THEORY

(Maximum Marks:70)

(Time Allowed:3 hours)

Candidates are allowed additional 15 minutes for only reading the papers

They must NOT start writing during this time

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*This paper contains **TWO PARTS-** Part I and part ii*

Answer All questions .

*Part 1 consists of one question of **20** marks having subparts*

Part ii consists of sections A, B, and C

*Section –A consists of seven question o**f two** marks each.*

*Section –B consists of seven question **of three** marks each*

*Section –c consists of three question **of five** marks*

Internal choices have been provided in two questions in Section-A, in two questions in Section -B, in all questions in Section-C.

The intended marks for all the question has been given in [ ]

Part -1

20 Marks

(Answer all questions)

1 A) Answer the following question briefly. [1×8]

i) Write any two prefertilization events.

Ans- Gametogenesis and Pollination

ii) Name the terminal stage of ageing in the life cycle of plants.

Ans-Senescent Phase

iii) Where does the fertilization of the eggs take place in angio spermic plants?

Ans-Fertilization of the eggs takes place in angios permic plants.

iv) Name the structure which is unique to the seed of a monocot.

Coleoptile is unique to the seed of monocot.

v) **Name the hormone that causes morning sickness**.

Ans- Human Chorionic Gonadotropin

vi) Why is cleavage in mammalsreffered as simple holoblastic?

Ans-The entire zygote divides completely with each cleavage so it is referred as simple holoblastic.

vii) Name an IUD that can be recommended to promote the cervix hostility to the sperms.

Ans- Hormone releasing IUDs, such as progestasert, LNG-20

viii) Expand the abbreviation IUCD.

Ans- Intra uterine Contraceptive Device.

b) Each subpart has four options. Choose the correct option. [1×5]

(i) Which of the following sexually transmitted diseases not specifically affect the sex organ?
1)AIDS
2)LoweredTesterone Level
3)Inflammation of Epididymis
4)All of the above
Ans-AIDS

ii**) If a pea plant shows a recessive phenotype:**

1) it can be either TT or tt

2) it can be either TT or Tt

3) it can be only TT

4) it can be only tt

Ans- It can be only tt

iii) The observable traits of an organism are its:

1) Phenotype

2) Pedigree

3) Genotype

4) Sociobiology

iv) Crossing over most commonly occurs during :

1) telophase ii

2) Prophase ii

3) Anaphase i

4) prophase i

AnsProphase i-

v) A fruit is:

1) a ripened ovary

2) an enlarged aggregate of several flowers

3)An enlarged ovule

4)a mature female gametophyte

Ans- ripened ovary.

c) Give one significant difference between each of the following . [2 × 1]

i) Autosome and sex chromosome

The chromosome in an organism that determine the sex of an individual are called sex chromosomes. The rest of the chromosomes are called autosomes.

ii)Linkage and crossing over.

Tendency of two or more genes of the same chromosome to remain together during the process of inheritance is known as linkage whereas mutual exchange of blocks of homologous genes between a pair of homologous chromosome is known as crossing over.

d) Define the following **[1×5]**

i)Mutation-

Mutation is the phenomenon which results in alteration of DNA sequences and consequently results in changes in the genotype and the phenotype of an organism.

ii)Petrification-

The fossils which preserve both external form and internal structure are called petrification. In these fossils every cells of the tissue are preserved.

iii)Homology-

Organs though different in function but of similar embryo genicorigin and development and having similar relationship with adjacent organs are known homologous organs and the this phenomenon is called homology. Population which is reproductively isolated from other similar but morphologically distinguishable populations.

iv) speciation

-It is the process by which new species are formed. A species may be defined as an interbreeding

V) Bacteriophages

Viruses which infect bacterial cells are known as bacteriophages. These are characterized by the presence of an angular head and a tail. Depending on the interaction of phges with the bacterial cell they have been distinguished into virulent and avirulent phages

Viruses

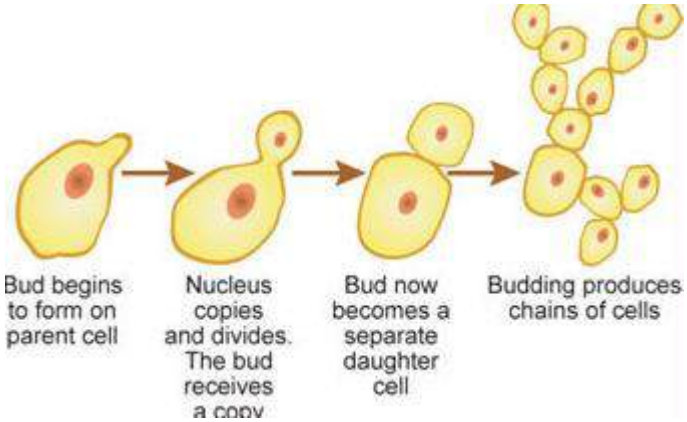
PART -2

SECTION – A (14 Marks)

