

CLASS : 12th (Sr. Secondary)

4380/4330

Series : SS-M/2019

SET : A, B, C & D

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MARKING INSTRUCTIONS AND MODEL ANSWERS

BIOLOGY

ACADEMIC/OPEN

(Only for Fresh/Re-appear Candidates)

उप-परीक्षक मूल्यांकन निर्देशों का ध्यानपूर्वक अवलोकन करके उत्तर- पुस्तिकाओं का मूल्यांकन करें। यदि परीक्षार्थी ने प्रश्न पूर्ण व सही हल किया है तो उसके पूर्ण अंक दें।

General Instructions :

- (i) *Examiners are advised to go through the general as well as specific instructions before taking up evaluation of the answer-books.*
- (ii) *Instructions given in the marking scheme are to be followed strictly so that there may be uniformity in evaluation.*
- (iii) *Mistakes in the answers are to be underlined or encircled.*

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P. T. O.

- (iv) *Examiners need not hesitate in awarding full marks to the examinee if the answer/s is/are absolutely correct.*
- (v) *Examiners are requested to ensure that every answer is seriously and honestly gone through before it is awarded mark/s. It will ensure the authenticity as their evaluation and enhance the reputation of the Institution.*
- (vi) *A question having parts is to be evaluated and awarded partwise.*
- (vii) *If an examinee writes an acceptable answer which is not given in the marking scheme, he or she may be awarded marks only after consultation with the head-examiner.*
- (viii) *If an examinee attempts an extra question, that answer deserving higher award should be retained and the other scored out.*
- (ix) *Word limit wherever prescribed, if violated upto 10%. On both sides, may be ignored. If the violation exceeds 10%, 1 mark may be deducted.*

- (x) *Head-examiners will approve the standard of marking of the examiners under them only after ensuring the non-violation of the instructions given in the marking scheme.*
- (xi) *Head-examiners and examiners are once again requested and advised to ensure the authenticity of their evaluation by going through the answers seriously, sincerely and honestly. The advice, if not heeded to, will bring a bad name to them and the Institution.*
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महत्त्वपूर्ण निर्देश :

- (i) *अंक-योजना का उद्देश्य मूल्यांकन को अधिकाधिक वस्तुनिष्ठ बनाना है। अंक-योजना में दिए गए उत्तर-बिन्दु अंतिम नहीं हैं। ये सुझावात्मक एवं सांकेतिक हैं। यदि परीक्षार्थी ने इनसे भिन्न, किन्तु उपयुक्त उत्तर दिए हैं, तो उसे उपयुक्त अंक दिए जाएँ।*
- (ii) *शुद्ध, सार्थक एवं सटीक उत्तरों को यथायोग्य अधिमान दिए जाएँ।*

- (iii) परीक्षार्थी द्वारा अपेक्षा के अनुरूप सही उत्तर लिखने पर उसे पूर्णांक दिए जाएँ।
- (iv) वर्तनीगत अशुद्धियों एवं विषयांतर की स्थिति में अधिक अंक देकर प्रोत्साहित न करें।
- (v) भाषा-क्षमता एवं अभिव्यक्ति-कौशल पर ध्यान दिया जाए।
- (vi) मुख्य-परीक्षकों/उप-परीक्षकों को उत्तर-पुस्तिकाओं का मूल्यांकन करने के लिए केवल Marking Instructions/ Guidelines दी जा रही है, यदि मूल्यांकन निर्देश में किसी प्रकार की त्रुटि हो, प्रश्न का उत्तर स्पष्ट न हो, मूल्यांकन निर्देश में दिए गए उत्तर से अलग कोई और भी उत्तर सही हो, तो परीक्षक, मुख्य-परीक्षक से विचार-विमर्श करके उस प्रश्न का मूल्यांकन अपने विवेक अनुसार करें।

SET - A

SECTION - A

- | | | |
|--------|-----|---|
| 1. (i) | (C) | 1 |
| (ii) | (B) | 1 |
| (iii) | (C) | 1 |

