

CLASS : 12th (Sr. Secondary)

3680/3630

Series : SS-M/2018

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.*
- (iv) *Examiners need not hesitate in awarding full marks to the examinee if the answer/s is/are absolutely correct.*

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- (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.*

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) (D)	1
(iii) (C)	1
(iv) (A)	1
(v) (B)	1
(vi) (B)	1
(vii) (D)	1
(viii) (B)	1
(ix) Fusion of gametes	1

- (x) Zygote or early embryo (upto 8 blastomero) produced outside transferred into fallopian tube. 1
- (xi) Masses of bacteria associated with fungal filaments to form mesh like structure. 1
- (xii) Mammals from colder climates generally have shorter limbs and ears to minimize heat loss. 1

SECTION - B

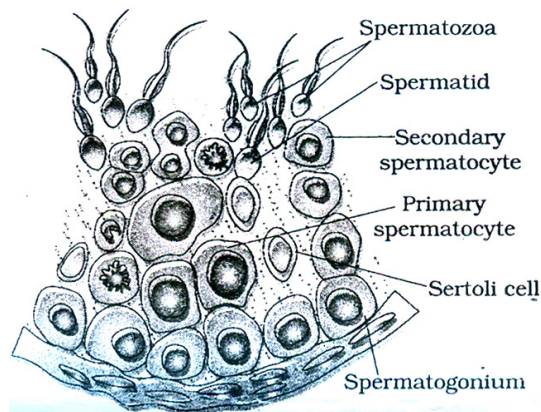
2. Each fallopian tube is about 10-12 cm long and extends from periphery of each ovary to uterus the part closer to ovary is funnel shaped infundibulum. It's edges have fimbriae. It leads into ampulla which opens into Isthmus which join the uterus. 2
3. Barrier methods are available for both male & females. Condoms are used, just before coitus to prevent semen into female reproductive tract. Nirodh is a condom for the male. Diaphragms, cervical caps and vaults are also barriers inserted into female reproductive tract to cover the cervix during coitus to block the entry of sperms through cervix. 2

- | 4. Promoter | Terminator |
|---|--|
| (i) Located at 5' end of structural gene. | Located at 3' end of the coding strand. |
| (ii) Provides binding site for RNA polymerase & also defines the template & coding strands. | It is the site to release RNA polymerase & defines the end of the transcription. |
- 1 × 2 = 2
- 5.** mRNA provides the template.
- tRNA brings aminoacids & read genetic code.
- rRNA play structural and catalytic role during translation. 2
- 6.** (i) According to it life came out of decaying and rotting matter like straw, mud etc. 1
- (ii) Louis Pasteur 1
- 7.** (i) Bacterium streptococcus. 1
- (ii) Modified by genetic engineering is used as a clot buster for removing clots from blood vessels of patients who have undergone myocardial infection leading to heart attack. 1

- 8.** It has two units small and large. The small subunit encounters an mRNA. There are two sites in large subunit, for subsequent amino acids to bind to and thus, be close enough to each other for formation of peptide bond. The ribosome also act as a catalyst for formation of peptide bond. 2
- 9.** Tracts of forest were set aside and all the trees and wildlife within were venerated & given full protection. Sacred groves are the last refuges for a large number of rare and threatened plants. Found in Khasi, Jaintia hills of Meghalaya & Western Ghats regions of Karnataka etc. 2
- 10.** Many species extinctions in last 500 years (steller's sea cow, passenger pigeon) due to over exploitation by humans. Many marine fish are over harvested, & endangering the continued existence of some commercially important species. 2

SECTION - C

11. (i) Diagram 2
(ii) Labelling 1



Diagrammatic sectional view of a seminiferous tubule (enlarged)

12. (i) The exaggerated response of the immune system to certain antigen present in the environment. $1 \times 3 = 3$
- (ii) Allergens are produced. The antibodies produced to these are of Ig E-type. Release of histamine & serotonin occur from most cells.
- (iii) **Symptoms** : Sneezing, watery eyes, running nose and difficulty in breathing.