(*Answer **all** question*)

Question 2

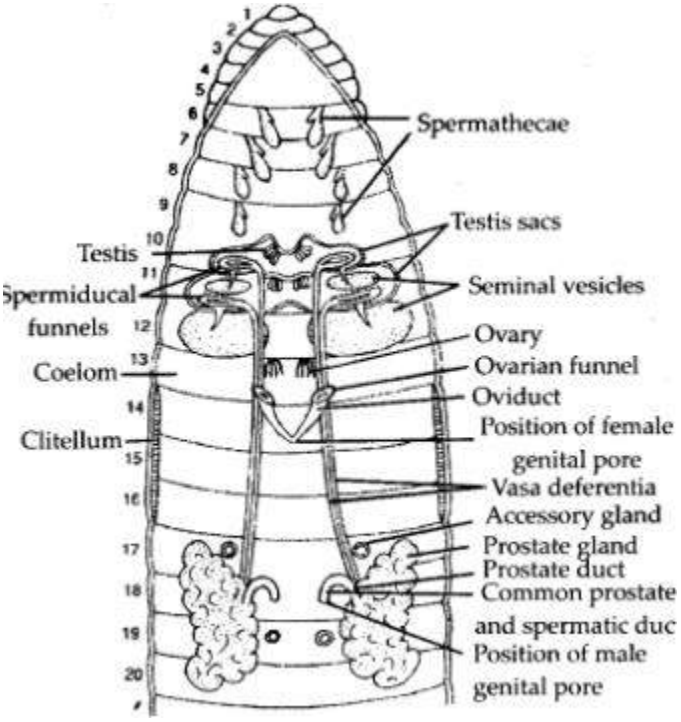
A) Diagrammatically show the process of budding in Saccharomycetes.



BUDDING IN YEAST

OR

Diagrammatically show the reproductive structure if a bisexual animal.



EARTHWORM- A BISEXUAL ANIMAL

Question 3 [3]

What is the technical term used for the flowers pollinated by honey bees and butterflies. List any two special features of such flowers.

Ans-Flowers pollinated by honeybees and butterflies are called Entomophilous.Such flowers develop large and brightly coloured petals, scent or nectar to attract honeybees and butterflies.

Question 4 **[2]**

Write the functions of Scutellum.

Ans- Scutellum is the single cotyledon in monocot seed s which absorb the digested food from the endosperm and pass it further to the embryo for growth and development.

Question 5 **[2]**

What are the proliferative phased in the menstrual cycle? For how many days does it last?

Ans-After menstruation, and proliferative stage starts with the the growth and proliferation oftissues on the walls of the uterus, fallopian tubes and vagina.it lasts for 10-12 days and at the end the ovum is ejected from the graafian follicle of the ovary.

OR

State Law of segregation.

Law of segregation states that when a pair of allomorphs are brought together in the hybrid(F1), They remain together in the hybrid together in the hybrid without blending but separates complete and pure during gamete formation.

Question 6 **[2]**

Give two causes of male infertility in males.

Infertility may be due to following reasons:

- Poor semen production- Poor sperm production leads to too few sperm in the semen.
- Sperm may lack the mobility they need to help them on their journey to egg. They may be deformed or dead.

Question 7 **[2]**

What are the different factors affecting Linkage?

Some important factors affecting Linkage are followings-

- Distance- Strength of linkage is inversely proportion to the distance between the linked genes.

- Age of organism-With increasing age , the chances of crossing over are reduced and hence the linkage increases.
- X-ray- Exposure to X –rays reduces the strength of linkage.

Question 8 **[2]**

How do histones acquire positive charge?

Ans- A protein acquires charge depending upon the abundance of amino acids residues with charged side chains. Histones are rich in the basic amino acids residues lysines and arginine's. Both the amino acids residue carry positive charges in their side chains.

SECTION – B(21 Marks)

Answer all questions

Question 9 **[3]**

a)What stimulates thepituitary torelease the hormone responsible for parturition?. Name the hormone.

The baby's descent into the pelvis and the pressure of its head against the cervix apparently set off contractions by stimulating nerves that send signals to the mother's Brain to pituitary gland to release the hormone oxytocin

OR

b) In which condition does the phenomenon of feedback repression operate in E.Coli?

