

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

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

Answer All questions .

Part I consists of one question of 20 marks having subparts

Part ii consists of sections A, B, and C

Section –A consists of seven question of 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)

Question (A)

[1×8]

Answer the following question briefly.

i) All papaya plants bear flowers but fruits are seen in some.

Papaya plants are dioecious.They bear both male and female flowers on the separate plants.
Hence only female plants bear the fruit.

ii) What is Geitonogamy?

Pollen of a flower pollinates any other flower present on the same plant.

iii) Which nuclei fuse to give rise to endosperm?

Two polar nuclei and one male gamete fuse to give rise to endosperm.

iv) Name the lining of Uterus

Endometrium is the lining of uterus

v) Where is testis located in human male?

Testis is located in Scrotum.

vi) Name a pre-natal diagnostic technique to determine the sex of a baby.

Amniocentesis

vii) Expand GIFT and ICSI

GIFT—Gamete Intrafallopian transfer.

ICSI-Intra Cytoplasmic Sperm Injection

viii) Name the plant over which Mendel conducted his hybridization experiments.

Pea Plant

b) Each subpart has four options. Choose the correct option in each case [1×4]

(i) An organism with two copies of same allele is:

1)Homozygous for that trait

- 2) Heterozygous for that trait
- 3) Homozygous for the allele
- 4) heterologous for the allele

Ans- Homozygous for that trait.

ii) Which of the following stages is the first one out of the sequence?

- 1) Cleavage
- 2) Blastula
- 3) Morula
- 4) Gastrula

Ans- Cleavage

iii) Animals assist with

- 1) Pollination and seed dispersal
- 2) Control of plants growth and response
- 3) Translocation of organic nutrients
- 4) Asexual propagation of plants

Ans-Pollination and seed dispersal

iv) Seed Dormancy is associated with

- 1) Hard Seed coat
- 2) Immature embryo
- 3) Presence of germinator inhibitors
- 4) All of these

Ans-All of these

C) Give one significant contribution of each scientist

[1 × 4]

- 1) A. F. W. Schimper- He first used the term 'plastids' for the cell organelles concerned primarily with synthesis and storage of carbohydrates.
- 2) Leuwenhoek- He is known as the father of Bacteriology.

3) Wallace- he divided the earth into biogeographical regions.

4) Sutton and Boveri- He has given the chromosomal theory of Inheritance.

c) Give reason for the following:

[4 × 1]

i) For tissue culture or micropropagation an explant is selected from the tip of the shoot.

Ans-The shoot meristem is generally free from viruses and other pathogens, therefore for tissue culture or micropropagation, an explant is selected from the tip of the shoot.

ii) Genetic code is universal.

Ans- All known living systems use nucleic acids and the same three-base codons to direct the synthesis of proteins from amino acids. The mRNA codon UUU. For example codes for phenyl amine in all cells of all organisms. Hence genetic code is universal.

iii) Breast feeding acts as a natural contraceptive for the mother.

Breast feeding acts as a natural contraceptive to mothers as there is a high level of progesterone which prevents menstrual flow.

iv) Tobacco is injurious to health.

Tobacco smoke contains at least seven polycyclic hydrocarbons which are known as carcinogens. Tobacco addiction causes Emphysema, gastric and duodenal ulcers. Besides it increases the risk of asthma attacks, bronchitis, and lung cancer.

PART -2

SECTION – A (14 Marks)

(Answer all questions)

Question 2 [2]

a) What was the specialty of the milk produced by the transgenic cow Rosie?

The transgenic cow, Rosie produces balanced Human protein rich milk. The milk contains the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural Cow milk.

OR

b) Why menstrual cycle is absent during pregnancy?

Ans- The high level of progesterone and estrogen during pregnancy suppress the gonadotropins which is required for the development of new follicle. Therefore, a new cycle cannot be initiated.

Question 3

[2]

Mention any two characteristics of pollen grain of Maize.

Ans- The pollen grains of Maize are smooth walled, relatively light, small and dry so that they can be easily blown away by wind.

Question 4

[2]

Define Mendel's Law of Segregation.

Mendel's Law of segregation states that when a pair of allelomorphs are brought together in the hybrid (F₁), they remain together in the hybrid without blending but separate completely and purely during gamete formation.

Question 5

a) What are the main significance of Linkage.

Ans- The phenomenon of linkage has a great significance as it reduces the possibility of variability in gametes unless crossing over separates the linked genes.

OR

b)

Name the reproductive structure of following organisms

1) Penicillium

Ans- Reproductive structure is conidia.

2) Ulothrix

Ans- Reproductive structure is Zoospore.

ii) Name the methods of vegetative propagation for the following :

1) Lemon

Ans- Root cutting

2) Sugar cane

Ans- Stem layering

Question 6[2]

How fitness of a population does help in evolution?

Ans- The individuals which are best fitted to new conditions of life and survive show high selective value and in course of time they develop various adaptive modifications to suit the changed condition of life.

Question 7

[2]

a) Give two characteristics feature of Ramapithecus.