13. Animal husbandry deals with the care and breeding of livestock like buffaloes, cow's pigs, horses, cattle, sheep, camels, goats, that are useful to humans. It includes poultry farming & fisheries (rearing, catching and selling of fish, molluscs & crustaceans. These are used by humans for products like milk, eggs, meat, wool silk, & honey etc. 3

14. Restriction enzyme digestions are performed by incubating purified DNA molecules with restriction enzyme at optimal conditions. Agarose gel electrophoresis is employed. DNA is negatively charged molecule hence move towards positive electrode. The process is repeated with vector DNA also. The joining of DNA involves several processes. After having cut the source DNA & vector DNA with specific restriction enzyme the cutout gene of interest from source DNA & cut vector with space are mixed & ligase is added so recombinant DNA is prepared. 3

- 15.** Increase in concentration of the toxicant at successive trophic levels. Toxic substance accumulated by an organism cannot be metabolized or excreted and passed on to next higher trophic level. For example : Biomagnification in aquatic food chain ultimately reach in fish eating birds & disturb calcium metabolism in birds, which causes thinning of eggshell & their premature breaking, eventually causing decline in bird population. 3

SECTION - D

- 16.** See Page No. **22-23** Biology Text book for Class XII. 5
- 17.** See Page No. **77-78** Biology Text book for Class XII. 5

OR

See Page No. **90-91** Biology Text book for Class XII.

- 18.** See Page No. **209** Biology Text book for Class XII. 5

OR

See Page No. **211** Biology Text book for Class XII.

SET - B

SECTION - A

- | | |
|-------------------|---|
| 1. (i) (C) | 1 |
| (ii) (D) | 1 |
| (iii) (D) | 1 |
| (iv) (A) | 1 |
| (v) (D) | 1 |
| (vi) (C) | 1 |
| (vii) (C) | 1 |
| (viii) (D) | 1 |

- (ix) *Strobilanthus kunthiana* (Neelakurangi). 1
- (x) Transfer of an ovum collected from a donor into fallopian tube of another female, which cannot produce but can provide suitable environment for fertilization & development. 1
- (xi) Chemical substances produced by microbes & can kill or retard the growth of disease causing microbes. 1
- (xii) A process to maintain the constancy of internal environment of an organism. 1

SECTION – B

2. (i) **Spermiogenesis** : Transformation of spermatids into sperm. 1
- (ii) **Spermiation** : Release of sperm from the seminiferous tubules. 1
3. Intra uterine devices are inserted in the uterus through vagina.
- Non-medicated IUDs : (Lippes Loop) 2
- Copper releasing IUDs : (CuT, Cu7, multiload 375)
- Hormone releasing IUDs (Progestasert, LNG-20)

These increase phagocytosis of sperms within uterus, reduce the motility & fertilizing capacity of sperms.

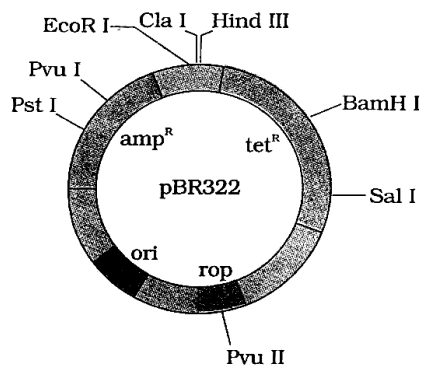
4. (i) **Exons** : The coding sequences or expressed sequences that appear in mature or processed RNA exons are interrupted by introns. 1
- (ii) **Introns** : Do not appear in mature or processed RNA as intervening sequences. 1
5. (i) One codon code for only one amino acid. 1
- (ii) Some amino acid are coded by more than one codon. 1
6. According to Hugo de Vries large difference arising suddenly in a population. Mutation causes evolution, not the minor variation. Mutations are random and directionless while Darwinian variations are small & directional. 2
7. (i) Trichoderma polysporum 1
- (ii) Used as an immunosuppressive agent in organ-transplant patients. 1

8. (i) Transcription level
- (ii) Processing level (Regulation of splicing)
- (iii) Transport of mRNA from nucleus to cytoplasm.
- (iv) Translational level. $\frac{1}{2} \times 4 = 2$
9. (i) *Speciation* is a function of time as tropical latitudes have remained relatively undisturbed for millions of years & have long evolutionary time for species diversification. 1
- (ii) Tropical environments are less seasonal which leads to species diversity.
- There is more solar energy available in tropics so high productivity occur. 1
10. When a species becomes extinct, the plant & animal species associated with it in an obligatory way also become extinct. eg. Extinction of host fish also lead to extinction of its unique assemblage of parasites. Same happens in case of a coevolved plant-pollinator. mutualism. 2