Ans- When a metabolite needed by bacterium is provided in excess from outside , the bacterium stops making it and thus conserve its reserves. This is achieved by the added metabolite turning off a set of genes involved in producing that metabolite in the bacterial cell.

Question 10 **[3]**

Name the cell from which endosperm of coconut develops.

Endosperm of coconut develops from the primary endosperm nucleus (3n)formed by the act of triple fusion. Coconut is an classical example of nuclear endosperm.

b) Give the characteristics feature of coconut

The watery liquid endosperm which fills the large embryo sac contains numerous freed nuclei. It is known as liquid syncytium

Question 11 **[3]**

How does variation arise in sexually reproducing organism?

Variation arise in sexually reproducing organism by Independent assortment of chromosome during meiosis, reciprocal recombination of linked genes on chromosome by crossing over in prophase-I of meiosis and random fertilization of gametes.

Question 12 [3]

List the two methodologies which were involved in Human Genome Project.

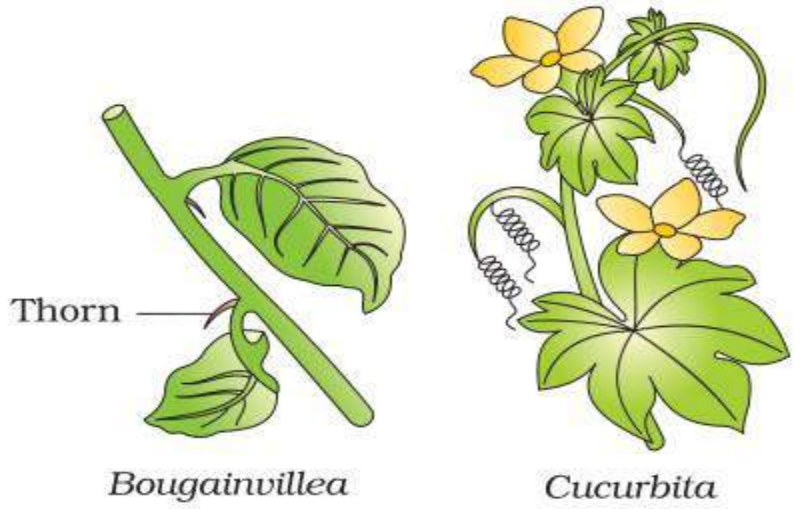
The two methodologies are Express Sequence Tags [E STs] and Sequence annotation.

ESTs focused on identifying all genes that are expressed as RNA.

In Sequence Annotation sequencing the whole set og genome is taken that contained all the coding and non-coding sequence and later assigning different regions in the sequence with function.

Question 13 **[3]**

a) Draw homologous structure in plants .explain it.

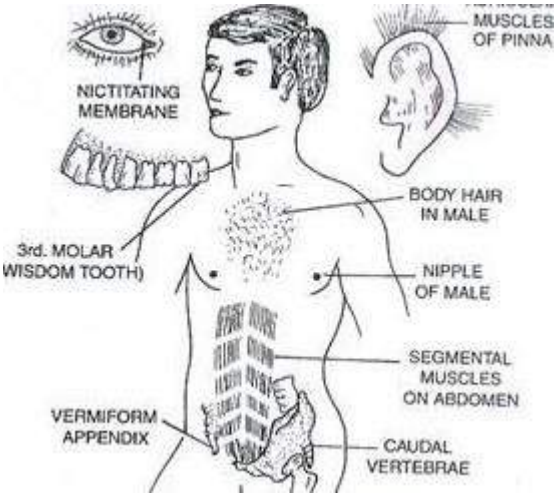


HOMOLOGOUS STRUCTURES: thorns of bougainvillea and tendrils of Cucurbits

Thorns of Bougenvillia and tendrils of cucurbits are homologous as both of them arise in axillary position and are thus a modification of branch.

OR

Show diagrammatically different vestigial organs in human?



VESTIGIAL ORGANS IN HUMAN.

Question 14 [3]

What are the two evidences which support Lamarck Theory of organic evolution?

Ans: There are various evidences that support the Lamarck theory of organic evolution.

i) Giraffe's Neck-He believes that giraffe neck become longer enough through the generation as giraffe stretched its neck to reach the leaves on tall trees.

ii) Feet of modern house-Ancestors of modern horse who lived in soft ground in jungles were browsers. Jungles were latter replaced by dry grasses. They had to graze on dry grass. These changes in habit changes the premolar and Molar reducing the number of digits.

Question15 [3]

What are the different contrary views regarding the development of modern Man?

There are two different views regarding the development of modern man.