Ans- Characteristics feature of Ramapithecus –

- They have relatively small and delicate jaws.
- They have man like dentition with semicircular teeth line arched palate and Upright face.

b) Why offspring from asexual reproduction are known to be clone?

Ans-offspring from asexual reproduction are known to be clones because they are morphologically and genetically similar to the parent.

Question 8[2] State two different roles of spleen in the human body.

Spleen is a center where both B- and T- lymphocytes multiply and thus plays an important role in immune responses. It also helps in the removal of debris and other particular matter from circulating blood.

SECTION – B (21 Marks)

Question 9**[3]**

Name the source and the effect on the human body of the following drugs :

- 1) Morphine
- 2) Cocaine
- 3) Marijuana

Ans-1) the source of Morphine is unripe capsules of *Papaver omniferum*. It causes depression and slow body function.

2) The source of Cocaine is *Erythroxylem coca*. It causes potent stimulating effect on the central nervous system producing a sense of euphoria.

3)The source of Marijuana is *Cannabis Sativa* . It produces effect on moods ,memory, motor coordination, cognitive ability.

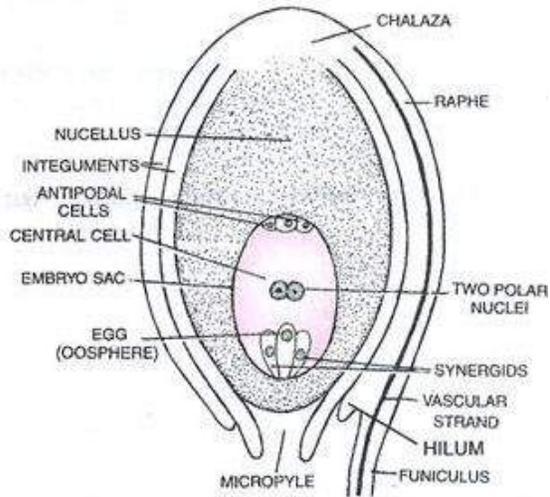
Question 10**[3]**

State the benefits of given microorganism to humans.

- a) Nucleopolyhedro virus- These baculo viruses are used as a biological control agents for insects and other arthropods. This is especially desirable when beneficial insects are being conserved to aid in an overall integrated pest management programme..
- b) *Saccharomyces Cerevisiae*- it is added to bread dough to ferment sugar, producing CO₂, that leavens the dough also used for production of beverages like wine ,beer, whisky.
- c) *Monascus purpureus*- statins produced by *Monascus purpureus* are used as a blood cholesterol lowering agent. It acts by inhibiting the enzyme responsible for synthesis of cholesterol.

Question 11**[3]**

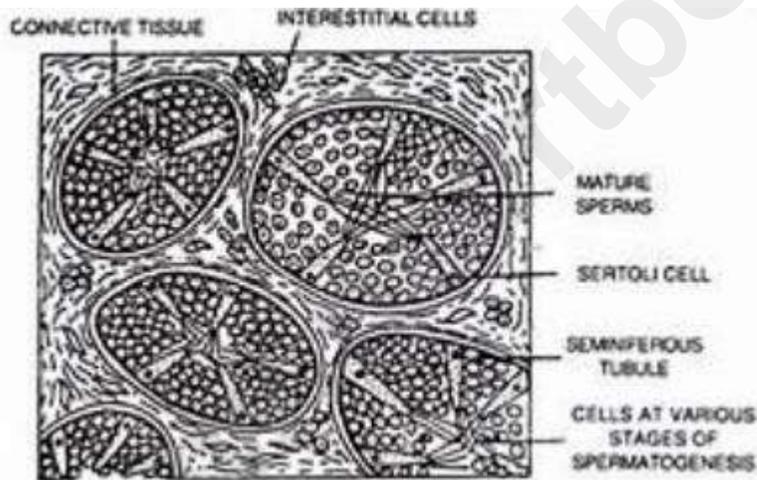
- A) Draw the structure of an ovule.



OVULE

OR

Draw T.S. of Mammalian testis.



MAMMALIAN TESTIS

Question 12

[3]

Mention one positive and one negative application of amniocentesis.

Amniocentesis is a reliable tool in prenatal diagnosis that can provide the obstetrician with essential information regarding the prognosis of the pregnancy. It is a primary tool of prenatal genetic studies. One of the main uses of amniocentesis is to detect chromosomal abnormalities. However, this beneficial technique is sometimes misused as by knowing sex, the female foetus which would have been absolutely normal is ruthlessly destroyed.

Question 13 [3]

Describe the structure of fruit with the help of diagram.

The fruit is a ripened ovary. It is formed after fertilization or sometimes without fertilization. A fruit consists of pericarp, that develops from the ovary wall and the seed derived from ovule. The pericarp may be thick or thin and is usually differentiated into an outer epicarp, a middle mesocarp, and an inner endocarp.

OR

Define the following

a) Immunity-

The overall ability of host to fight the disease causing organism conferred by immune system is called immunity. It is the resistance of the host to fight toward a pathogenic microbe.

b) Mutualism-

It is an interaction between two species in which both are benefited. In such interactions there occurs a close and often permanent and obligatory contact essential for survival of both.

c) BOD-

It refers to the amount of oxygen that would be consumed if all the organic matter in one litre of water oxidized by bacteria.

