



Code Number:

A

Aakash

Medical | IIT-JEE | Foundations

Corp. Office: Aakash Educational Services Limited, 3rd Floor, Incuspaze Campus- 2, Plot No. 13,
Sector- 18, Udyog Vihar, Gurugram, Haryana - 122015

Time: 3 hrs.

Mock Test Paper for Class-XII

Max. Marks: 70

BIOLOGY

Answers & Solutions

PART-I (BOTANY)

1. Answer (b)
Dobson
2. Answer (d)
Dominant epistasis
3. Answer (a)
10
4. Answer (d)
(A) is correct, (R) is wrong
5. Answer (d)
400 -700 nm
6. Answer (d)
(1)-(iv), (2)-(iii), (3)-(i), (4)-(ii)
7. Answer (c)
Brazil
8. Answer (c)
confer resistance to antibiotics
9. In 1900 the work of Mendel's experiments were rediscovered by three biologists, Hugo de Vries of Holland, Carl Correns of Germany and Erich von Tschermak of Austria.
10. Phytoremediation - use of plants to bring about remediation of environmental pollutants.
11. Enzymes required for genetic engineering is
 - i) Restriction endonucleases
 - ii) DNA polymerase
 - iii) DNA ligase
 - iv) Alkaline phosphatase
 - v) Terminal Transferase

12. The callus cells undergoes differentiation and produces somatic embryos, known as Embryoids. The e embryoids are sub-cultured to produce plantlets.
13. A graphical representation of energy flow at each successive trophic level in an ecosystem is called pyramid of energy. • The bottom of the pyramid of energy is occupied by the producers. There is a gradual decrease in energy transfer at successive tropic levels from producers to the upper levels. Therefore, the pyramid of energy is always upright.
14. Biofertilizers could be also called as microbial cultures, bioinoculants, bacterial inoculants or bacterial fertilizers. • Biofertilizers are defined as preparations containing living cells or latent cells of efficient strains of microorganisms that help crop plants uptake of nutrients by their interactions in the rhizosphere when applied through seed or soil.
15. **Uses of genetic mapping**
- It is used to determine gene order, identify the locus of a gene and calculate the distances between genes.
 - They are useful in predicting results of dihybrid and trihybrid crosses.
 - It allows the geneticists to understand the overall genetic complexity of particular organism.
- 16.
- Cryopreservation, also known as Cryoconservation, is a process by which protoplasts, cells, tissues, organelles, organs extracellular matrix, enzymes or any other biological materials are subjected to preservation by cooling to very low temperature of -196°C using liquid nitrogen.
 - At this extreme low temperature any enzymatic or chemical activity of the biological material will be totally topped and this leads to preservation of material in dormant status. Later these materials can be activated by bringing to room temperature slowly for any experimental work.

17.

	Habitat	Niche
1.	A specific physical space occupied by an organism (Species)	A functions space occupied by an organism in the same eco-system.
2.	Same habitat may be shared by many organisms (species)	A single niche is occupied by a single species
3.	Habitat specificity is exhibited by organism.	Organisms may change their niche with time and season.

18. **Carbon sequestration:** Trees absorb carbon dioxide (CO_2) from the atmosphere, storing carbon in their wood, leaves, and roots, effectively reducing greenhouse gases that cause warming.
- **Temperature regulation:** Through transpiration (releasing water vapor) and providing shade, forests cool the air, moderating local and regional temperatures.
 - **Water cycle Regulation:** They absorb rainfall, release moisture back into the atmosphere (transpiration), and influence cloud formation, which affects rainfall patterns and helps prevent droughts.
 - **Oxygen production:** Photosynthesis releases vital oxygen, essential for life, while removing CO_2 .
 - **Soil stability:** Tree roots hold soil, preventing erosion and maintaining land health, which supports healthy ecosystems that regulate climate.

19.