According to Leakey erectus migrates from Africa throughout the world and developed into sapiens independently at different places. Contraryto this Chris Stringer considers that Homo erectus changed into Homo sapiens in one particular region and then migrated to different parts of the world.

SECTION C(15 Marks)

(Answer all questions)

Question 16 **[5]**

a) Organic farmers prefer biological control for controlling plant diseases than using chemicals. Justify

Ans: Bio control refers to the use of biological methods for controlling plant diseases and pests.Pathogens, pests and weeds are the three natural enemies of our agriculture These are generally controlled by the use of insecticide and pesticides. These chemicals are toxic and extremely harmful to human beingsand animals and polluting our environment. Hence farmers prefer to use biological control methods to control diseases.

b) Give an example of a bacterium a fungus used as a bio control agent.

Ans- Bacteria as bio control agent- Bacillus Thruingiensis
Fungi as bio control agent - Trichoderma

OR

Explain the significance of satellite DNA in DNA fingerprinting technique.

Ans: The satellite DNA sequences normally do not code for many proteins, but they form a large portions of human genome. These sequences show high degree of polymorphism And form the basis of DNA fingerprinting . since DNA from every tissue from an individual show the same degree of polymorphism , they become very useful identification tool in forensic application.

question 17 **[5]**

a) Write short notes on following-

1) Vaccine- Vaccine is a harmless variant or derivative of a pathogen introduced to the body in order to induce an immune response.

2) Apomixis – The phenomenon of substitution of sexual process by asexual method is known as apomixes and the plant is called as apomictic plant.

3) Fragmentation- In filamentous algae like Ulothrix , Spirogyra thallus often breaks into small fragments .Each fragment has a capability to grow independently into a new thallus.

4) Kyoto protocol- It is a legally binding agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% from the year 1990.This treaty was negotiated at the city of Kyoto, Japan and came into force on 16th February, 2005.

5) Gene bank- Gene Bank is an institution where valuable plant material likely to be lost in the wild or in the cultivation is preserved in a vial able condition.

OR

b) i) Mention two objectives of setting up of GAEC by our government.

Ans-GEAC stands for Genetic Engineering Approval Committee. It makes decision regarding the validity of GM research and safety of introducing GM- organisms for public services.

ii) What are transgenic animals? Give an example.

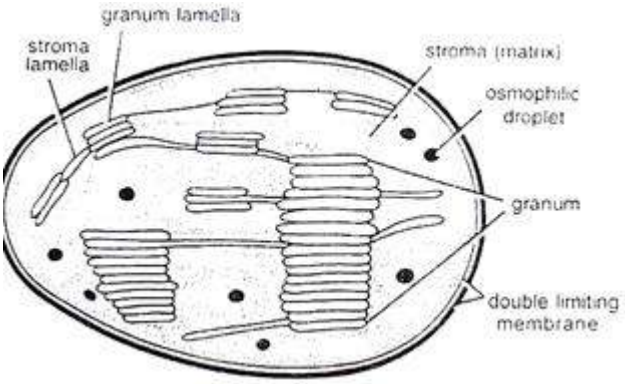
Ans-Animals that have had their DNA manipulated to possess and express an extra foreign gene are known as transgenic animals. Transgenic rats, rabbits,pigs,sheep cow are some example of transgenic animals.

iii) What do you understand by gene therapy?

Gene therapy is a technique for curing a genetic diseaseby introducing a functional gene and thus complementing the functional loss due to defective gene.

Question 18 [5]

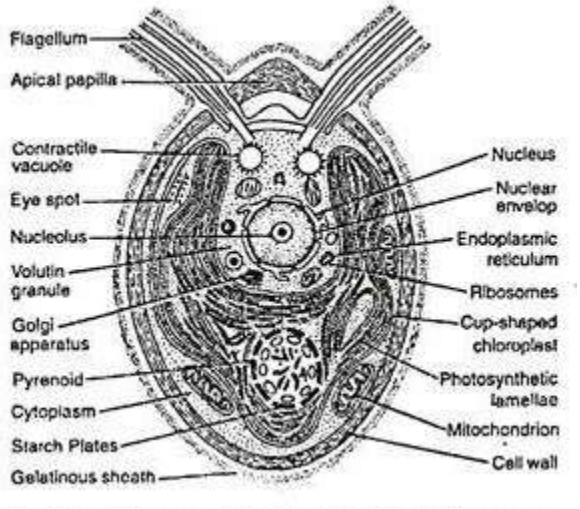
Draw a Labeled diagram of electron microscopic structure of the chloroplast.



CHLOROPLAST

OR

(b) Draw a well labelled diagram of electron microscopic structure of a eukaryotic cell.



EUKARYOTE- CHLAMYDOMONAS