



Sample Paper-03

Dropper NEET (2024)

dd/mm/yyyy

**BOTANY**

**ANSWER KEY**

- |         |         |
|---------|---------|
| 1. (2)  | 26. (4) |
| 2. (4)  | 27. (1) |
| 3. (3)  | 28. (1) |
| 4. (3)  | 29. (2) |
| 5. (2)  | 30. (4) |
| 6. (4)  | 31. (4) |
| 7. (4)  | 32. (4) |
| 8. (4)  | 33. (4) |
| 9. (1)  | 34. (3) |
| 10. (4) | 35. (4) |
| 11. (1) | 36. (1) |
| 12. (3) | 37. (1) |
| 13. (2) | 38. (4) |
| 14. (3) | 39. (3) |
| 15. (3) | 40. (2) |
| 16. (1) | 41. (3) |
| 17. (2) | 42. (4) |
| 18. (2) | 43. (3) |
| 19. (4) | 44. (4) |
| 20. (1) | 45. (2) |
| 21. (3) | 46. (3) |
| 22. (2) | 47. (3) |
| 23. (1) | 48. (2) |
| 24. (3) | 49. (1) |
| 25. (3) | 50. (4) |



## HINTS AND SOLUTION

1. (2)  
(A) Dominance = In a heterozygous organism only one allele expresses itself  
(B) Codominance = In a heterozygous organism both alleles express themselves fully  
(C) Pleiotropy = A single gene influences many characters  
(D) Polygenic inheritance = Many genes govern a single character.
2. (4)  
Potato and brinjal are two different Species but both belongs to the genus Solanum.  
In *Mangifera indica*, Mangifera and indica are generic and Species epithets, respectively.
3. (3)  
Genetic code is read in mRNA in a contiguous fashion. It is not absolutely universal, it is nearly universal.  
Therefore D&F are incorrect statements.
4. (3)  
In most of the water pollinated species, pollen grains are protected from wetting due to presence of mucilaginous covering.  
Pollens are not spherical in all hydrophyllous plants. They are long needle shaped in case of zoostera. So, (V) & (VI) are false statements.
5. (2)  
Predators also help in maintaining species diversity in a community, by reducing the intensity of competition among competing prey species.
6. (4)  
A genome is an organism's complete set of DNA including all of its genes. Each genome contains all of the information needed to build and maintain that organism. This is the largest in the given options.  
Chromosomes are the threadlike structures located inside the nucleus of animal and plant cells.  
The building blocks of nucleic acids are the nucleotides.  
A gene is the basic physical and functional unit of heredity. Genes are made up of DNA.  
Thus, the correct answer is option (4), 'Genome, chromosome, gene, nucleotide'.
7. (4)  
The sequence of the coding strand and the mRNA is the same, exception is the T is replaced with U. AGGUAUCGCAU is the sequence of the transcribed mRNA.
8. (4)  
CO<sub>2</sub> of low concentrations enters the mesophyll cells through stomata and is absorbed by phosphoenol pyruvic acid (3C) with the help of PEP-carboxylase to form oxaloacetic acid (4C). OAA (4C), being unstable, gets converted into stable 4C acids like malic acid or aspartic acid. These acids diffuse into bundle sheath where they release CO<sub>2</sub> to form pyruvic acid (3C).
9. (1)  
*Trichoderma polysporium* produces cyclosporine A which acts as immunosuppressive agent during organ transplant. They suppress the immune system of the patient so that it does not act against organ transplanted.
10. (4)  
Ethylene is a simple gaseous PGR. It is synthesised in large amounts by tissues undergoing senescence and ripening fruits. Influences of ethylene on plants include horizontal growth of seedlings, swelling of the axis and apical hook formation in dicot seedlings.
11. (1)  
When only light of wavelength beyond 680 nm is available for excitation; Synthesis of NADPH<sup>+</sup> H<sup>+</sup> will not occur as it is formed in non-cyclic photophosphorylation which involves both PS-I & PS-II.
12. (3)  
Standing crop = Mass of living material at a particular time in a trophic level  
Productivity = Rate of biomass production  
Net primary productivity = Less than GPP due to respiratory losses  
Stratification = Vertical distribution of different species occupying different levels
13. (2)  
The given diagram shows parents placentation. In parietal placentation, the ovules develop on the inner wall of the ovary or on peripheral part. Ovary is one-chambered but it becomes two chambered due to the formation of the false septum, e.g., mustard and Argemone.
14. (3)  
Red algae produces hydrocolloid 'caragreen'.  
e.g; *Porphyra* and *Gelidium*.



