

Way to Success

Quartely Examination - 2019 (Key)

12th Biology

PART – I [BIO – BOTANY]

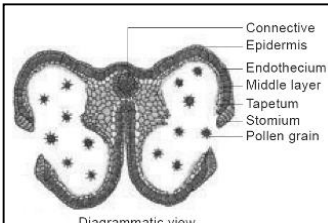
SECTION – I

1. b) Air	5. c) (3) and (4)
2. c) Law of Segregation	6. b) Callus undergoes differentiation and produces somatic embryoids.
3. b) i-C, ii-D, iii-A, iv-B	7. d) Agar
4. d) i-C, ii-D, iii-A, iv-B	8. c) Capillary water

SECTION – II

9.	Micro propagation of plants of industrial level maintains high standards of homogeneity in plants like pine apple, banana, straw berry and potato.						
10.	A single gene affects multiple traits and after the phenotype of the organism.						
11.	Some enzymes cut in a way producing protruding and recessed ends known as sticky or cohesive end . Such cut are called staggered or asymmetric cuts.						
12.	Evergreen forests – Found where heavy rainfall occurs throughout the year.						
13.	Cryopreservation, also known as Cryo-conservation, 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.						
14.	Ecologically important days. <table style="width: 100%; margin-left: 20px;"> <tr> <td>• March 21 - World forest day</td> <td>• June 05 - World environment day</td> </tr> <tr> <td>• April 22 - Earth day</td> <td>• July 07 - Van Mohostav day</td> </tr> <tr> <td>• May 22 - World bio diversity day</td> <td>• September 16 - International Ozone day</td> </tr> </table>	• March 21 - World forest day	• June 05 - World environment day	• April 22 - Earth day	• July 07 - Van Mohostav day	• May 22 - World bio diversity day	• September 16 - International Ozone day
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SECTION – III

15.	<p>T.S of Mature anther : Transverse section of mature anther reveals the presence of anther cavity surrounded by an anther wall. It is bilobed, each lobe having two theca, A typical anther is tetrasporangiate.</p> <p>1. Anther wall: It consists of following layers.</p> <p>a. Epidermis-It is single layered and protective is function.</p> <p>b. Endothecium-It is generally a single layer of radially elongated cells found below the epidermis. The hygroscopic nature of endothelial cell along with thin walled stomium helps in the dehiscence of another.</p> <p>c. Middle layers - Two to three layers of cells next to endothecium are generally ephemeral. They disintegrate (or) get crushed during maturity.</p> <p>d. Tapetum - It is the innermost layer of another wall and attains its maximum development at the tetrad stage of microsporogenesis. It nourishes the developing sporogenous tissue, microspore mother cells and microspores. Tapetum also controls the fertility (or) sterility of the microspores (or) pollen grains.</p> <p>2. Anther cavity: The another cavity is filled with microspores in young stages or with pollen grains at maturity.</p> <p>3. Connective : It is the column of sterile tissue surrounded by the anther lobe. It possesses vascular tissues. It also contributes to the inner tapetum.</p>	 <p style="text-align: center; font-size: small;">Diagrammatic view</p>
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16.	<p>1) Single cross over 2) Double cross over 3) Multiple cross over</p> <p>1) single cross over Formation of single chiasma and involves only two chromatids out of four.</p> <p>2) double cross over Formation of two chiasmata and involves two or three or all four strands.</p> <p>3) multiple cross over Formation of more than two chiasmata and crossing over frequency is extremely low.</p>
17.	<p>Spirulina can be grown easily on materials like waste water from potato processing plants containing starch straw, molasses, animal manure and even sewage.</p>
18.	<p>Thermal stratification Thermal Stratification is usually found in aquatic habitat. The change in the temperature profile with increasing depth in a water body is called thermal stratifications. There are three kinds of thermal stratification.</p> <p>Types</p> <ol style="list-style-type: none"> 1. Epilimnion The upper layer of warmer water . 2. Metalimnion the middle layer with a zone of gradual decrease in temperature. 3. Hypolimnion The bottom layer of colder water
19.	<p>A patent consists of three parts: the grant, specifications and claims.</p> <div style="text-align: center;"> <p>General Steps in Patenting</p> <pre> graph TD A[Discovery / Invention] --> B[Primary appraisal] B --> C[Filing patent in the office of Controller of Patents] C --- D[Assessment] C --- E[License negotiation] C --> F[Further patenting abroad] F --> G[Grant / refusal of patent] G --> H[Enforcement of approved patent] </pre> </div>