(iv)	(A)	1
(v)	(D)	1
(vi)	Meloidegyne incognitia	1
(vii)	Morgan	1
(viii)	Johannesburg in South Africa	1
(ix)	(i) When more than one pistil & free.	
		$\frac{1}{2} \times 2 = 1$
	(ii) When more than one pistil & fused together.	
(x)	Transfer of pollen grains from anther to the stigma of a different plant.	1
(xi)	Apis indica	1
(xii)	Erythroxylum Coca	1
(xiii)	Streptococcus pneumonia	1
(xiv)	Multiple ovulation embryo transfer technology.	1

SECTION – B

2. (i) Runner
(ii) Rhizome
(iii) Sucker
(iv) Offset & bulb $\frac{1}{2} \times 4 = 2$
3. Small animals have a large surface area relative to their volume, they tend to lose body heat very fast when it is cold outside, then they have to expend much energy to generate body heat through metabolism. 2
4. (i) Fungus *Trichoderma polysporum* produce a bioactive molecule, cyclosporin A, that is used as an immunosuppressive agent in organ-transplant patients.
(ii) Statins produced by yeast *monascus purpureus* commercialized as blood cholesterol lowering agents. $1 \times 2 = 2$
5. Baculo viruses of genus *Nucleopolyhedro virus* are pathogens & used as biological control agents. They are species specific & for narrow

spectrum insecticidal applications. They do not have negative impacts on plants, mammal's birds, fish & on non-target insects. They are used in ecological sensitive area treatment. 2

6. (i) When emasculated flowers covered with a bag of suitable size made up of butter paper. 1
- (ii) Prevent contamination of its stigma of with unwanted pollen. 1
7. (i) **Exonucleases** : remove nucleotides from the ends of the DNA. 1
- (ii) **Endonucleases** : makes cut at specific positions within the DNA. 1
8. Bt toxin protein exist as inactive protoxins but once an insect ingest the inactive toxin, it is converted into an active form of toxin due to alkaline pH of gut. The activated toxin binds to the surface of midgut epithelial cells & create pores that cause cell swelling & lysis & eventually cause death of the insect. 2

9. (i) Identification of DNA with desirable genes & introduction of the identified DNA into the host. 1
- (ii) Maintenance of introduced DNA in the host & transfer of the DNA to its progeny. 1
10. (i) When male & female animals of two different related species are mated. 1
- (ii) The progeny may combine desirable features of both the parents & of economic value. 1

Ex. : The Male

11. (i) **Aneuploidy** : Failure of segregation of chromatids during cell division cycle results in the gain or loss of a chromosome. 1
- (ii) **Polyploidy** : Failure of cytokinesis after telophase stage of cell division results in an increase in a whole set of chromosomes in an organism. 1

SECTION – C

- 12.** (i) The process, when decomposers break down complex organic matter into inorganic substances i.e. carbon dioxide, water & nutrients. 1
- (ii) Temperature and soil moisture regulate decomposition through their effects on the activities of soil microbes. Warm & moist environment favour decomposition whereas low temperature & anaerobiosis inhibit decomposition & build up organic molecules. 2
- 13.** (i) All living organisms (species or types) that we see today were created as such.
- (ii) The diversity was always the same since creation and will be the same in future also.
- (iii) Earth is about 4000 years old. $1 \times 3 = 3$
- 14.** Tropical Amazonian rain forest in South America has the greatest biodiversity on Earth. It is home to more than 40000 species of plants, 3000 of fishes, 1300 of birds, 427 of mammals &

Amphibians each, 378 of reptiles & more than 125000 invertebrates. There might be at least two million insect species waiting to be discovered & named. 3

- 15.** (i) Made crops more tolerant to abiotic stresses.
- (ii) Pest resistant crops.
- (iii) Helped to reduce post harvest losses.
- (iv) Increased efficiency of mineral usage by plants.
- (v) Enhanced nutritional value of food e.g. vitamin 'A' enriched rice.
- (vi) Create tailor made plants to supply alternative resources to industries in the form of starches, fuels & pharmaceuticals.

