

CBSE SAMPLE PAPER

CLASS-XII

BIOLOGY

General Instructions:

1. This paper consists of 27 questions in four sections.
2. Section-I has 1 to 8 questions carrying one mark each.
3. Section-II has 9 to 15 questions carrying two mark each.
4. Section-III has 16 to 23 questions carrying five mark each.
5. Section-IV has 24 to 27 questions carrying five mark each.

Section-I

Q1. How many chromosomes are in a gamete of an organism that has 46 chromosomes in its cells? **Ans.** Gametes (n) have half the number of chromosomes found in the cells (2n). Hence, $2n = 46$ then $n = 23$.

Q2. The mechanism to prevent the self pollen from fertilizing the ovules by inhibiting pollen germination or pollen tube growth on the pistil. What is that mechanism?

Ans. Self Incompatibility.

Q3. What is Amniocentesis?

Ans. Fetal test based on chromosomal pattern in amniotic fluid surrounding the developing embryo can be used for sex determination.

Q4. What is pedigree analysis?

Ans. It is study of family history about inheritance of a particular trait. It is done for several generations.

Q5. Give the name of enzymes used for DNA replication.

Ans. DNA ligates,DNA helices,DNA polymerase.

Q6. On examining a patient, he had a mass of proliferating cells damaging the neighboring tissues also.The doctor explained the disease to the patient. Name the disease and its property.

Ans. Malignant tumor, Metastasis.

Q7. Traditional hybridization procedures used in plant and animal breeding very often leads to inclusion and multiplication of undesirable genes along with the desirable ones. What are the steps involved in genetic engineering to over come this limitation?

Ans. (i) Gene cloning (ii) Gene transfer.

Q8. What are the advantages of Molecular diagnosis technique?

Ans. (i) Accurate Disease can be detected at very early stage. (ii) Can be diagnosed even if the number of pathogens is very low.

Section-II

Q9. When do implantation occurs?

Ans. The blastocyst is a liquid-filled ball of cells. Occurs around 5 – 8 days after conception. Implantation in the endometrium occurs at this stage.

Q10. What do you understand by term mutations?

Ans. Mutations are changes in a genomic sequence: the DNA sequence of a cell's genome or the DNA. They can be defined as sudden and spontaneous changes in the cell. Mutations are caused by radiation, viruses, transposon and antigenic chemicals, as well as errors that occur during meiosis or DNA replication.

Q11. What is disruptive selection?

Ans. Disruptive selection, like directional selection, favors the variants of opposite extremes over intermediate individuals. Disruptive selection differs in that sudden changes in the environment creates a sudden force favouring that. In nature, sexual dimorphism is probably a common example.

Q12. Rahul was suffering from the malfunctions of kidneys and need a replacement. His friend comes forward to donate him a kidney but after thorough examination the doctors refused to accept the kidney. Why he was refused to donate and what is it that the doctors check?

Ans. He underwent blood group and tissue typing / matching because the body is able to differentiate between self non self. Defense systems may generate cell mediated immune response.

Q13. What are symbiotic associations and state their advantages?

Ans. Symbiotic Associations Eg. Genus Glomus sp. form mycorrhiza Fungal symbiont absorbs phosphorus from soil and passes it to plant. Plants show resistance to root – borne pathogens. Tolerance to salinity and drought, Increase in growth and development.

Q14. Give the principle of PCR.

Ans. PCR principle: PCR reaction is a DNA synthesis reaction that depends on the extension of primers annealed to opposite strands of a dsDNA template that has been denatured (melted apart) at temperatures near boiling. By repeating the melting, annealing and extension steps, several copies of the original template DNA can be generated.

Q15. In oogamous organisms, female gamete is large and non-motile but the male gamete is very small. Why such type of adjustment is there in higher organisms?

Ans. Female gamete is large and non motile, is an adaptation for storing more food which will be required for the future development. The male gamete has to move to reach the counterpart, so it has the machinery for its reaching and delivering the chromosomes. It is therefore both the gametes have specialized themselves for their functions.

Section-III

Q16. Give the scientific term for the process of copying genetic message from one strand of DNA into RNA. Only one strand of DNA is used during transcription. Why?

Ans. Transcription :If both are copied they would code for m-RNA molecules with different sequences, hence different proteins will be formed from same DNA sequence. If two strands of m-RNA are produced simultaneously they would coil being complementary to each other.

Q17. State the process of bio-gas production?

Ans. In a concrete tank which is 10- 15 mts deep, the slurry of bio-waste or cow/buffalo dung is fed. Methanogens work on it, i.e. carry out fermentation. Floating cover placed above the gas holder tank, it rises as biogas content rises. Connecting pipe is there to supply biogas.

Q18. What are the factors that affect population growth?

Ans. Factors that affect the size of population

- Food availability
- Weather
- Predication pressure
- Competition Density of population at any time at a given place depends on Normality, Mortality.
- Emigration Immigration.

Q19. What is the difference b/w endometrium and myometrium?