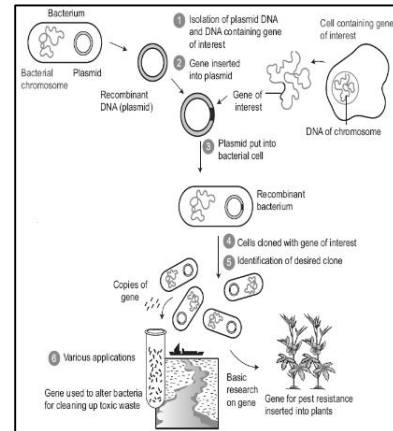
SECTION – IV

20.	<ul style="list-style-type: none"> • Chloroplast Inheritance 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 is transferred to the stigma of dark green leaved plant, 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 contribute the cytoplasm during fertilization since the male gamete contribute only the nucleus but not cytoplasm. 	
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(OR)

The steps involved in recombinant DNA technology are:

- Isolation of a DNA fragment containing a gene of interest that needs to be cloned.
- This is called an insert.
- Generation of recombinant DNA (rDNA) molecule by insertion of the DNA fragment into a carrier molecule called a vector that can self-replicate within the host cell.
- Selection of the transformed host cells that is carrying the rDNA and allowing them to multiply thereby multiplying the rDNA molecule.
- The entire process thus generates either a large amount of rDNA or a large amount of protein expressed by the insert.
- Wherever vectors are not involved the desired gene is multiplied by PCR technique. The multiple copies are injected into the host cell protoplast or it is shot into the host cell protoplast by shot gun method.



21.

The basic concept involved in plant tissue culture

Basic concepts of plant tissue culture are totipotency, differentiation, dedifferentiation and redifferentiation.

(i) Totipotency	The property of live plant cells that they have the genetic potential when cultured in nutrient medium to give rise to a complete individual plant.
(ii) Differentiation	The process of biochemical and structural changes by which cells become specialized in form and function.
(iii) Redifferentiation	The further differentiation of already differentiated cell into another type of cell. For example, when the component cells of callus have the ability to form a whole plant in a nutrient medium, the phenomenon is called redifferentiation.
(iv) Dedifferentiation	The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is called dedifferentiation.

(OR)

- In deep sea (> 500) the environment is dark and its inhabitants are not aware of the existence of celestial source of energy called Sun. Absence of sunlight, does not lead photosynthesis. So, Autotrophic green algae are not found in the deepest strata of the ocean.
- Seeds germinate in the fruits of mother plant itself. This types of germination is known as vivipary. This is seen in Halophytic plants which grow on soils with high concentration of salts.

PART – I [BIO – ZOOLOGY]

SECTION – I

1. b) Arrhenotoky
2. c) Bartholin’s gland
3. b) Both A and B are true (R) is the correct explanation of (A)
4. d) semi-conservative nature of DNA replication
5. c) Atavistic organs
6. c) Bursa of Fabricius brings cell mediated immunity
7. b) (i), (ii) and (iii) are fals. (iv) is true
8. a) i-iv, 2-v, 3-ii, 4-iii, 5-i