$$\frac{1}{2} \times 6 = 3$$

- 16.** Cannabinoids are a group of chemicals which interact with cannabinoids receptors present in the brain. Natural cannabinoids are obtained from inflorescence of *Cannabis Sativa*. The flower tops, leaves & resin of it are used in

various combinations to produce marijuana, hashish, charas & Ganja. Generally taken by inhalation & oral ingestion. They effect on cardiovascular system of body. 3

17. (i) Point mutation : When mutation arise due to change in a single base pair of DNA. 1

(ii) Frame shift mutation : Deletions & insertions of base pairs of DNA. 1

(iii) Mutagen : Chemical & physical factors that induce mutation. ex : UV radiation. 1

18. Test tube baby programme : Ova from the wife/donor(female) & sperms from husband/donor(male) are collected & are induced to form zygote under simulated conditions in the laboratory. The zygote or early embryos (with upto 8 blastomeres) could then be transferred into the fallopian tube & embryos with more than 8 blastomeres into the uterus to complete its further development. 3

SECTION – D

- 19.** See Page No. **272** Biology Text book for Class XII. 5

OR

See Page No. **282** Biology Text book for Class XII. 5

- 20.** See Page No. **108** Biology Text book for Class XII. 5

OR

See Page No. **97-98** Biology Text book for Class XII. 5

- 21.** See Page No. **43-44** Biology Text book for Class XII.

- (i) Diagram with labelling 2½
(ii) Description of structure 2½

SET - B

SECTION – A

- | | | |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1. (i) | (D) | 1 |
| (ii) | (B) | 1 |
| (iii) | (B) | 1 |
| (iv) | (B) | 1 |
| (v) | (A) | 1 |
| (vi) | Sutton and Boveri | 1 |
| (vii) | 1992 | 1 |
| (viii) | Remnants of nucellus i.e. residual persistent nucellus is called perisperm. | 1/2 |
| | ex : Black Papper and Beet (any one) | 1/2 |
| (ix) | Use of bio-resources by multinational companies & other organizations without proper authorization from the countries & people concerned without compensatory payment. | 1 |

- (x) Transfer of pollengrains from the anthers to the stigma of another flower of the same plant. 1
- (xi) When protoplast of tomato is fused with that of potato having hybrid plants combining tomato & potato characteristics. 1
- (xii) ELISA. 1
- (xiii) Salmonella typhi 1
- (xiv) International Rice Research Institute. 1

SECTION – B

- 2.** (i) Enhance the chances of syngamy & A large no. of offspring are produced. 1
- (ii) Offspring are extremely vulnerable to predators. 1
- 3.** (i) Loss of unnecessary sense organs.
- (ii) Presence of adhesive organs or suckers to cling to the host.
- (iii) Loss of digestive system.
- (iv) High reproductive capacity. $\frac{1}{2} \times 4 = 2$

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- 4.** (i) Symbiotic associations of fungi with plants. 1/2
- (ii) (a) The fungal symbionts absorb phosphorus from soil & pass it to plant.
- (b) Resistance to root borne pathogens, tolerance to salinity & drought.
- (c) Increase in plant growth & development. $\frac{1}{2} \times 3 = 1\frac{1}{2}$
- 5.** (i) BOD is the amount of the oxygen that would be consumed if the organic matter in one litre of water were oxidized by bacteria. 1
- (ii) BOD is a measure of the organic matter present in the water. The greater the BOD of waste water, more is its polluting potential. 1
- 6.** (i) Fusion of three haploid nuclei. 1
- (ii) It takes place in an embryo sac. The central cell after triple fusion becomes PEC & endosperm formed. 1/2
- (iii) Male gamete fuses with two polar nuclei located in the central cell. 1/2

7. (i) Group of letters that form the same words when read both forward & backward. e.g. MALAYALAM. 1
- (ii) EX : 5'-GAATTC-3'
3'-CTTAAG-5' 1
8. Lymphocytes from patient's blood are cultured outside body. A functional ADA cDNA is then introduced into these lymphocytes, & subsequently returned to the patient. The patient required perititic infusion of such genetically engineered lymphocytes. 2
9. (i) **Microinjection** : When recombinant DNA is directly injected into the nucleus of an animal cell. 1
- (ii) **Biolistics** : Cells are bombarded with high velocity micro particles of gold or tungsten coated with DNA. 1
10. (i) Knowledge of the nature & habits of bees.
- (ii) Selection of suitable location for keeping beehives.
- (iii) Catching & hiving of swarms.