SECTION - C

11. (i) Structural and functional unit between developing embryo & maternal body. Chorionic villi & uterine tissue interdigitated with each other. 1
- (ii) (a) It facilitate O₂ supply & nutrients to the embryo removal of carbon dioxide & excretory waste materials produced by embryo. 1
- (b) Also acts as in endocrine tissue producing hCG hPL, estrogens, progesterone is bacteria. 1
12. (i) *Streptococcus pneumoniae* & *Haemophilus influenzae*. $\frac{1}{2} \times 2 = 1$
- (ii) Fever, chills, cough & headache nails of fingers & lips becomes gray to bluish colour in severe cases. 1
- (iii) By inhaling the droplets/aerosols released by infected person or by sharing glasses & utensils with an infected person. 1

13. (i) These made crops more tolerant to abiotic stress. 1 × 3 = 3
- (ii) These reduces reliance on chemical pesticides & post harvest loses.
- (iii) These increase efficiency of mineral usage by plants & enhance nutritional value.
14. (i) Diagram 2
- (ii) Labelling 1



E. coli cloning vector pBR322
showing restriction sites

15. The fertile top soil can be removed very easily due to over cultivation, unrestricted grazing, deforestation & poor irrigation practices &
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resulting in arid patches of land. When large barren patches extend & meet over time, a desert is created. Desertification is due to increased urbanization. 3

SECTION - D

- 16.** See Page No. **26-27** Biology Text book for Class XII. 5

OR

See Page No. **31** Biology Text book for Class XII.

- 17.** See Page No. **85-86** Biology Text book for Class XII. 5

OR

See Page No. **76-77** Biology Text book for Class XII.

- 18.** See Page No. **208-209** Biology Text book for Class XII. 5

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P. T. O.

SET - C

SECTION - A

- | | |
|--|---|
| 1. (i) (A) | 1 |
| (ii) (B) | 1 |
| (iii) (D) | 1 |
| (iv) (A) | 1 |
| (v) (C) | 1 |
| (vi) (C) | 1 |
| (vii) (C) | 1 |
| (viii) (C) | 1 |
| (ix) At lower end, embryonal axis has radical and root cap enclosed in an undifferentiated sheath. | 1 |
| (x) Friedrich Meischer. | 1 |
| (xi) <i>Thermus aquaticus</i> . | 1 |
| (xii) The organism which can tolerate wide range of salinities. | 1 |

SECTION – B

2. (i) The structures which are capable of giving rise to new offspring. 1
- (ii) Runner, Rhizome, Suckers, tubers, bulb, offset. 1
3. (i) Amniotic fluid surrounding the foetus is checked for chromosomal pattern. 1
- (ii) (a) Use we can know any genetic defect in child before birth. $\frac{1}{2}$
- (b) Female foeticide is the misuse. $\frac{1}{2}$
4. (i) Mutation due to change in a single base pair of DNA. 1
- (ii) Sickle cell anaemia. 1
5. (i) **Aneuploidy** : Failure of segregation of chromatids during cell division cycle results in gain or loss of a chromosome (s). 1
- (ii) **Polyplody** : An increase in a whole set of chromosome in an organism. 1

6. (i) Fusion of the protoplasts from two different varieties of plants which have desirable characters. When grown they form new plant called somatic hybrid. 1
- (ii) **Example :** When protoplast of tomato is fused with that of potato, then new hybrid plant is formed i.e. Pomato having characters of tomato & Potato. 1
7. It is done by treating the bacterial cell with calcium, which increases the efficiency with which DNA enters the bacterium through pores of cell wall. Recombinant DNA can be forced into such cells by incubating cells with them on ice followed by placing them briefly at 42°C & then back on ice. 2
8. (i) Cry gene 1
- (ii) (a) Cry IAc, Cry II Ab control cotton bollworm. ½
- (b) Cry IAb control corn borer. ½

9. (i) Providing the best catalyst in the form of microbe or pure enzyme. 1
- (ii) Creating optimal conditions through engineering for catalyst to act & down stream processing to purify the protein/organic compound. 1
10. It disturb calcium metabolism which causes thinning of egg shell and their premature breaking which cause decline in bird population. 2

SECTION - C

11. (i) **Autogamy** : Transfer of pollen grains from the anther to the stigma of the same flower. In oxalis, two types of flowers are produced. 1
- (ii) (a) **Chasmogamous** : Flowers which are similar to flowers of other species with exposed anthers & stigma.