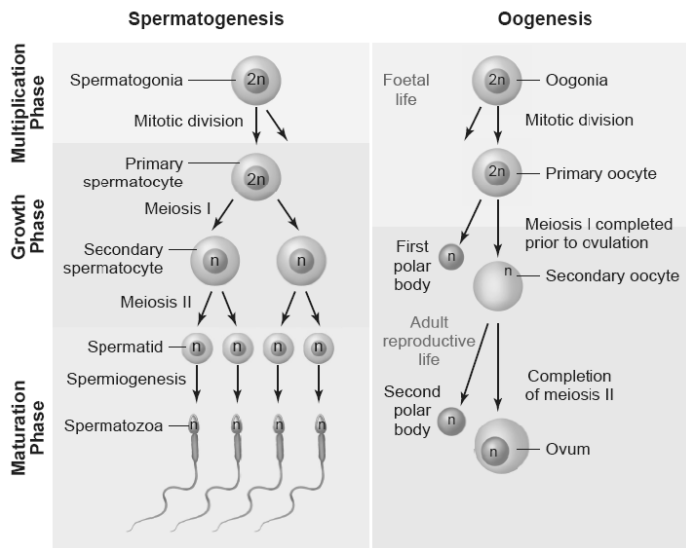
SECTION – II

9.	Paedogamy is the sexual union of young individuals produced immediately after the division of the adult parent cell by mitosis.	
10.	Foeticide	Infanticide
	It refers to ‘aborting the foetus in the mother’s womb’ intentionally.	It is ‘killing the child after the birth’.
11.	<ul style="list-style-type: none"> • It is characterized by multiple and severe body malformations as well as profound mental deficiency. • Small head with small eyes, cleft palate, malformation of the brain and internal organs are some of the symptoms of this syndrome. 	
12.	<ul style="list-style-type: none"> • Darwin failed to explain the mechanism of variation. • Darwinism explains the survival of the fittest but not the arrival of the fittest. 	
13.	Zymology is an applied science which deals with the biochemical process of fermentation and its practical uses.	
14.	<ul style="list-style-type: none"> • Those organisms which can tolerate only a narrow range of temperature are Stenotherms • E.g : Fish, Frogs, Lizards and Snakes. 	

SECTION – III

15.	<ul style="list-style-type: none"> • Development of an egg into a complete individual without fertilization is known as parthenogenesis. • E.g : Honey bees, Solenobia
16.	<ul style="list-style-type: none"> • Amniocentesis is a prenatal technique used to detect any chromosomal abnormalities in the foetus and it is being often misused to determine the sex of the foetus. • Once the sex of the foetuis known, there may be a chance of female foeticide. Hence, a statutory ban on amniocentesis is imposed.
17.	Cyclosporin A, an immunosuppressant used in organ transplantation is produced from the fungus <i>Trichoderma polysporum</i> . It is also used for its anti-inflammatory, anti-fungal and anti-parasitic properties.
18.	<ul style="list-style-type: none"> • Mutations or discontinuous variation are transmitted to other generations. • In naturally breeding populations, mutations occur from time to time. • There are no intermediate forms, as they are fully fledged. • They are strictly subjected to natural selection.
19.	<ul style="list-style-type: none"> • The physical space occupied by an organism and its functional role in the community. • The ecological niche of an organism not only depends on where it lives but also includes the sum total of its environmental requirements.

SECTION – IV



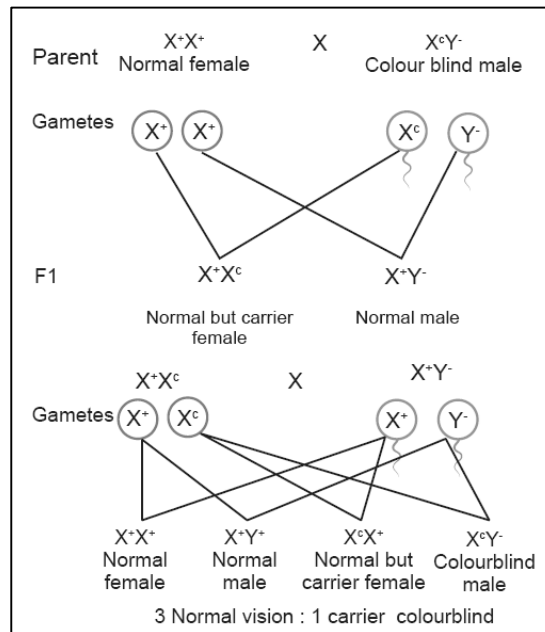
(OR)