- (iv) Management of beehives during different seasons & handling & collection of honey and bee wax. $\frac{1}{2} \times 4 = 2$

11. (i) **Incomplete dominance** : When F_1 had a phenotype that did not resemble either of the two parents & was in between two. 1
- (ii) **Co-dominance** : When F_1 generation resembles both parents. 1

SECTION – C

12. In primary succession in water, the pioneers are the small phytoplanktons, they are replaced by rooted submerged plants with time. Rooted floating angiosperms followed by free floating plants, then reed-swamp, marsh meadow, scrub & finally the trees, with time water body is converted into land. 3
13. In England before industrialization set in, it was observed that there were more white winged moths on trees than dark winged or melanised moths. After industrialization i.e. in 1920, there were more dark winged moths in the same area.

Predators will spot a moth against a contrasting background during post industrialization period the tree trunks become dark due to industrial smoke & roots. White wing moth did not survive due to predators, dark winged. 3

- 14.** (i) Decline in plant production.
(ii) Lowered resistance to environmental perturbations i.e. drought.
(iii) Increased variability in certain ecosystems processes such as plant productivity-water use & pest & disease cycles. $1 \times 3 = 3$
- 15.** Transgenic animals that produce useful biological products can be created by introduction of the portion of DNA which codes for (α -1-antitrypsin) used to treat emphysema. Treatment of phenyl ketonuria & cystic fibrosis may be done, such attempts are being made. Transgenic cow produced human protein-enriched milk & the milk contained the human alpha-lactalbumin & was nutritionally a more balanced product for human babies than natural cow milk. 3

- 16.** Tobacco is smoked, chewed or used as a snuff. It contains nicotine. Which stimulates adrenal gland to release adrenaline & nor-adrenaline into blood circulation both of which raise blood pressure & increase heart rate.

Smoking is associated with increased incidence of cancer of lung, urinary bladder & throat, bronchitis, emphysema, coronary heart disease, gastric ulcer. Tobacco chewing cause cancer of oral cavity. Smoking increases Co content in blood.

3

- 17.** (i) *Drosophila* could be grown on simple synthetic medium in the laboratory.
- (ii) They complete their life cycle in about two weeks & a single mating could produce a large no. of progeny flies.
- (iii) There was a clear differentiation of the sexes. Many types of hereditary variations can be seen with low power microscopes.

 $1 \times 3 = 3$

- 18.** (i) Non-medicated IUDs are lippes loop.
- (ii) Copper releasing IUDs (CuT, Cu7, multiload 375). Cu ions released suppress sperm motility & the fertilizing capacity of sperms.
- (iii) Hormone releasing IUDs (Progestasert, LNG-20) makes the uterus unsuitable for implantation & cervix hostile to the sperms.

$$1 \times 3 = 3$$

SECTION – D

- 19.** See Page No. **275** Biology Text book for Class XII. 5

OR

See Page No. **280-81** Biology Text book for Class XII. 5

- 20.** See Page No. **96-97** Biology Text book for Class XII. 5

OR

See Page No. **101-102** Biology Text book for
Class XII. 5

21. See Page No. **46-47** Biology Text book for Class
XII.

- | | | |
|------|--------------------------|----|
| (i) | Diagram with labelling | 2½ |
| (ii) | Description of Structure | 2½ |

SET - C

SECTION - A

- | | | | |
|-----------|-------|----------------------------------------------------------------------------|---|
| 1. | (i) | (C) | 1 |
| | (ii) | (D) | 1 |
| | (iii) | (D) | 1 |
| | (iv) | (C) | 1 |
| | (v) | (A) | 1 |
| | (vi) | Transfer of pollen grains from the anther to
stigma of the same flower. | 1 |

