2020-BIOLOGY ANSWER KEY

Part III

Type A

BIO-BOTANY

Part-I

Section-1

1. C. Meristem Culture
2. B.malaivembu & kadambu
3. C.Half red flowered (Compare with Incomplete dominance phenomenon)
4. D. (1)-ii;(2)-iv;(3)-(i); (4)-iii
5. B. Microspore
6. C.GFP
7. C.Bad ozone
8. D.Atomita

Section-2

9. **Cybrid:** (Pg:113)- The fusion product of protoplasts without nucleus of different cells is called a cybrid. (2 mark)
10. **Four uses of seed ball:** (Pg-142)- Any four uses- (½ + ½ + ½ + ½)
11. **Objectives of clean development mechanism:** (Pg-172) - Clean Development Mechanism (CDM) is defined in the Kyoto protocol (2007) which provides project based mechanisms with two objectives to prevent dangerous climate change and to reduce green house gas emissions. CDM projects helps the countries to reduce or limit emission and stimulate sustainable development.
12. **Organic farming:** pg:214 - Organic farming is an alternative agricultural system in which plants/crops are cultivated in natural ways by using biological inputs to maintain soil fertility and ecological balance thereby minimizing pollution and wastage. (2 mark)
13. **Nilavembu**-(Pg-212)- Botanical name- *Andrographis paniculata* (1 mark)Family-Acanthaceae (1/2 mark) and 1 uses of nilavembu- treat liver disorders;effectively used to treat malaria and dengue (1/2 mark)
14. **Enzymes in genetic engineering** (Pg:84)- Restriction endonuclease and DNA ligase (must)-1 mark; Alkaline phosphatase-1

Section-3

15. **Chloroplast Inheritance**:pg:48 F1- Dark green leaved (1Mark)

certain traits are governed either by the chloroplast or mitochondrial genes. This phenomenon is known as extra nuclear inheritance, it involves cytoplasmic organelles such as chloroplast

and mitochondrion that act as inheritance vectors, it is also called Cytoplasmic inheritance. 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.(2mark)

16. **PBR 322** (Pg-87)- pBR 322 plasmid is a reconstructed plasmid and most widely used as cloning vector (1Mark); it contains 4361 base pairs. In pBR, ***p*** denotes plasmid, ***B***and ***R*** respectively the names of scientist **B**oliver and **R**odriguez who developed this plasmid (1 Mark) The number **322** is the number of plasmid developed from their laboratory, contains amp_R and tet_R two different antibiotic resistance genes and recognition sites (1Mark)
17. **Green house effect**(Pg-170)- Green House Effect is a process by which radiant heat from the sun is captured by gases in the atmosphere that increase the temperature of the earth ultimately. The gases that capture heat are called **Green House Gas.**carbon dioxide ($CO_{2)-60\%}$, methane ($CH_{4)}$-20% Nitrous Oxide (N_2O)-6%; CFC-20% and relative contributions of green house gases: carbon dioxide ($CO_{2)-60\%}$, methane ($CH_{4)}$-20% Nitrous Oxide (N_2O)-6%; CFC-20%
18. **Cryopreservation** (Pg.117): 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. (2 Mark)
    At this extreme low temperature any enzymatic or chemical activity of the biological material will be totally stopped and this leads to preservation of material in dormant status. (1Mark)
19. **Habitat and niche** (Pg-123)- Each point 1 mark (1+1+1)

Section-4

20. (a) **Mode of pollen tube entry to ovule** (pg:22)- Diagram- 2mark and Each type 1 mark Porogamy, Chalazogamy & Mesogamy (1+1+1)

    (or)

    (b) **Gene mapping and its uses** (Pg-63,63): The diagrammatic representation of position of genes and related distances between the adjacent genes is called genetic mapping/ Linkage mapping (1Mark); first developed by Morgan's student Alfred H Sturtevant in 1913. It provides clues about where the genes lies on that chromosome(1 Mark); uses (3 Marks): It is used to determine gene order, identify the locus of a gene and calculate the distances between genes(1) They are useful in predicting results of dihybrid and trihybrid crosses(1). It allows the geneticists to understand the overall genetic complexity of particular organism.(1)
21. (a) **Protection of ecosystem**: Pg- 160: Any 5 points

    (or)