- 15. (3)**  
Meiosis is called reduction division because the number of chromosomes in daughter cells becomes half of the number of chromosomes in mother cells. In spite of this, meiosis enables the conservation of specific chromosome number of each species. In fact, had there been no meiosis, organisms would not have been able to evolve to sexual mode of reproduction. We know that fertilization involves fusion of male and female gametes. Thus, zygote gets the chromosome pool from two cells and the number of chromosomes in a zygote becomes double that of the gametes. To ensure conservation of specific chromosome number after fertilization, it is necessary that the gametes should have half the number of chromosomes compared to what it is in somatic cells.
- 16. (1)**  
There are 34 hotspots of biodiversity worldwide, three of which occur in India, including the Western Ghats & Sri Lanka, Indo-Burma (North East India) and the Himalayas. Western ghats & Sri Lanka, Indo Burma and the Himalayas are therefore India's hot spots of biodiversity.  
India is one of the megadiverse countries in the world with 45,000 species of plants and twice as many of the animals have been recorded in India.
- 17. (2)**  
(A) Complex-I = FMN is a coenzyme  
(B) Complex-II =  $\text{FAD}^+$  is a coenzyme  
(C) Complex-III = Accepts  $\text{e}^-$  from  $\text{UQH}_2$   
(D) Complex-IV = Contains copper centres
- 18. (2)**  
A = Hypocotyl root axis  
B = Shoot apical meristem  
C = Scutellum  
D = Endosperm
- 19. (4)**  
Only animal cells contain a single membrane bound organelle called centrosome which helps in cell division.  
Amyloplasts store carbohydrates (starch), elaioplasts store oils and fats whereas the aleuroplasts store proteins.  
Therefore, B & D are false while as A & C are true.
- 20. (1)**  
In dicot stem epidermis may bear trichomes and a few stomata. The outer hypodermis consists of a few layers of collenchymatous cells. Cortical layers below hypodermis consist of rounded thin-walled parenchymatous cells with conspicuous intercellular spaces. The cells of the endodermis are rich in starch grains.
- 21. (3)**  
Growth = Increase in mass and increase in number of individuals.  
Reproduction = Production of offspring  
Metabolism = Sum total of all chemical reactions occurring in a living body  
Cellular organization = Composed of one or more living cells
- 22. (2)**  
Phenotypic and genotypic ratios coincide in both incomplete dominance and co-dominance, i.e., 1:2:1. Inheritance like incomplete dominance and co-dominance are deviations from Mendel's law of dominance.
- 23. (1)**  
Dihybrid cross is a cross between two different genes that have two different traits. When a tall plant with red colored flower ( $\text{TTRR}$ ) is crossed with dwarf plant with white colored flower ( $\text{ttrr}$ ), the  $\text{F}_1$  generation will have all tall plants with red colored flowers ( $\text{TtRr}$ ). When  $\text{F}_1$  generation is crossed, the  $\text{F}_2$  generation will have phenotype in the ratio of 9:3:3:1.
- 24. (3)**  
The primary transcript in eukaryotes contains both exons & introns the non coding sequences. The introns are removed during processing by splicing & the exons are joined. The presence of introns in primary transcript is the reminiscent of antiquity.
- 25. (3)**  
Chloroplast is a double membrane bound organelle. The space limited by the inner membrane is called the stroma. Chloroplast contain chlorophyll. Chloroplast may be present in organs (young green stem) other than leaves.