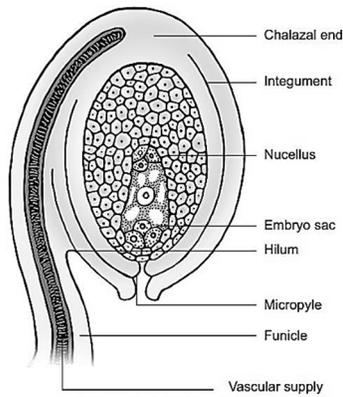


Figure 2: L.S of ovule

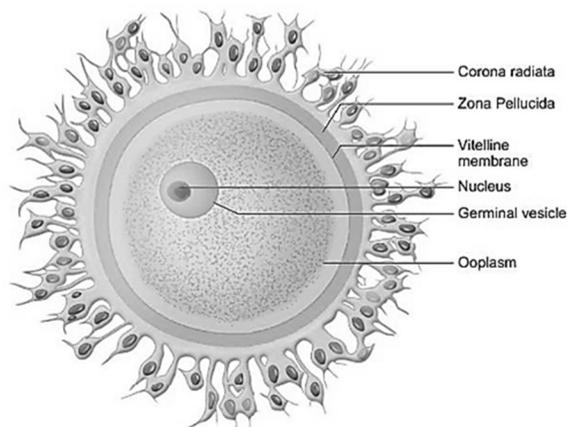
20. a) Single cell proteins are dried cells of microorganism that are used as protein supplement in human foods or animal feeds.
- Single Cell Protein (SCP) offers an unconventional but plausible solution to protein deficiency faced by the entire humanity. Applications of Single-Cell Protein
 - It is used as protein supplement It is used in cosmetics products for healthy hair and skin. • It is used as the excellent source of protein for feeding cattle, birds, fishes etc.
 - It is used in food industry as aroma carriers, vitamin carrier, emulsifying agents to improve the nutritive value of baked products, in soups, in ready-to-serve-meals, in diet recipes
 - It is used in industries like paper processing, leather processing as foam stabilizers.
- b) The term millet is applied to a variety of very small seeds originally cultivated by ancient people in Africa and Asia. They are gluten free and have less glycemic index.
1. Finger Millet – Ragi Botanical name: *Eleusine coracana*
 2. Sorghum Botanical name: *Sorghum vulgare*
 3. Foxtail Millet Botanical name: *Setaria italica*
 4. Kodo Millet Botanical name: *Paspalum scrobiculatum*
21. a) Chloroplast Inheritance:
- It is found in 4 O' Clock plant (*Mirabilis jalapa*)
 - In this, there are two types of variegated leaves namely dark green leaved plants and pale green leaved plants.
 - When the pollen of dark green leaved plant (male) is transferred to the stigma of pale green leaved plant (female) and pollen of pale green leaved plant (male) is transferred to the stigma of dark green leaved plant (female), the F1 generation of both the crosses must be identical as per Mendelian inheritance.
 - But in the reciprocal cross the F1 plant differs from each other. In each cross, the F1 plant reveals the character of the plant which is used as female plant.
 - This inheritance is not through nuclear gene. It is due to the chloroplast gene found in the ovum of the female plant which contributes the cytoplasm during fertilization since the male gamete contribute only the nucleus but not cytoplasm.
- b) Microsporogenesis:
- The stages involved in the formation of haploid microspores from diploid microspore mother cell through

meiosis is called Microsporogenesis.

- The primary sporogenous cells directly, or may undergo a few mitotic divisions to form sporogenous tissue.
- The last generation of sporogenous tissue functions as microspore mother cells.
- Each microspore mother cell divides meiotically to form a tetrad of four haploid microspores (microspore tetrad).
- Microspores soon separate from one another and remain free in the anther locule and develop into pollen grains.

PART-II (ZOOLOGY)

1. Answer (a)
Sertoli cells
2. Answer (a)
Commensalism
3. Answer (c)
Gall fly
4. Answer (d)
21st chromosome
5. Answer (c)
Liver
6. Answer (b)
Thomas Henry Huxley
7. Answer (b)
Uttarakhand
8. Answer (a)
SCID (Severe Combined Immunodeficiency)
9. Goals of Human Genome Project:
 - Identify all the genes (approximately 30000) in human DNA.
 - Determine the sequence of the three billion chemical base pairs that makeup the human DNA.
 - To store this information in databases.
 - Improve tools for data analysis.
 - Transfer related technologies to other sectors, such as industries.
 - Address the ethical, legal and social issues (ELSI) that may arise from the project.
10. Oligopotency refers to stem cells that can differentiate into few cell types. Eg: lymphoid progenitor cells give rise to T&B lymphocytes.
11. Structure of ovum:



