



# DIRECTORATE OF SCHOOL EDUCATION TAMILNADU

<b>12NPCB09 (2023-24)</b>	<b>NEET PRACTICE QUESTIONS (TEST-9)</b>	<b>Class : XII Time : 1.15 hrs Total Marks : 240</b>
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## Answer key

### 12th - BOTANY

31. D) A nematode *Meloidegryne incognita* infects the roots of tobacco plants and causes a great reduction in yield. RNAi takes place in all eukaryotic organisms as a method cellular defense. This method involves silencing of specific mRNA due to complementary dsRNA molecule that binds to and prevents translation of mRNA.

*Agrobacterium* vector is used to introduce nematode specific genes into host plants.

32. D) Strains of the bacterium *Bacillus thuringiensis* produce over 200 different Bt toxins. Most Bt toxins are insecticidal to the larvae of moths and butterflies, beetles, cotton bollworms and gnatflies but are harmless to other forms of life.

The Bt toxin protein exist as inactive protoxins but once an insect ingest the inactive protein, it is converted into an active form of toxin due to the alkaline pH of the gut which solubilise the crystals. The activated toxin binds to the surface of midgut epithelial cells and create pore that cause cell swelling and lysis and eventually cause death of the insect.

33. D) Golden rice is a transgenic crop rice with high vitamin A content. It has been developed by transferring beta carotene synthesizing gene into the transgenic rice. Beta carotene is the precursor of vitamin A. This transgenic rice has been crossed with the already adapted varieties of rice to make them grow well in a particular area. It is very useful for the people suffering from vision impairment due to vitamin A deficiency.

34. D) Herbicide resistant plants have been developed in such a way that they continue to produce normal crop yield and at the same time remain unaffected by the activity of herbicides. These plants also reduces the use of weeding labour, farmer's cost and increases yield.

35. D) The normal mRNA of a gene is said to be 'sense' because it carries the codons that are 'read' during translation. Normally, the complement to the mRNA 'sense' strand will not contain a sequence of codons that can be translated to produce a functional protein. Thus this complementary strand is called 'anti-sense' RNA. The anti-sense RNA and mRNA molecules will anneal to form duplex RNA molecules and duplex RNA molecules
36. B) Bollworms
37. A) A first transgenic plant was produced in tobacco. A gene resistant to L-phosphinothricin (PPT), an active ingredient of herbicide 'Basta' was isolated from *Medicago sativa*. It inhibits the enzyme GS(glutamine synthase) which is involved in ammonia assimilation. This gene resistant to PPT was incorporated into tobacco, as a result transgenic tobacco was produced which was resistant to PPT.
38. D) Cotton
39. C) The stage between the two meiotic divisions is called interkinesis which is short-lived. There is no replication of DNA during interkinesis. Interkinesis is followed by Prophase II.
40. D) In Diakinesis stage, Nucleolus and nuclear envelope disappears. Spindle fibers assemble  
Diplotene stage may last for days or years depending on the sex and organism. Eg. Oocyte of some vertebrates.
41. D) Crossing over leads to recombination of genetic material on the two chromosomes, this is mediated by the enzyme recombinase during pachytene stage.  
Crossing over takes place during the stage pachytene not during zygotene  
This enzyme not playing any role in the formation of bivalent.  
This enzyme not playing any role in formation of chiasmata
42. D) During the cytokinesis of plant cell, the formation of the new cell begins with formation of simple precursor called as Cell plate. This leads into uninucleate condition. Absences of cytokinesis leads into the formation of multinucleate condition.

In animal cell cytokinesis starts from formation of furrow in plasma membrane. The furrow gradually deepens and joins in the centre.

Middle lamella is absent in animal cell. Cytokinesis of plant cell only represents middle lamella.

Cytokinesis of plants, Cell plate grows from centre towards lateral walls.

43. B) During Metaphase stage of Mitosis, condensation of chromosomes is completed and they can be observed clearly under the microscope. So that chromosomal morphology can be studied easily.

44. A)  $G_0$  stage otherwise called as Quiescent stage means inactive stage. In this stage cells remains metabolically active without proliferation. Cells can exist for long periods of time

45. A)  $G_1$  phase corresponds to the interval between mitosis and initiation of DNA replication. Cells became metabolically active and grows by producing proteins, lipids , carbohydrates and cell organelles but does not replicate its DNA

In S phase growth of the cell continues as replication of DNA occur, protein molecules called histones are synthesised and attach to the DNA. DNA content increases from 2C to 4C.