- (vii) A collection of methods that allow correction of a gene defect that has been diagnosed in a Embryo/child. 1
- (viii) UV radiations. 1
- (ix) When thalamus also contributes to fruit formation. $\frac{1}{2}$
 ex : Apple, Strawberry, Cashew etc.
 (any **one**) $\frac{1}{2}$
- (x) Threatened animals & plants are taken out from their natural habitat & placed in a special setting for protection & special care. 1
- (xi) Breeding crops with higher level of vitamins & minerals or higher proteins & heal their fats. 1
- (xii) WIDAL 1
- (xiii) *Wuchereria bancrofti* 1
- (xiv) Indian Agricultural Research Institute. 1

SECTION – B

2. (i) The female gamete undergoes development to form new organisms without fertilization.

1

- (ii) Rotifers, honeybees & some lizards & birds (Turkey) (any **two**) $\frac{1}{2} \times 2 = 1$

3. **In brood parasitism :** The parasitic bird lays its eggs in the nest of its host and lets the host incubate them. Eggs of bird have evolved to resemble the host's egg in size & colour to reduce the chances of the host bird detecting the foreign eggs & ejecting them from the nest i.e. cuckoo & the crow. 2

4. Rhizobium fix atmospheric nitrogen into organic forms, as plant nutrient. These have symbiotic associations as nodules on the roots of leguminous plants. Azospirillum & Azotobacter can fix nitrogen while free living in the soil & enrich the nitrogen content of the soil. 2

5. Microbial biocontrol agents i.e. bacteria *Bacillus thuringiensis* in the form of dried spores mixed with water & sprayed onto vulnerable plants are eaten by insect larva. Toxin is released in the gut of larva & it get killed. 2
6. (i) Insect pollinated flowers are large, colourful, fragrant & rich in nectar. 1
- (ii) Flowers are clustered into inflorescence to make them conspicuous. 1
7. Bacteria is treated with specific concentration of a divalent cation i.e. calcium, which increases the efficiency with which DNA enters into bacterium through its cell wall's pores. Recombinant DNA can then be forced into such cells by incubating cells with it on ice & followed by heat shock & putting them back on ice. This enables bacteria to take up the recombinant DNA. 2
8. (i) *Bacillus thuringiensis*. 1
- (ii) Proteins encoded by gene *cryIA_c* & *cryIIAb* control cotton bollworms & *cryIAb* controls corn borer. 1

9. Large volumes of culture can be processed in bioreactors. These can be thought of as vessels in which raw materials are biologically converted into specific products, individual enzymes etc, using microbial plant, animal or human cells. It provides optimal conditions for achieving the desired product. 2
10. (i) **Monosomy** : Lack of one of any one pair of chromosome or deletion of one chromosome.
Ex : Turner Syndrome. 1
- (ii) Trisomy : Presence of an additional copy of the chromosome in an individual Ex : Down's syndrome & Klinefelter's syndrome (any **one**). 1
11. MOET is a programme for herd improvement. In this method, a cow is administered hormones with FSH like activity to induce follicular maturation & super ovulation. The animal either mated with bull or artificially inseminated. Fertilized eggs at 8-32 cells stage are recovered & transferred to surrogate mothers. 2

SECTION – C

- 12.** (i) It does not take into account the same species belonging to one or more trophic levels.
- (ii) It assumes a simple food chain, it does not accommodate a food web.
- (iii) Saprophytes are not given any place in ecological pyramids even though they play a vital role in the ecosystem. $1 \times 3 = 3$
- 13.** Mendel had talked of inheritable 'factors' influencing phenotype. Darwin either ignored these observations or kept silence. Hugo de Vries worked on evening prim rose & put forth an idea of mutation. Which causes evolution & not the minor variations that Darwin talked about. Mutation caused speciation & called it saltation (single step large mutation). 3
- 14.** (i) Biodiversity plays a major role in many ecosystem services that nature provides. The fast dwindling Amazon forest to produce through photosynthesis, 20% of the total oxygen in the Earth's atmosphere.

(ii) Pollination is another service, ecosystem provide through pollinators layer.