Ans. Endometrium Myometrium

- It is innermost glandular layer that lines the uterine cavity.
- It is the middle thick layer of smooth muscles of the uterine wall.
- Implantation occurs in this layer.
- It is responsible for the uterine movement.
- It undergo cyclic changes during the menstrual cycle.
- It does not undergo any cyclic changes during the menstrual cycle.

Q20. How ZW sex determination system differs from XY?

Ans. The ZW sex-determination system is found in birds, reptiles, some insects and other organisms. The ZW sex-determination system is reversed compared to the XY system: females have two different kinds of chromosomes (ZW), and males have two of the same kind of chromosomes (ZZ).

Q21. “Giraffes who in an attempt to forage leave on tall trees had to adopt by elongation of their necks.” Make use of this statement to enumerate the main points of Lamarck’s theory and Darwin’s theory of Natural selection.

Ans. In order to eat leaves of tall trees, Giraffe had to adapt by stretching (elongation) of their neck i.e. evolution is driven by use & disuse of organs (Lamarckism) main points of theory to be incorporated. Variant Giraffes with an ability to elongate the neck were already there in the crowd of giraffes & linking of it to explain main points of Darwin’s theory of natural selection.

Q22. How r-DNA is used in Diagnosis of diseases?

Ans. Genetic diagnosis

a. Diagnosing inherited disorders * Cystic fibrosis * Muscular dystrophy * Haemophilia A and B

b. Diagnosing cancer - Certain cancers are caused by specific and reproducible mutations. **eg: Retinoblastoma** - Childhood cancer of the eye. The heritable form (germ line mutation of one of the two retinoblastoma alleles): mutation is detected in all cells. Spontaneous form: only detected in tumour tissue.

c. Blood group typing.

d. Prenatal diagnosis – eg determining the sex of foetus for those at risk of X-linked disorders PCR is one of the most versatile techniques invented.

Q23. Since the origin of life on earth and evolution there have been 5 episodes of mass extinction, but the current rate of extinction is 100-1000 times. What are the main causes of high extinction rate and how is it going to harm human beings?

Ans. Human activities are the basic cause for it. Causes – 4 major causes (The evil Quartet along with suitable examples of each:-

(i) Habitat loss and fragmentation-decline in covered forest area from 14% to 6%.

(ii) Overexploitation- extinction of steller’s sea cow.

(iii) Alien species invasion-Nile perch introduction into Lake Victoria resulted in extinction of 200 species cichlid fish.

(iv) Co-extinction-coevolved plant pollinator mutualism.

Harms:

(a) Decline in plant production.

(b) Lowered resistance to Env. Perturbations like drought.

(c) Increased variability in certain ecosystem processes such as plant productivity, water use etc.

Section-IV

Q24. What are the basis to decide on biodiversity conservation?

Ans. Biodiversity conservation: Reasons for conservation can be grouped into three categories:

(a) Narrow utilitarian-for deriving direct economic benefit from nature.

(b) Broad utilitarian-as biodiversity plays a major role in many ecosystem services.

(c) Ethical-we need to realise that every species has an intrinsic value and we need to pass on our biological legacy to future generations.

Q25. Explain in details the process of STP.

Ans. Treatment is done in two stages.

Primary : Physical removal of particles large and small by filtration and sedimentation. Solids so left makes primary sludge and the Supernatant becomes effluent.

Secondary: Primary effluent taken to large aeration tanks. Agitated mechanically and air pumped into it. Aerobic microbes form masses with fungal filaments known as flocs. Microbes consume organic matter in effluent for growth, thus BOD (Biological oxygen demand) reduced. Then it is passed into settling tank. Bacterial flocs get sediment-ed , a small portion is kept to activate the sludge. Small part of activated sludge used as inoculums in aeration tank and major part is pumped into large anaerobic sludge dig-esters. Anaerobic bacteria digest bacteria and fungi. Bacteria produce gases such as menthane, hydrogen sulphide and CO₂ – Biogas. And then secondary effluent is released into rivers and streams.

26. Define the following terms :

(a) Acrosome

(b) Amniotic sac

(c) Birth

(d) Parturition Blastocyst

(e) Cervix

(f) Clitoris

(g) Coitus

- **Acrosome**-The part of a sperm cell that contains an enzyme – (This enables a sperm cell to penetrate an egg.)Afterbirth-placenta and fetal membrane expelled from the uterus after the birth of a baby.
- **Amniotic sac**-Fluid-filled membrane or sac that surrounds the developing embryo while in the uterus.(protects baby from hard shocks, keeps it at a constant temperature.)
- **Birth**-The process of being born. process by which baby moves from the uterus into the outside world.
- **Parturition Blastocyst**-Blastula = early stage of an embryo; a liquid-filled sphere whose wall is composed of a single layer of cells; during this stage (about eight days after fertilization) implantation in the wall of the uterus occurs.
- **Cervix**-Lower part, or neck, of uterus. (Opening to the uterus.)
- **Clitoris**-Small, sensitive organ in front of the vagina.
- **Coitus**-Synonym for sexual intercourse.

Q27. Write the scientific name of the organism that T.H.Morgan selected for his experiment . Why did he choose this organism ?

Ans. *Drosophila melanogaster*.