In  $G_0$  , cells cease growth with reduced rate of RNA and protein synthesis.

In  $G_2$ , one of the protein Maturation Promoting Factor(MPF) is synthesized. It brings about condensation of interphase chromosomes into the mitotic form.



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<b>11NPCB09</b> <b>(2023-24)</b>	<b>NEET PRACTICE QUESTIONS</b> <b>(TEST-9)</b>	<b>Class : XI</b> <b>Time : 1.15 hrs</b> <b>Total Marks : 240</b>
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## Answer key

### 11<sup>th</sup> - BOTANY

31. C) The stage between the two meiotic divisions is called interkinesis which is short-lived. There is no replication of DNA during interkinesis. Interkinesis is followed by Prophase II.
32. D) In Diakinesis stage, Nucleolus and nuclear envelope disappears. Spindle fibers assemble  
Diplotene stage may last for days or years depending on the sex and organism. Eg. Oocyte of some vertebrates.
33. D) Crossing over leads to recombination of genetic material on the two chromosomes, this is mediated by the enzyme recombinase during pachytene stage.  
Crossing over takes place during the stage pachytene not during zygotene  
This enzyme not playing any role in the formation of bivalent.  
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34. D) During the cytokinesis of plant cell, the formation of the new cell begins with formation of simple precursor called as Cell plate. This leads into uninucleate condition. Absences of cytokinesis leads into the formation of multinucleate condition.  
In animal cell cytokinesis starts from formation of furrow in plasma membrane. The furrow gradually deepens and joins in the centre.  
Middle lamella is absent in animal cell. Cytokinesis of plant cell only represents middle lamella.  
Cytokinesis of plants, Cell plate grows from centre towards lateral walls.

35. B) During Metaphase stage of Mitosis, condensation of chromosomes is completed and they can be observed clearly under the microscope. So that chromosomal morphology can be studied easily.
36. A)  $G_0$  stage otherwise called as Quiescent stage means inactive stage. In this stage cells remain metabolically active without proliferation. Cells can exist for long periods of time
37. A)  $G_1$  phase corresponds to the interval between mitosis and initiation of DNA replication. Cells become metabolically active and grow by producing proteins, lipids, carbohydrates and cell organelles but do not replicate its DNA
- In S phase growth of the cell continues as replication of DNA occurs, protein molecules called histones are synthesised and attach to the DNA. DNA content increases from 2C to 4C.
- In  $G_0$ , cells cease growth with reduced rate of RNA and protein synthesis.
- In  $G_2$ , one of the protein Maturation Promoting Factor (MPF) is synthesised. It brings about condensation of interphase chromosomes into the mitotic form.
38. A) Formation of spindle fibres during Prophase.
39. B) Some cells in the adult animals do not appear to exhibit division and many other cells divide only occasionally, as needed to replace cells that have been lost because of injury or cell death. These cells that do not divide further exit  $G_1$  phase to enter an inactive stage called  $G_0$  stage of cell cycle.
40. D) both are false
41. B) Meiosis involves exchange of genes between homologous chromosomes. So the gametes produced are genetically different from each other. Offsprings produced by fusion of gametes therefore also show recombinations or genetic variations. These variations in the offsprings make organisms more adaptable to the environment and these have a definite role in evolution.
42. C) Colchicine is an alkaloid derived from the autumn crocus, *Colchicum autumnale*. It inhibits spindle formation in cells during mitosis so that chromosomes cannot separate during anaphase, thus inducing multiple sets of chromosomes. Colchicine is used in genetics, cytology, and plant breeding research and also in cancer therapy to inhibit cell division.

43. C) **Tubulin.** Mitotic spindles are made of microtubules. Microtubules are made of radially arranged protofilaments, which are made of tubulin dimers.  
Actin and myosin are the contractile proteins of muscle fibres.  
Myoglobin is the oxygen carrying pigment found in muscles.
44. C) Mitosis is an equational division where after division each cell produces two daughter cells, therefore after 7 divisions one cell will give 128 cells in case of mitosis.
45. A) During the S phase of mitosis, the cells synthesises and replicates the DNA. The amount of DNA is doubled during this phase while the number of chromosomes remains constant.

