

Sample Paper

Class XII (2017-18)

Biology

Time allowed: 3 Hrs.

Maximum Marks: 70

GENERAL INSTRUCTIONS:

- (i) There are a total of 26 questions and five sections in the question paper. All questions are compulsory.
- (ii) Section A contains question number 1 to 5, **Very Short Answer type** questions of one mark each.
- (iii) Section B contains question number 6 to 10, **Short Answer type I** questions of two marks each.
- (iv) Section C contains question number 11 to 22, **Short Answer type II** questions of three marks each.
- (v) Section D contains question number 23, **Value Based Question** of four marks.
- (vi) Section E contains question number 24 to 26, **Long Answer type** questions of five marks each.
- (vii) There is no overall choice in the question paper; however, an internal choice is provided in one question of two marks, one question of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

[SECTION A]

1. A geneticist interested in studying variations and patterns of inheritance in living beings prefers to choose organisms for experiments with shorter life cycle. Provide a reason.
2. Identify the reason for selection of DNA polymerase from *Thermus aquaticus* for Polymerase Chain Reaction.
3. Name an IUD that you would recommend to promote the cervix hostility to the sperms.
4. Indiscriminate diagnostic practices using X-rays etc. should be avoided. Give one reason.
5. What is Biopiracy?

[SECTION B]

6. After a brief medical examination a healthy couple came to know that both of them are unable to produce functional gametes and should look for an 'ART' (Assisted Reproductive Technique). Name the 'ART' and the procedure involved that you can suggest to them to help them bear a child.
7. Differentiate between male and female heterogamety.
8. How has mutation breeding helped in improving the production of mung bean crop?

OR

Explain the importance of inbreeding in cattle.

9. Mention a product of human welfare obtained with the help of each one of the following microbes:

(a) LAB	(b) <i>Saccharomyces cerevisiae</i>
(c) <i>Propionibacterium sharmanii</i>	(d) <i>Aspergillus niger</i>
10. Are humming birds and fish regulators or conformers? Give reasons in support of your answer.

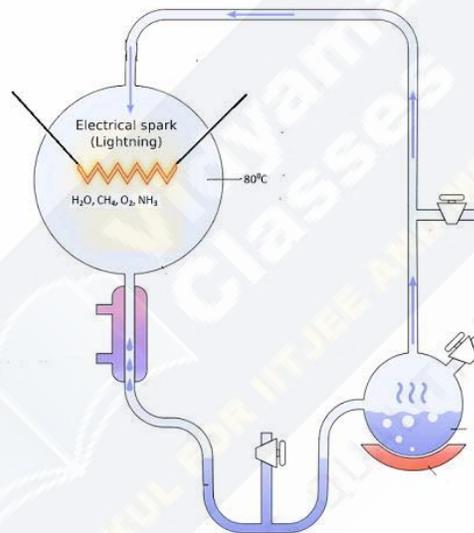
[SECTION C]

11. Double fertilization is reported in plants of both, castor and groundnut. However, the mature seeds of groundnut are non-albuminous and castor are albuminous. Explain the post fertilization events that are responsible for it.
12. (a) A recombinant vector with a gene of interest inserted within the gene of b-galactosidase enzyme, is introduced into a bacterium. Explain the method that would help in selection of recombinant colonies from non- recombinant ones.
- (b) Why is this method or selection referred to as "insertional inactivation"?

OR

What is a bioreactor used for ? Name a commonly used bioreactor and any two of its components.

13. Name the two end products of double fertilization in angiosperms. How are they formed? Write their fate during the development of seed.
14. (a) Draw the figure of vector pBR322 and label the following: Origin of replication , Ampicillin resistance site, Tetracycline resistance site, Bam H1 restriction site.
- (b) Identify the significance of Origin of replication.
15. A student was simulating Urey and Millers experiment to prove the origin of life. The set up by the student is given :