Question 14 [3]

Describe the contribution of different scientists in abiogenesis theory.

According to this theory life has originated from nonliving organic matter abiogenetically or without the interference of living things. Greek philosopher Anaximander maintained that plants and animals were formed from inorganic substances. Epicurus advocated the origin of worms and several other animals from the soil or manure by the action of warmth of the sun and air. Aristotle believed that life arose from spontaneously. Van Helmont was of the opinion that human sweat and wheat bran when kept together for three weeks can form mice.

Question 15 [3]

Explain two defence mechanism evolved in preys to avoid over population of their predator.

Ans-prey species have evolved various defenses to lessen the impact of predation. Some species of insect and frogs are cryptically coloured called camouflaged to avoid being detected easily by the predator. Some are poisonous and therefore avoided by the predators.

In plants herbivore are predators. They cannot run away from their predators. Plants have evolved an astonishing variety of morphological and chemical defences against herbivores

SECTION C(15 Marks)

(Answer all questions)

Question 16 [5]

a) What do you mean by ecological factors? What is its kind?

Ans- Each part of the environment which affects in a specific way the structure or functioning of an organism or influences its growth is called ecological factor or factors of environment. All ecological factors fall in four groups.

- 1) Climatic factor- The major climatic factors are precipitation, humidity, temperature, light, wind. Different combination of these factors account for different types of climate and responsible for different types of vegetation in world.
- 2) Topography- These factor include the form, surface and behavior of the earth with special reference to slope, mountain chain, valley, etc.
- 3) Edaphic factors- Soil is an important factor for life .ecological factors which relate to the structure and composition of soil are called edaphic factors.
- 4) Biotic factors- Any activity of the living beings that affects the environment in anyway includes biotic factors.

OR

b) Write short notes on

1) Food web-

The interconnected food chains operating in the ecosystem which establish a network of relationships between various species is called a food web.

2) Addiction-

Addiction is the physical and mental dependence on a specific substance which is unable to resist indulgence in such a habit is called an addict.

3) Niche

Niche is a complex description of how an organism is related to its biological and physical environment. The niche includes not only physical space occupied by an organism but its functional role in the community.

4) Bio piracy-

Bio piracy refers to the use of bio resources by multinational companies and other organizations without proper authorizations from the countries and people concerned without compensatory payment. It is widespread in Asia, Africa and Latin America where abundant biological resources are produced.

5) Pneumonia-

It is a respiratory disease of lungs. The causative agent is bacterium *Streptococcus pneumoniae* but protozoa and virus may also cause pneumonia. Its symptoms are a persistent dry cough, high fever with rapid rate of breathing, chest pain, headache, chills.

Question 17

[5]

(a) Ecological services-

Living things perform a host of various ecological services that help maintain life, natural system and moderate conditions on planet. They provide the oxygen to respire, food to eat. They remove carbon dioxide from earth. They bring rainfall to moderate climate. They help fertilize earth's soil. They control pests and provide the genetic resources that we employ to impart abundant yields and vigour our crop. The ecological services performed by earth's biota have economic, medical, genetic, agricultures, climatic and survival values.

OR

A child suffering from thalassemia is born to a normal couple. But the mother is being blamed by the family for delivering a sick baby

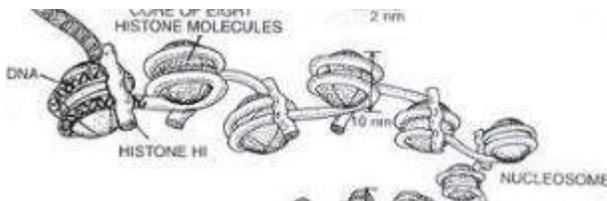
a) What is thalassemia?

Ans: Thalassaemia is an autosomal recessively inherited disease due to the gene substitution mutation. It is an inherited abnormality in hemoglobin which causes the red blood cells to break down too easily. The RBC's are small, pale and short lived.

b) Why a mother is not blamed for delivering a child suffering from this disease?

Question 18 [5]

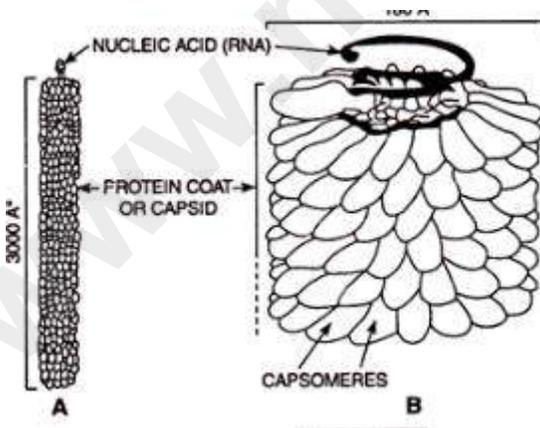
a) Draw nucleosome model of chromosome structure.



NUCLEOSOME STRUCTURE OR CHROMOSOME

OR

b) Draw a structure of Tobacco Mosaic Virus.



c)

TOBACCO MOSAIC VIRUS