- In human beings a dominant X – linked gene is necessary for the formation of colour sensitive cells, the cones.
- The recessive form of this gene is incapable of producing colour sensitive cone cells.
- Homozygous recessive females (X^cX^c) and hemizygous recessive males (X^cY) are unable to distinguish red and green colour.
- The inheritance of colour blindness can be studied in the following two types of marriages.

20.

Marriage between colour blind man and normal visioned woman

A marriage between a colour blind man and a normal visioned woman will produce normal visioned male and female individuals in F1 generation but the females are **carriers**. The marriage between a F1 normal visioned carrier woman and a normal visioned male will produce one normal visioned female, one carrier female, one normal visioned male and one colour blind male. Colour blind trait is inherited from the male parent to his grandson through carrier daughter, which is an example of criss-cross pattern of inheritance



21.

- **Alfred Hershey and Martha Chase** (1952) conducted experiments on bacteriophages that infect bacteria.
- Hershey and Chase wanted to observe whether it was DNA or protein that entered the bacteria.
- All nucleic acids contain phosphorus and contain sulphur (in the amino acid cysteine and methionine)
- Hershey and Chase used radioactive isotopes of Sulphur (³⁵S) and phosphorus (³²P) to keep separate track of the viral protein and nucleic acids during the infection process.
- The phages were allowed to infect bacteria in culture medium which contained the radioactive isotopes ³⁵S or ³²P.
- The bacteriophage that grew in the presence of ³⁵S had labelled proteins and bacteriophages grown in the presence of ³²P had labelled DNA.
- The differential labelling thus enabled them to identify DNA and proteins of the phage.
- Hershey and Chase mixed the labelled phages with unlabeled *E. coli* and allowed bacteriophages to attack and inject their genetic material.
- It was observed that only ³²P was found associated with bacterial cells and ³⁵S was in the surrounding medium and not in the
- bacterial cells. When phage progeny was studied for radioactivity, it was found that it carried only ³²P and not ³⁵S.
- Hershey and Chase thus conclusively proved that it was DNA, not protein, which carries the hereditary information from virus to bacteria.
- If they had used radioactive labelled carbon and nitrogen they would have not got the same result because carbon and nitrogen are found in DNA and protein.
- If they had used radioactive labelled carbon and nitrogen these labelled molecules would have been found in DNA and proteins and they would never be able to prove whether DNA or protein of a virus causes the heredity information

(OR)

- In the 1950s, experiments by Porter and Edelman revealed the basic structure of the immunoglobulin.
- An antibody molecule is Y shaped structure that comprises of four polypeptide chains, two identical light chains (L) of molecular weight 25,000 Da (approximately 214 amino acids) and two identical heavy chains (H) of molecular weight 50,000 Da (approximately 450 amino acids).
- The polypeptide chains are linked together by di-sulphide (S-S) bonds. One light chain is attached to each heavy chain and two heavy chains are attached to each other to form a Y shaped structure. Hence, an antibody is represented by H₂ L₂.
- Each chain (L and H) has two terminals. They are C - terminal (Carboxyl) and amino or N-terminal.
- Each chain (L and H) has two regions. They have variable (V) region at one end and a much larger constant (C) region at the other end.
- Antibodies responding to different antigens have very different (V) regions but their (C) regions are the same in all antibodies.
- In each arm of the monomer antibody, the (V) regions of the heavy and light chains combines to form an antigen – binding site shaped to ‘fit’ a specific antigenic determinant. Consequently each antibody monomer has two such antigen – binding regions.
- The (C) regions that forms the stem of the antibody monomer determine the antibody class and serve common functions in all antibodies.