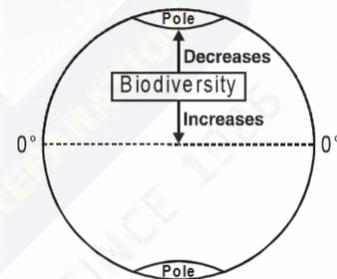


- (a) Find out the reasons why he could not get desired results.
- (b) What conclusion was drawn by Urey and Miller through this experiment?
- (c) Compare the conclusion drawn with the theory of spontaneous generation.
16. A team of students are preparing to participate in the interschool sports meet. During a practice session you find some vials with labels of certain cannabinoids.
- (a) Will you report to the authorities? Why?
- (b) Name a plant from which such chemicals are obtained.
- (c) Write the effect of these chemicals on human body.
17. Explain adaptive radiation with the help of a suitable example.
18. A teacher wants his/her students to find the genotype of pea plants bearing purple coloured flowers in their school garden. Name and explain the cross that will make it possible.

19. Name the bacterium that causes typhoid. Mention two diagnostic symptoms. How is this disease transmitted to others?
20. (a) Name the tropical sugar cane variety grown in South India. How has it helped in improving the sugar cane quality grown in North India?
- (b) Identify 'a', 'b' and 'c' in the following table:

No.	Crop	Variety	Insect Pests
1	<i>Brassica</i>	Pusa Gaurav	(a)
2	Flat bean	Pusa Sem 2 Pusa Sem 3	(b)
3	(c)	Pusa Sawani Pusa A-4	Shoot and fruit borer

21. (a) Mention the cause and the body system affected by ADA deficiency in humans.
- (b) Name the vector used for transferring ADA.DNA into the recipient cells in humans. Name the recipient cells.
22. (a) Hot spots are the regions of exceptionally high biodiversity. But they have become regions of accidental habitat loss too. Name the three hot spots of our country. Why are they called 'Hot spot'?
- (b) Study the diagram of the earth given below. Give the name of the pattern of biodiversity therein. Suggest any two reasons for this type of occurrence.



[SECTION D]

23. Seeing a crowd of students in one corner of the school, the Principal rushed to see the matter and found some children beating and chasing a small monitor lizard. On seeing the Principal, all the children fled to their classes except Alok who requested the Principal to arrange for some medical assistance for the injured animal. The Principal rewarded the student.
- (a) Was Alok an indisciplined boy who did not run to the class on seeing the Principal? What values does the act promote?
- (b) How do endangered species differ from vulnerable species?
- (c) Mention the factors resulting in loss of biodiversity/extinction.

[SECTION E]

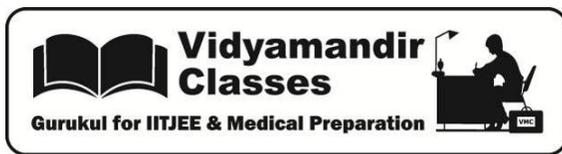
24. (a) Coconut palm is monoecious, while date palm is dioecious. Why are they so called?
- (b) Draw a labelled diagram of sectional view of a mature embryo sac of an angiosperm.
- OR**
- (a) How is 'oogenesis' markedly different from 'spermatogenesis' with respect to the growth till puberty in the humans?
- (b) Draw a sectional view of human ovary and label the different follicular stages, ovum and Corpus luteum.
25. (a) Explain the process of DNA replication with the help of a schematic diagram.
- (b) In which phase of the cell cycle does replication occur in Eukaryotes? What would happen if cell-division is not followed after DNA replication?
- OR**
- (a) What is a genetic code?
- (b) Explain the following: Degenerate code; Unambiguous code; Universal code; Initiator code.

26. (a) Draw a simplified model of phosphorus cycling in a terrestrial ecosystem.
(b) Write the importance of such cycles in ecosystems.

OR

- (a) Explain the narrowly utilitarian, broadly utilitarian and ethical arguments in favours of conservation of biodiversity.
(b) How is designation of certain areas as hotspots a step towards biodiversity conservation? Name any two hotspots in India.





Answers to Sample Paper

Class XII (2017-18)

Biology

[SECTION A]

1. Many generations can be obtained (in a short time) and variations can be exhibited or selected faster.
2. It remains active during the high temperature induced denaturation of double stranded DNA.
3. LNG-20 or progestasert (Any one)
4. Act as Carcinogen and can produce (harmful) mutation / chromosomal aberration / damage to DNA / normal cells converted to neoplastic.
5. Illegal / non-authorized / non-compensated use of bioresources by organisations (MNC).