26. (4)  
Dicots are non-endospermic e.g; pea .Castor is a dicot but endospermic. Monocots are endospermic e.g; wheat & maize.
27. (1)  
Measurement and comparison of total growth per unit time is called the absolute growth rate.The growth of the given system per unit time expressed on a common basis is called the relative growth rate.
28. (1)  
The Calvin cycle reactions can be divided into three main stages:  
1. carbon fixation  
2. reduction  
3. regeneration of the starting molecule.
29. (2)  
A stable community must be either resistant or resilience to occasional disturbances (natural or man-made). A stable community must be resistant to invasion by alien species. A stable community is with less biodiversity and endemism but still high on productivity.  
The Rivet Popper Hypothesis was proposed by Paul Ehrlich. The hypothesis suggests the importance of species richness in the maintenance of the ecosystem. The rivets of an aeroplane were compared with species in an ecosystem.
30. (4)  
Commensalism = Barnacles growing on the back of whale  
Parasitism = Presence of lice among hairs of human  
Mutualism = Mycorrhizae  
Predation = Prickly pear cactus and Cactoblastis
31. (4)  
*Aspergillus niger* is a fungus producing citric acid.  
*Clostridium butyricum* are Gram-positive bacteria that produce butyric acid.
32. (4)  
Humus is the amorphous, dark coloured and colloidal substance which is highly resistant to microbial action. It undergoes decomposition at an extremely slow rate.  
Being colloidal in nature it serves as a reservoir of nutrients.
- The humus is further degraded by some microbes and release of inorganic nutrients occurs by the process known as mineralisation.
33. (4)  
Deuteromycetes occur mostly as saprophytes. Deuteromycetes have well-developed, separate, mycelium and reproduce asexually by means of special spores known as conidia. Basically, Deuteromycetes are known as fungi imperfect because of a perfectly sexual stage has not been observed. Fruiting body is not present.
34. (3)  
Genera like *Selaginella* and *Salvinia* which produce two kinds of spores, macro (large) and small (micro) spores are known as heterosporous. Microspore and macrospore germinate and gives rise to male and female gametophyte respectively. The female gametophytes in these plants are retained on the parent sporophyte for a variable period. The development of the zygote into young embryo takes place within the female gametophytes. This event is a precursor to the seed habits considered an important step in evolution. So, the correct answer is 'Embryo develops in female gametophyte which is retained on parent sporophyte'.
35. (4)  
When the two photosystems work in a series, a process called non-cyclic photophosphorylation occurs.  
Cyclic photophosphorylation occurs when only light of wavelengths beyond 680 nm are available for excitation.
36. (1)  
Sclerenchymatous hypodermis is seen in monocot stem.  
Starch Sheath is endodermis in dicot stem.  
Bulliform cells are present on upper (adaxial) epidermal cells of monocot leaf.  
Undifferentiated mesophyll is seen in monocot leaf.
37. (1)  
Cellular respiration is an exergonic process because the breaking of C– C bonds of complex compounds through oxidation within the cells, leads to release of considerable amount of energy.



38. (4)  
The genetic code is universal which means that a particular codon specifies a particular amino acid in all the organisms. The genetic code is nonoverlapping means a base in mRNA is not shared by two different codons; if it was the case, six bases could code for four amino acids which are not true. Wobble pairing refers to loose base pairing between first base of the anticodon (5'-3'direction) and the third base of the codon on mRNA. Genetic code show degeneracy which means that multiple codons specify particular amino acid; asparagine is encoded by "GAU and GAC". Degeneracy allows one amino acid to be encoded by multiple codons; thus 61 codons for 20 amino acids.
39. (3)  
$$\frac{(\text{"Change in population"})}{(\text{"Original population"})} = \frac{(60 - 50)}{50} = 10/50 = 0.2 \text{ offspring epr lotus per year.}$$
40. (2)  
Underground stems act as organs of perennation to tide over conditions unfavourable for growth. Thorns protect plants from browsing animals. Axillary buds of stems may also get modified into woody, straight and pointed thorns. Underground stems of some plants spread to new niches and when older parts die new plants are formed.
41. (3)  
*Family solanaceae* is a dicot family, but *Family Liliace* is a monocot family, so they cannot belong to same order Polymoniales.
42. (4)  
The infoldings of plasma membrane in bacterial cells are called mesosomes. They help the bacteria in respiration, protein.
43. (3)  
The mycelium of ascomycetes is branched and septate. Each cell is uninucleate (not coenocytic). Coenocytic mycelium is the characteristic feature of class phycomycetes.
44. (4)  
Differences between mosses and ferns are:  
(a) Mosses are non-vascular plants; ferns are vascular.  
(b) Gametophyte is the dominant generation in mosses; sporophyte is dominant generation in ferns.  
(c) Mosses can have male and female gametophytes; fern gametophytes have male and female parts on same plant.
45. (2)  
The vacuole is bound by a single membrane called tonoplast. In plant cells, vacuoles can occupy upto 90% of the volume of the cell. In Amoeba, the contractile vacuoles are important for excretion.
46. (3)  
Number of meiosis to produce 200 male gametes =  $n/4$   
Number of meiosis to produce 200 egg cells =  $n$   
where,  $n$  = number of seeds = 200  
Thus, total number of meiosis required to produce 200 seeds =  $n + n/4 = 200 + 200/4 = 250$
47. (3)  
300 ppm  $\text{CO}_2$  concentration means that the concentration is 0.03% which is the normal concentration of  $\text{CO}_2$ . Hence, the plant will show normal photosynthesis.
48. (2)  
Glucose is a six-carbon compound. It catabolises into two molecules of pyruvic acid (each with three carbon compound) by the process of glycolysis.
49. (1)  
Leaf A:  $5/20 \times 100 = 25\%$   
Leaf B:  $5/25 \times 100 = 20\%$ .
50. (4)  
Ground tissue can be defined as all the tissues except epidermis and vascular bundles. Ground tissue constitutes the interior of organs except vascular system. It consists of simple tissues such as parenchyma, collenchyma and sclerenchyma.

