

1982: The U.S Food and Drug administration approved the release of the first genetically engineered human insulin. Originally biosynthesizing recombination DNA methods by Genetics 1978.

Once approved the cloning process lead to mass production of humulin.

1987: Yoshizumi fishing accidentally discarded the describe parts of the DNA sequence which later will be called CRISPR

Q4: Chromosomal theory of inheritance?

ANS: Chromosomal theory of inheritance:

- *The Boveri-Sutton chromosome theory (also known as the chromosome theory of inheritance or the Sutton-boveri theory) is a fundamental unifying theory of genetics which identifies chromosomes as the carriers of genetic material.*

Why fruitfly

they have like human have xx in female xy in males, they're cheap, easy and fast to grow. You can raise hundreds of them in a little bottle with sugar sludge at the bottom, and many geneticists still do this today! They have a short lifespan and so many generations can be studied in a short time frame. They have a high rate of reproduction.

Key points of the theory;

Boveri and Sutton's chromosome theory of inheritance states that genes are found at specific locations on chromosomes, and that the behavior of chromosomes during meiosis can explain Mendel's **law of inheritance.**

Morgan discovered a mutation that affected fly eye color. He observed that the mutation was inherited differently by male and female flies.

Verification of chromosomal theory through Morgan's experiment!

Morgan's chromosomal theory verification began when he found a mutation that effects fruit fly's eye color.

Fruit-fly normally have red eye color and is dominant in nature however, the mutation that Morgan found was recessive.

This mutation gave rise to white eye color in males and was inherited in different patterns in both males and females.

Hence...

Morgan did lots of other experiments to confirm an x chromosome location for the eye color gene. He was careful to rule out alternative possibilities (for instance, that it was simply impossible to get a white-eyed female fruit fly).

Pulling together all of his observations, Morgan concluded(correctly) that the gene must lie on, or be very tightly associated with, the x chromosome.

QNo: 3 Discus in detail the Mendel law of inheritance

Ans . Before Mendel law

There was a concept of spontaneous generation from different experiments at that time backed up busted these concepts and laws .

1.ARISTOLE AND SPONTANEOUS GENERATION (383- 322)

“ According to Aristotle it was readily observable that aphids arise from the dew on plants, fleas from putrid matter, and mice from directly hay; and this belief remained unchallenged for more than two thousand years.

2) FRANCESCO REDI EXPERIMENT (LATE 1600s)

Redi was an Italian physician and one of the first to formally challenge the doctrine of spontaneous generation.

The laws of inheritance were derived by Gregor Mendel, a 19th century monk.

MENDEL'S LAW OF INHERITANCE;

Mendel postulated three laws, which are now called after his name as Mendel's laws of heredity. They are :

1. Law of dominance and recessive :

Definition: *When two homozygous individuals with one or more sets of contrasting characters are crossed, the character that appears in the F1 hybrids are dominant characters and those that do not appear in F1 are recessive characters.*

OR

If there are two alleles coding for the same trait and one is dominant it will show up in the organism while the other won't.

Importance of law of dominance:

The phenomenon of dominance is of practical importance as the harmful recessive characters are masked by the normal dominant characters in the hybrids.

Exceptions to law of dominance is the incomplete Dominance.

*As for example, in four-o'clock plant, *Mirabilis jalapa*. When plants with red flowers(RR) are crossed with plants having white flowers(rr), the hybrid F_1 plants (Rr) bear pink flowers. When these F_1 plants with pink flowers are self-pollinated they develop red (RR), pink (Rr) and white (rr) flowered plants in the ratio of 1 : 2 : 1.*

2) Law of segregation (Purity of gametes):

The law of segregation states that when a pair of contrasting factors or genes or allelomorphs are brought together in a heterozygote(hybrid) the two

members of the allelic pair remain together without being contaminated and when gametes are formed from the hybrid, the two separate out from each other and only one enters each gametes.

Example- *Pure tall plants are homozygous and, therefore genes(factors) TT; similarly dwarf possess genes tt. The tallness and dwarfness are two independent but contrasting factors or determiners. Pure tall plants produce gametes all of which possess gene T and dwarf plants t type of gametes.*

3) Law of independent assortment:

The inheritance of more than one pair of characters(two pairs or more) is studied simultaneously, the factors are genes for each pair of characters assort out independently of the other pairs. Mendel formulated this law from the results of a dihybrid cross.

The cross was made between plants having yellow and round cotyledons and plants having green and wrinkled cotyledons.

*The F1 hybrids all had yellow and round seeds.
When these F1 plants were self fertilized they
produced four types of plants in the following
proportion:*

Yellow and round 9

Yellow and wrinkled 3

Green and round 3

Green and wrinkled 1