[SECTION B]

6. Test tube baby programme
Collection of ova and sperm from donor
(Given Corresponding procedure should be correctly explained)
Explanation:
IVF - Fertilisation outside the body in almost similar conditions as that in the body
ICSI - Sperm is directly injected into the ovum
ET - Embryo is transferred into reproductive tract / uterus
ZIFT - Zygote or early embryos (upto eight blastomeres) transferred into fallopian tube
IUT - Early embryos (with more than eight blastomeres) transferred into uterus

7.

Male heterogamety		Female heterogamety
(i)	Male produces two types of gametes (while female produces only one type of gamete)	Female produces two types of gametes (while male produces only one type of gamete)
(ii)	XY / XO type // two types of heterogamety	ZW type // one type of heterogamety

8. Produce disease resistant varieties , against yellow mosaic virus / powdery mildew

OR

Maintaining purelines , inbreeding exposes harmful recessive genes that are eliminated by selection, helps in accumulation of superior genes, and elimination of less desirable genes.(any two)

9.
 - (a) Milk to curd
 - (b) Bread / ethanol / alcoholic drinks / whiskey / brandy / beer / rum
 - (c) Swiss cheese
 - (d) Citric acid
10. Humming birds and fishes are Conformers. Heat loss or gain is a function of surface area. Since small animals have a larger surface area (relative to their volume), they tend to lose body heat very fast when it is cold outside, they have to expend much energy, to generate body heat through metabolism thus cannot maintain a constant body temperature

[SECTION C]

11. Development of endosperm (preceding the embryo) takes place in both, developing embryo derives nutrition from endosperm. Endosperm is retained / persists / not fully consumed in castor, endosperm is consumed in groundnut.
12. (a) Selection of recombinant due to inactivation of antibiotics is a cumbersome procedure as it requires simultaneous plating on two plates having different antibiotics. Therefore alternative selectable markers have been developed which differentiate recombinant from non-recombinant on the basis of their ability to produce colour in the presence of a chromogenic substrate.
- (b) The method is referred as Insertional inactivation because a recombinant DNA is inserted within the coding sequence of an enzyme β -galactosidase which results in the inactivation of the enzyme.

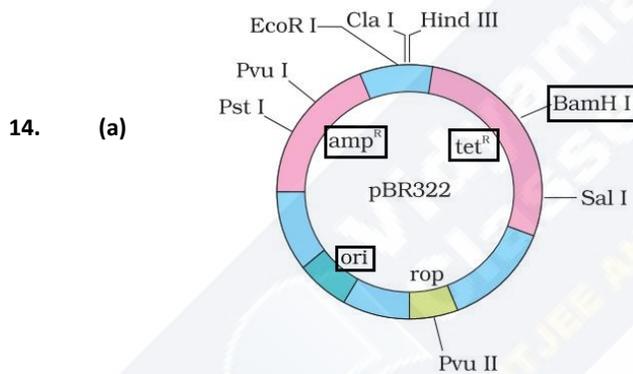
OR

Making recombinant protein on a large scale

Simple – stirred tank bioreactor

Foam breaker/impeller/stirrer/pH control/motor/agitator system/O₂ delivery system/temperature control system/sampling ports (any two)

13. Syngamy- male gamete + female gamete = zygote.
Triple fusion- male gamete + polar nuclei = Primary Endosperm Nucleus; zygote give rise to embryo, PEN forms endosperm.



- (b) Origin of replication is responsible for controlling the copy number of the DNA sequence inserted.
15. (a) He could not get desired results because:
- (i) O₂ was used instead of H₂
- (ii) Temperature maintained was 80°C instead of 800°C.
- (b) It was concluded that life could have come from pre - existing non-living organic molecules and their formation was preceded by chemical evolution.
- (c) He observed formation of Amino acids when in a closed flask CH₄, H₂, NH₃ and water vapour were heated at 800° C in presence of electric discharge. Analysis of meteorite content also reveals similar compounds indicating that similar process are occurring elsewhere in space / Chemical evolution. Urey & Miller proved that life originated abiogenetically whereas theory of spontaneous generation emphasized that units of life called spores were transferred to different planets including Earth.
16. (a) Yes. May be abused by sports person.
- (b) *Cannabis* /any other relevant plant.
- (c) Effects cardiovascular system of the body.