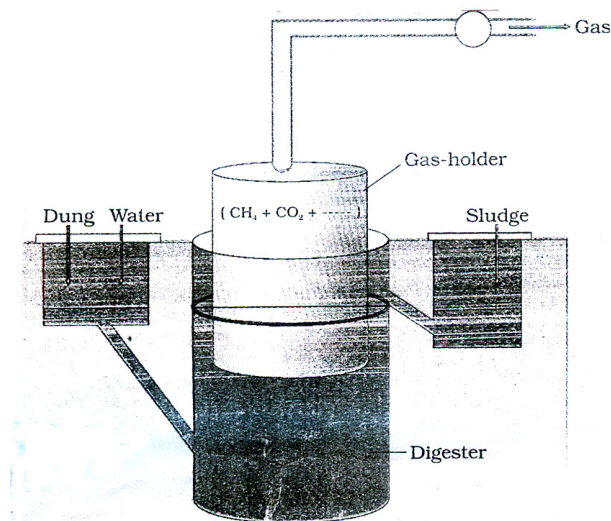
- (b) **Cleistogamous** : flowers which do not open at all. Anthers & stigma lie close to each other. When anthers dehiscence, pollen come in contact with stigma. So there is no chance of cross pollen landing on stigma & Assured seed set even in the absence of pollinators so these are invariably autogamous. 2

12. Miller created electric discharge in a closed flask containing CH_4 , H_2 , NH_3 & water vapour at 800°C . & observed formation of amino acids. The chemical evolution was more or less accepted. He created the conditions in a laboratory scale as that of on earth i.e. high temperature, volcanic storms, reducing atmosphere containing CH_4 , NH_3 etc. 3

13. Tobacco contains nicotine an alkaloid which stimulates adrenal gland to release adrenaline and nor-adrenaline which raise blood pressure & increase heart rate & CO-content increases in

blood so O_2 deficiency occur smoking increased incidence of lung cancer, cancer of urinary bladder & throat, Bronchitis, emphysema, gastriculcer, chewing tobacco causes oral cancer. 3

14. (i) Diagram 2
 (ii) Labelling 1



A typical biogas plant

15. (i) Breakdown of complex organic matter into inorganic substances e.g. carbon dioxide, water & nutrients is decomposition. Detritus is raw material for decomposition. 1

- (ii) (a) Warm and moist environment favour decomposition. 1
- (b) Whereas low temperature and anaerobiosis inhibit decomposition resulting in build up of organic material. 1

SECTION - D

- 16.** See Page No. **47** of Biology Text book for Class XII. 5

OR

See Page No. **51** of Biology Text book for Class XII.

- 17.** See Page No. **118 of** Biology Text book for Class XII. 5

OR

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

- 18.** See Page No. **262-263** Biology Text book for Class XII. 5

SET - D

SECTION - A

- | | | |
|--------|---|---|
| 1. (i) | (B) | 1 |
| (ii) | (D) | 1 |
| (iii) | (A) | 1 |
| (iv) | (B) | 1 |
| (v) | (B) | 1 |
| (vi) | (C) | 1 |
| (vii) | (B) | 1 |
| (viii) | (C) | 1 |
| (ix) | Epicotyl has a shoot apex and a few leaf primordia enclosed in a hollow foliar structure. | 1 |
| (x) | Central Drug Research Institute (CDRI) Lucknow. | 1 |

- (xi) Gel electrophoresis. 1
- (xii) The organism, which can tolerate narrow range of temperature. 1