12. Ethanol is referred to as industrial alcohol. It is used for industrial, laboratory and fuel purposes. So, ethanol is referred to as industrial alcohol. • Saccharomyces cerevisiae is the major producer of ethanol (C₂H₅OH).
13. Sameer, an App provides hourly updates on the National Air Quality Index (AQI) published by CPCB.
15. **Coprolites:**
- Hardened faecal matter of animals is referred as coprolites.
 - Which are paleontological evidences for biological evolution.
 - Analysis of the coprolites enables us to understand the nature of diet; the pre historic animals thrived on earth.
16. During pregnancy, the placenta acts as a temporary endocrine gland.
- It synthesises large quantities of human Chorionic Gonadotropin (hCG), human Chorionic Somatomammotropin (hCS) or human Placental Lactogen (hPL), oestrogens and progesterone.
 - Which are essential for a normal pregnancy.
17. **E-Waste management:**
- Reducing E-Waste generation
 - Promoting proper Recycling & disposal methods
 - Reusing • Avoiding informal disposal methods
 - Preventing unauthorised processing of E-waste
 - Creating awareness about E- waste effect on health
- 18.

r-Selected species	k-selected species
Smaller sized organisms	Larger sized organisms
Produce many offsprings	Produce few offsprings
Mature early	Late maturity with extended parental care
Short life expectancy	Long life expectancy
Each individual reproduces only once or few times in their life time	Can reproduce more than once
Only few reach adulthood	Most individuals reach maximum life span
Unstable environment, density independent	Stable environment, density dependent

19. PCR (Polymerase Chain Reaction):
- Polymerase Chain Reaction doesn't directly replicate RNA; instead, reverse transcription PCR (RT-PCR) uses for replication of RNA.
 - In this process the RNA molecules (mRNA) must be converted to complementary DNA (cDNA) by the enzyme reverse transcriptase.
 - The cDNA then serves as the template for PCR.
20. a) • identify and protect all threatened species.
- identify and conserve in protected areas the wild relatives of all economically important organisms.
 - identify and protect critical habitats for feeding, breeding, nursing, resting of each species
 - resting, feeding and breeding places of the organisms should be identified protected.
 - Air, water and soil should be conserved on priority basis

- Wildlife Protection Act should be implemented

b) Hardy Weinberg's assumptions:

- No mutation – No new alleles are generated by mutation nor the genes get duplicated or deleted.
- No genetic drift- There should not be sudden changes in allele /gene frequencies.
- Random mating – Every organism gets a chance to mate and the mating is random with each other with no preferences for a particular genotype.
- No gene flow - Neither individuals nor their gametes enter (immigration) or exit (emigration) the population.
- Very large population size - The population should be infinite in size.
- No natural selection- All alleles are fit to survive and reproduce.

21.

a)

Group	Drugs	Effects
Stimulants	Amphetamines, Cocaine, nicotine and tobacco	Accelerates the activity of the brain
Depressants	Alcohol, Barbiturates, Tranquilizers	Slows down the activity of the brain
Narcotic/Analgesics	Opium, Morphine	Act as depressants on the central Nervous System
Cannabis	Bhag (Marijuana), Ganja, Charas	Affects the cardiovascular system
Hallucinogens	Lysergic acid diethylanamide (LSD), Phencyclidine	Distorts the way one sees, hears and feels

b)

- Syngamy is the process of fusion of two haploid gametes to produce a diploid zygote. Different kinds of syngamy (fertilization) includes;
- Autogamy: The male and female gametes are produced by the same cell or same organism and both the gametes fuse together to form a zygote e.g. Actinosphaerium and Paramecium.
- Exogamy: the male and female gametes are produced by different parents and they fuse to form a zygote. So, it is biparental. e.g. Human – dioecious or unisexual animal.
- Hologamy: The entire mature organisms do not form gametes but they themselves behave as gametes and the fusion of such mature individuals e.g. Trichonympha.
- Paedogamy: The sexual union of young individuals produced immediately after the division of the adult parent cell by mitosis.
- Merogamy: The fusion of small sized and morphologically different gametes (merogametes) takes place.
- Isogamy: The fusion of morphological and physiological identical gametes (isogametes). e.g. Monocystis,
- Anisogamy: The fusion of dissimilar gametes. e.g. higher invertebrates and all vertebrates.