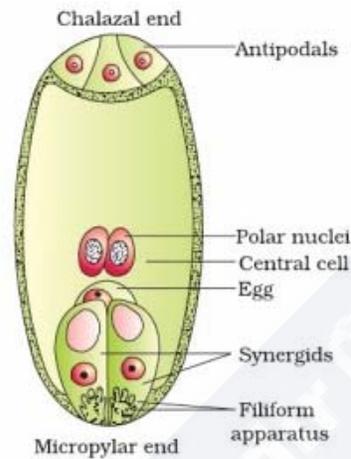
17. Evolution of different species in a given geographical area starting from a point and literally radiating to other geographical areas or habitat is called adaptive radiation.
Example 1. A number of marsupials each different from other / Tasmanian wolf / Tiger Cat / Banded anteater / Marsupial rat / Kangaroo / Wombat / Bandicoot / Koala / Marsupial mole / Sugar glider (any two or more), evolved from an ancestral stock, but all within Australian continent.
Example 2. Darwin's finches, from original seed eating features many other forms with altered beaks arose, enabling them to become insectivorous / vegetarian finches on the same (Galapagos) islands.
18. Test cross.
 Purple flower to be crossed with white (homozygous recessive) flower.
 If all flowers of F₁ are purple then genotype is homozygous dominant / PP.
 If 50% are purple and 50% are white then genotype is heterozygous dominant / Pp.
 (same thing can be shown with the help of crosses)
19. The pathogenic bacterium *Salmonella typhi* causes typhoid in human beings.
 The two diagnostic symptoms are as follows:
 (a) Sustained high fever (39 degree to 40 degree Celsius)
 (b) Weakness and Loss of Appetite
 The disease is transmitted to others through pathogens which generally enter the small intestine through food and contaminated water and migrate to other organs through blood.
20. (a) *Saccharum officinarum*, crossed with, North Indian variety (*Saccharum barberi*) to increase quality.
 (b) (i) Aphids (ii) Jassids / aphids / fruit borer (c) Okra (Bhindi).
21. (a) The cause of ADA deficiency is deletion of the gene for adenosine deaminase. It effects the functioning of immune system.
 (b) A functional ADA (cDNA) using a retroviral vector is introduced in the lymphocytes of the patient which acts as a vector. The recipient cell is lymphocyte itself which from the blood of patient are grown in culture outside the body and then returned to the body after introducing functional DNA to it.
22. (a) Western Ghats and Sri Lanka; Indo-Burma; Himalaya called 'biodiversity hot spots' as they show
 (i) High level of species richness (ii) High degree of endemism
 (iii) Under constant threat of extinction.
 (b) Latitudinal gradients (i) More solar energy available in tropics, more productivity. (ii) Tropical environments are less seasonal, so more predictable.

[SECTION D]

23. (a) No. Alok was a brave and courteous boy. He expressed his love for animals, commitment towards natural resource conservation.
 (b) Endangered species (when population of a species reduces to a level which poses immediate danger of extinction, e.g. one horn rhinoceros, great Indian bustard, musk deer etc). Vulnerable species (species whose population have greatly reduced and may be endangered species in future if the causative factors continue to operate. E.g Asiatic wild ass, black buck, spotted deer, golden langur etc)
 (c) (i) Habitat loss and fragmentation (ii) Over exploitation
 (iii) Alien species invasion (iv) Co-extinction