SECTION - B

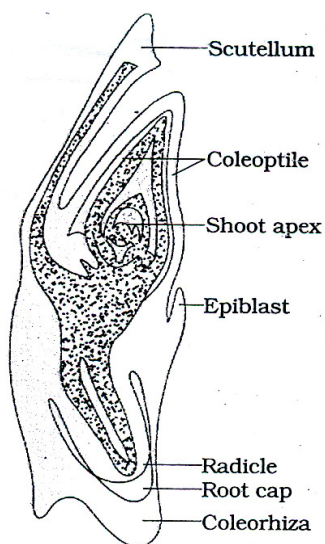
2. (i) When fertilization occur outside the body. 1
- (ii) Off-springs are extremely vulnerable to predators threatening their survival upto adulthood. 1
3. **In surgical method** : Gamete transport is blocked & thereby prevent conception.
- (i) **In male** : Vasectomy in which a small part of Vas deferens is removed or tied up through a small incision on scrotum. 1
- (ii) **In female** : *Tubectomy* in which a part of fallopian tube is removed or tied up. 1
4. (i) Fishery is catching, processing and selling of fish, shell fish or other aquatic animals. 1
- (ii) Hilsa, Sardines, Mackerel, Pomfrets.
(any **two**) $\frac{1}{2} \times 2 = 1$

5. Phenyl ketonuria is autosomal recessive trait. The affected individual lacks an enzyme that converts amino acid phenylalanine into tyrosine. Phenylalanine accumulated & converted into phenyl pyruvic acid & cause mental retardation. These are also excreted through urine because of poor absorption by kidney. 2
6. (i) Caused by substitution of glutamic acid by valine at sixth position of the beta globin chain of haemoglobin molecule. 1
- (ii) Mutant haemoglobin molecule undergo polymerization under low O₂ tension causing change in RBC shape from biconcave disc to elongated sickle like structure. 1
7. (i) **Micro injection** : Recombinant DNA is directly injected into the nucleus of animal cell. 1
- (ii) **Biolistics or gene gun** : Plant cells are bombarded with high velocity microparticles of gold or tungsten coated with DNA. 1
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8. (i) Rosie 1
- (ii) Produced human protein-enriched milk (2.4 grams per litre). The milk contained human alpha-lactalbumin & was nutritionally a more balanced product for human babies than natural cow-milk. 1
9. **Biopiracy** : Use of bio-resources by multinational companies & other organizations without proper authorization from the countries and people concerned without compensatory payment. 2
10. *By the measures* like cutting down use of fossil fuel, improving efficiency of energy usage, reducing deforestation, planting trees & slowing down the growth of human population, by reducing the emission of green house gases into the atmosphere. 2

SECTION - C

11. (i) Diagram 2
 (ii) Labelling 1



L.S. of an
embryo of grass

12. (i) **Homo habilis** : Brain capacities were between 650-800 C.C. Probably did not eat meat. 1
- (ii) **Homo erectus** : Had a large brain around 900 C.C. probably ate meat. 1
- (iii) **Neanderthal man** : Brain size of 1400 CC lived in near east & Central Asia. They used hides to protect their body & buried their dead. 1

13. Opioids drugs : These bind to specific opioid receptors present in our central nervous system & gastro intestinal tract. Heroin (commonly called smack) is chemically diacetyl morphine is white, odourless, bitter crystalline compound. This is obtained by acetylation of morphine, which is extracted from latex of poppy plant. Heroin in a depressant and slows down body functions. Generally taken by snorting and injection. 3

- 14. (i)** Two enzymes responsible for restricting the growth of bacteriophage in *E.Coli* were isolated. One of these added methyl groups to DNA, while the other cut DNA & later was called restriction endonuclease. 1½
- (ii)** The first letter of the name comes from the genus and second two letters come from the species of the prokaryotic cell from which they were isolated, eg. ECORI comes from

Escherichia coli RY 13. In ECORI, Roman numbers following the names indicate the order in which the enzymes isolated from that strain of bacteria. 1½

15. (i) The rate of biomass production is productivity. 1

(ii) (a)	It is Gross primary productivity Rate of production of organic matter during photo-synthesis.	Net primary productivity. It is Gross primary productivity minus respiration losses.
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(b)	A considerable amount of GPP is utilized by plants in respiration.	It is available biomass for consumption of to heterotrophs.
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SECTION - D

16. See Page No. **48-49** of Biology Text book for Class XII. 5

OR

See Page No. **54** of Biology Text book for Class XII.

- 17.** See Page No. **114-115** of Biology Text book for Class XII. 5

OR

See Page No. **112** of Biology Text book for Class XII.

- 18.** See Page No. **262** of Biology Text book for Class XII. 5