(ii) The aesthetic pleasures of walking through thick woods, watching spring flower in full bloom or waking up to a bulbul's song in the morning. $1 \times 3 = 3$

15. (i) Animals that have had their DNA manipulated to possess & express an foreign gene. 1

(ii) Many transgenic animals are designed to increase the understanding of how genes contribute to the development of disease. These are specially made to serve as models for human diseases so that investigation of new treatments for diseases is made possible i.e. cancer, cystic fibrosis etc. 2

16. (i) The exaggerated response of the immune system to certain antigens present in the Environment. 1

(ii) Histamine and serotonin. $\frac{1}{2}$

- (iii) Sneezing, watery eyes, running nose and difficulty in breathing. 1

17. (i) Communication was not easy (as it is now) in those days & his work could not be widely publicized.

- (ii) His concept of genes (or factors) as stable & discrete units was not accepted by his contemporaries.

- (iii) Mendel's approach of using mathematics to explain biological phenomenon was totally new & unacceptable to biologists of his time. Mendel could not provide any physical proof for the existence of factors or what they were made of . $1 \times 3 = 3$

18. Oral administration of small doses of progestogens or progestogen-estrogen combinations used by the females. Used in form of tablets. Pills inhibits ovulation & implantation. Pills are to be taken daily for a period of 21 days starting within first five days of

menstrual cycle. After a gap of 7 days it has to be repeated till to prevent conception. Saheli - is oral contraceptive for females contains a non steroidal preparation. It is 'once a week' pill. 3

SECTION - D

- 19.** See Page No. **280-81** Biology Text book for Class XII. 5

OR

See Page No. **286** Biology Text book for Class XII. 5

- 20.** See Page No. **104-105** Biology Text book for Class XII. 5

OR

See Page No. **100-101** Biology Text book for Class XII. 5

- 21.** See Page No. **48** Biology Text book for Class XII.

- (i) Labelled Diagram 2½
(ii) Structure of a sperm 2½

SET - D

SECTION – A

- | | | |
|--------|---------------------------------------------------------------------------------------------------------------|----------------------------|
| 1. (i) | (C) | 1 |
| (ii) | (B) | 1 |
| (iii) | (D) | 1 |
| (iv) | (A) | 1 |
| (v) | (B) | 1 |
| (vi) | CryIAb | 1 |
| (vii) | Drosophila melanogaster | 1 |
| (viii) | When species confined to that region & not found anywhere else. | 1 |
| (ix) | The portion of embryonal axis below the level of cotyledons, that terminates at its lower end in the radicle. | 1 |
| (x) | (i) Leaf and stripe rust. | |
| | (ii) Hill bunt. | $\frac{1}{2} \times 2 = 1$ |

- (xi) Interferons are proteins secreted by virus infected cells which protect non-infected cells from further viral infection. 1
- (xii) Eutamoeba histolytica. 1
- (xiii) When body attacks self cells which cause damage to the body. Ex : Rheumatoid arthritis. 1
- (xiv) Single Cell Protein. 1

SECTION – B

2. (i) **External fertilization** : When syngamy occurs in the external medium (water) i.e. (outside the body of organism). 1
- (ii) Offspring are extremely vulnerable to predators threatening their survival up to adulthood. 1

3. (i) **Amensalism** : The interaction where species is harmed whereas the other is unaffected. 1

(ii) **Commensalism** : The interaction in which one species benefits and the other is neither harmed nor benefited. 1

4. (i) In Paddy fields cyanobacteria serve as an important bio-fertilizer. Blue green algae add organic matter to the soil & increase its fertility.

(ii) Cyanobacteria e.g. Anabaena, Nostoc, Oscillatoria can fix atmospheric nitrogen.

$1 \times 2 = 2$

5. (i) Yeast *saccharomyces cerevisiae* is used for the production of wine, beer, whisky & brandy etc.