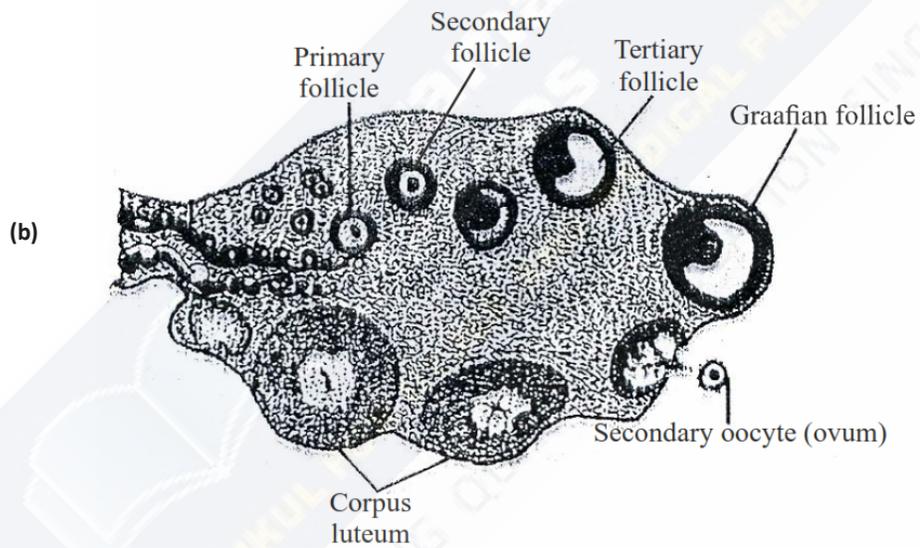
[SECTION E]

24. (a) Coconut palm bears both kinds (sexes) of flowers on the same plant.
Date palm bears only one type (sex) or male and female flowers on different plants.
- (b)

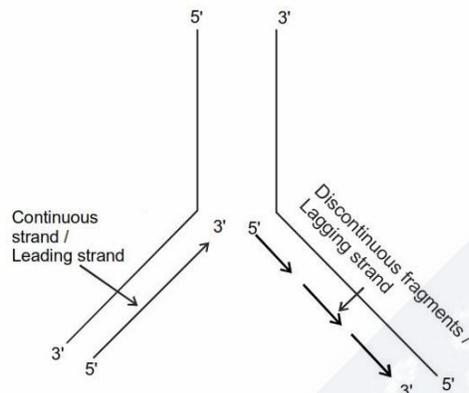


OR

- (a) Oogenesis is initiated at the embryonic stage. Spermatogenesis begins only at puberty.



25. (a) - Replication of DNA begins at ori, to form a replication fork.
 - DNA dependent DNA polymerase forms a new strand in 5' → 3' direction.
 - Role of DNA ligase is to join discontinuously synthesised fragments.

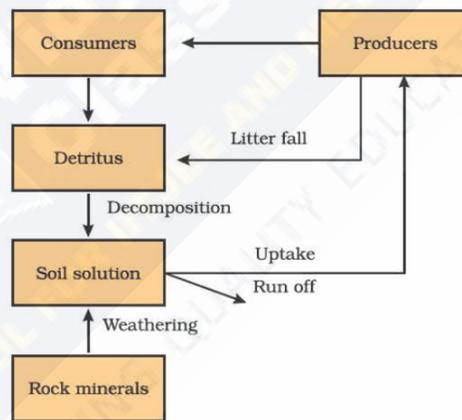


- (b) Replication occurs in S phase.
 If cell-division is not followed after DNA replication, it results in Polyploidy.

OR

- (a) A triplet on mRNA that codes for a particular amino acid, 61 codons + 3 stop codons.
 (b) Degenerate code- Some amino acids are coded by more than one codon,
 Unambiguous code- One codon codes for a specific amino acid
 Universal code- From bacteria to human UUU codes for phenylalanine
 Initiator code- AUG – codes for methionine (also)

26. (a)



- (b) Recycling of nutrients time & again

OR

- (a) Narrowly utilitarian – Humans derive countless economic benefits from nature food, firewood, fibre, construction material, industrial products (tannins, lubricants, dyes, rennin, perfumes) medicines
 Broadly utilitarian – Role in many ecosystem services that nature provides eg – 20% O₂ from Amazon forest, pollination (any other ecosystem service)
 Ethical argument – what humans owe to the millions of organisms with whom we share this planet.
 e.g. Philosophically/spiritually – every species has an intrinsic value
 (b) As these regions have very high levels of species richness & high degree of endemism, they need to be identified for maximum protection.
 Hotspots – Western Ghats & Sri Lanka, Indo- Burma, Himalayas (Any two)