    (B) (i)Who will get new variety? – Somu (1 mark)- Artificial selection

    (ii) Advantages and disadvantages of selection (pg.192)- **Mass selection**: After repeated selection for about five to six years, selected seeds are multiplied and distributed to the

farmers (½ mark)The only disadvantage of mass selection is that it is difficult to distinguish the hereditary variation from environmental variation. (½ Marks)

Pure line selection: a variety formed by this method shows more homozygosity with respect to all genes (½Mark) the new genotypes are never created and they are less adaptable and less stable to the environmental fluctuations(½ mark).

clonal selection is employed to select improved variety from a mixed population (clones). The selected plants are multiplied through vegetative propagation to give rise to a clone (½ Mark)The genotype of a clone remains unchanged for a long period of time.No variation (½ Mark)

BIO-ZOOLOGY

Part-II

Section-1

1. A. (1)-iv; (2)-I;(3)-ii;(4)-(iii)
2. C. Ecoli does not have the machinery for glycosylation of proteins
3. C.Formation of three germ layer embryo from single layer of embryo
4. D.One sperm fertilizing one egg
5. C. Detection of pathogens
6. C. Both (A) and (R) are wrong
7. C. Birds
8. D. One oxygen atom less in deoxyribose sugars

Section-2

9. **Ovulation and day of menstrual cycle**:Pg-21- the rupture of the Graafian follicle and the release of the ovum (secondary oocyte) from the ovary wall into the peritoneal cavity. This process is called as **ovulation (1 ½)** menstrual flow occurs and lasts for 3-5 days.(½ Mark)
10. **Causes of down syndrome**: Pg-57-Trisomic condition of chromosome - 21 results in Down's syndrome. It is characterized by severe mental retardation, defective development of the central nervous system, increased separation between the eyes, flattened nose, ears are malformed, mouth is constantly open and the tongue protrudes.
11. **Operon & E.coli:** Pg-84 The Clusters of genes with related functions (1)In *E.coli*, nearly 260 genes are grouped into 75 different operons(1)
12. **Difference between Active and passive immunity**: Pg-122 (Any two difference out of 6)
13. **Industrial alcohol**: Pg-145- *Saccharomyces cerevisiae* is the major producer of ethanol (C_2H_5OH). It is used for industrial, laboratory and fuel purposes. So ethanol is referred to as industrial alcohol

14. **Important applications of human stem cells:** Pg-161- the generation of cells and tissues that could be used for cell based therapies. Human stem cells could be used to test new drugs.

Section-3

15. **Let down reflex**: Pg-26- Oxytocin causes the "Let-Down" reflex-the actual ejection of milk from the alveoli of the mammary glands(1). During lactation, oxytocin also stimulates the recently emptied uterus to contract, helping it to return to pre - pregnancy size(2)
16. **Amniocentesis:** Pg-42- Amniocentesis involves taking a small sample of the amniotic fluid that surrounds the foetus to diagnose for chromosomal abnormalities (1).
    Amniocentesis is generally performed in a pregnant woman between the 15_{th} and 20_{th} weeks of pregnancy by inserting a long, thin needle through the abdomen into the amniotic sac to withdraw a small sample of amniotic fluid. The amniotic fluid contains cells shed from the foetus.(2)
17. **Hormone of thymus gland & its role**: Pg-123- Thymosin,Thymodulin, thymopoeitin,One of its main secretions is the hormone thymosin. It stimulates the T cell to become mature and immunocompetent
18. **Gene bank:** Pg-208- a type of biorepository which preserve genetic materials (1) Seeds of different genetic strains of commercially important plants can be stored in long periods in seed banks(1)gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques(1)
19. **Criss cross inheritance**(1 Mark) pg:53,54 Red-green colour blindness or daltonism, haemophilia and Duchenne's muscular dystrophy are examples of X-linked gene inheritance in humans (1) 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(1)

Section-4

1. **Methodologies of HGP**: Pg-85,86 (Any 5 points out of 11 points)

   (or)

   Evolutionary path of man: Pg-107 (If its written in flow chart form well and good)
2. **Population density:** Pg-184,185 (2 Mark)

   Natality and mortality: Pg-185 (3Mark)

   (or)

   Effects of chemicals used in field of agriculture: Pg-221 (5 marks-Any 5 points out of 11)