- (ii) It is also used for fermented malted cereals
& fruit juices to produce ethanol. $1 \times 2 = 2$

- 6.** (i) Pollen grains are light and non-sticky.
(ii) Possess well exposed stamens
(iii) Large often feathery stigma
(iv) Single ovule in each ovary & numerous
flowers packed into an inflorescence.

$$\frac{1}{2} \times 4 = 2$$

- 7.** (i) Denaturation, Annealing, Extension 1
(ii) *Thermus aquaticus* 1

- 8.** (i) Providing the best catalyst in the form of
improved organism i.e. a microbe or pure
enzyme.
(ii) Creating optimal conditions through
engineering for a catalyst to act & Do an
streaming processing technology. $1 \times 2 = 2$

- 9.** This is a sequence from where replication starts & any piece of DNA when linked to this sequence can be made to replicate within the host cells. This sequence is also responsible for controlling the copy number of the linked DNA. 2
- 10.** The defect is caused by the substitution of glutamic acid by Valine at the sixth position of the beta globin chain of the haemoglobin molecule. It is single base substitution at the 6th codon of beta globin gene from GAG to GUG. 2
- 11.** This is the practice of mating of animals within the same breed, but having no common ancestors on either side of their pedigree upto 4 to 6 generations. It is best breeding method for the animals below average in productivity in milk production growth rate in beef cattle. It helps in overcoming inbreeding depression. 2

SECTION – C

- 12.** (i) No respiratory release of phosphorus unlike carbon cycle.
- (ii) Atmospheric inputs of phosphorus through rainfall are much smaller than carbon inputs.
- (iii) Gaseous exchange of phosphorus between organism and environment are negligible.

1 × 3 = 3

- 13.** Miller created high temp, reducing atmosphere containing CH₄, NH₃ etc. in a laboratory scale. He created electric discharge in a closed flask containing CH₄, H₂, NH₃ & water vapour at 800°C. He observed formation of amino acid. In similar experiments others observed formation of

sugars, nitrogen bases, pigments & fats. With this evidence the chemical evolution was more or less accepted. 3

- 14.** (i) Tracts of forest were set aside, & all the trees and wildlife within were venerated & given total protection.
- (ii) Found in Khasi and Jaintia Hills in Meghalaya, Aravali hills of Rajasthan, Western Ghat of Karnataka & Maharashtra etc.
- (iii) These are the last refuges for a large number of rare and threatened plants.

$$1 \times 3 = 3$$

- 15.** Transgenic animals can be specifically designed to allow the study of how genes are regulated & how they affect normal functions of the body & its development i.e. study of complex factors

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involved in growth i.e. insulin like growth factor. By introducing genes from other species that alter the formation of this factor & studying the biological effects that result, information is obtained about the biological role of the factor in the body. 3

16. (i) **Physical barriers** : Skin on our body is the main barrier which prevents entry of the microorganisms. Mucous coating of the epithelium lining of respiratory, gastrointestinal & urogenital tracts also help in trapping microbes entering our body.
- (ii) **Cellular barriers** : Polymorpho-nuclear leukocytes (PMNL-neutrophils) and monocytes & natural killer (type of

lymphocytes) in the blood as well as macrophages in tissues can phagocytose & destroy microbes. $1\frac{1}{2} \times 2 = 3$

17. (i) Early symptoms of STDs are minor & include itching fluid discharge slight pain, swellings etc. 1

(ii) (a) Avoid sex with unknown partners/multiple partners & always use condoms during coitus. 1

(b) In case of doubt, one should go to a qualified doctor for early detection & get complete treatment if diagnosed with disease. 1

18. Sutton & Boveri noted that behaviour of chromosomes was parallel to the behaviour of genes & used chromosome movement to explain

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Mendel's laws. Chromosomes as well as genes occur in pairs. The two alleles of a gene pair are located on homologous sites on homologous chromosomes. They argued that the pairing & separation of a pair of chromosomes would lead to the segregation of a pair of factors they carried. 3

SECTION – D

- 19.** See Page No. **284** Biology Text book for Class XII. 5

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- 20.** See Page No. **120** Biology Text book for Class XII. 5

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21. See Page No. **45** Biology Text book for Class XII.

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|------|------------------------------------|----|
| (i) | Diagram & labelling | 2½ |
| (ii) | Description of structure of uterus | 2½ |



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