

Question Bank of Biology

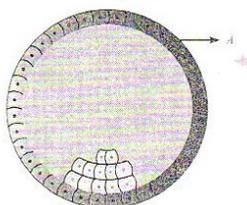
Class 12th Science

UNIT 1: REPRODUCTION

VERY SHORT ANSWER QUESTIONS

1 Mark

1. Name an organism where cell division is itself a mode of reproduction.
2. In yeast and *Amoeba*, the parent cell divides to give rise to two new individual cells. How does the cell division differ in these two organisms?
3. Mention the unique flowering phenomenon exhibited by *Strobilanthus kunthiana* (neelakuranji).
4. How does the floral pattern of Mediterranean orchid *Ophrys* guarantee cross pollination?
5. (a) State the difference between meiocyte and gamete with respect to chromosome number.
(b) Why is a whiptail lizard referred to as parthenogenetic?
6. An anther with malfunctioning tapetum often fails to produce viable male gametophytes. Give one reason.
7. Write the location and function of the Sertoli cells in humans.
8. When do the oogenesis and the spermatogenesis initiate in human females and males respectively?
9. Identify the figure given below and the part labeled "A".



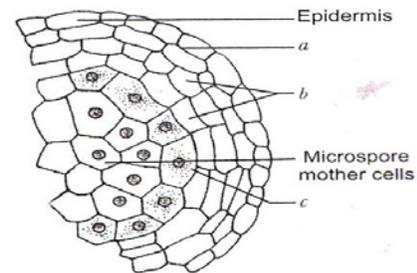
10. Mention any two events that are inhibited by the intake of oral contraceptive pills to prevent pregnancy in humans.
11. Bring out one main difference between CuT and LNG-20.

SHORT ANSWER QUESTIONS

2, 3 Marks

1. Given alongside is an enlarged view of one microsporangium of a mature anther.

- (i) Name 'a', 'b' and 'c' wall layers.
- (ii) Mention the characteristics and Function Of the cells forming wall layer 'c'.



2. (a) How does cleistogamy ensure autogamy?
(b) State one advantage and one disadvantage of cleistogamy to the plant.
3. Why should a bisexual flower be emasculated and bagged prior to artificial pollination?
4. Differentiate between albuminous and non-albuminous seeds, giving one example of each.
5. How does the Mediterranean orchid *Ophrys* ensures its pollination by bees?
6. Mention the fate of corpus luteum and its effect on the uterus in absence of fertilization of the ovum in a human female.
7. Draw a labeled diagram of sectional view of a human ovary showing various stages of follicles growing in it.
8. How do copper and hormone releasing IUDs act as contraceptives? Explain.

9. How are assisted reproductive technologies helpful to humans? How are ZIFT and GIFT different from intra uterine transfers? Explain.

LONG ANSWER QUESTIONS

5 Marks

1. (a) Trace the development of embryo after syngamy in a dicot plant.
(b) Endosperm development precedes embryo development. Explain.
(c) Draw a diagram of a mature dicot embryo and label cotyledons, plumule, radical and hypocoty in it.
2. (a) Draw a diagram of an enlarged view of T.S of one microsporangium of an angiosperm and label the following parts:
 - (i) Tapetum
 - (ii) Middle layer
 - (iii) Endothecium
 - (iv) Microspore mother cells
(b) Mention the characteristic features and function of tapetum.
(c) Explain the following giving reasons:
 - (i) Pollen grains are well preserved as fossils.
 - (ii) Pollen tablets are in use by people these days.
3. (a) Draw a schematic diagram of a human sperm and label the cellular components. Give the functions of any three parts.
(b) Where are the sperm heads found embedded to survive after spermatogenesis?

4. (a) Give a schematic representation of spermatogenesis in humans.
- (b) At which stage of line does gametogenesis begin in human male and female respectively?
- (c) Name the organs where gametogenesis gets completed in human male and female, respectively.

HOTS (Higher Order Thinking Skills)

1. Suggest a possible explanation why the seeds in a pea are arranged in a row, whereas those in tomato are scattered in the juicy pulp.
2. Why is whiptail lizard parthenogenetic?
3. The plant Yucca and moth cannot complete their life cycle without each other. Why?
4. Apomixes refers to the formation of seeds without fertilization. Mention any two ways in which such seeds are formed.
5. Name two hormones that can be found only in the blood of a pregnant woman. Mention the source organ/tissue that secretes each of them.
6. What name is given to the cells of inner cell mass that have the potential to give rise to all tissues and organs in a human being?

VALUE BASED QUESTIONS

- 1. A popular TV programme show that in some villages, infant girls killed soon after their birth.**

Answer the following questions based on the above information:

- (i) Do you approve such practice?**
 - (ii) What impact does it have on population?**
 - (iii) How can you help in stopping such practices?**
- 2. A married couple goes to the hospital for regular check-up of the lady who is pregnant. The man is curious and asks the doctor to tell him the sex of the child. But the doctor refuses.**

Answer the following questions based on the above information:

- (i) Did the doctor do the right thing? Which value is being promoted by the doctor?**
- (ii) What is this process of determining the sex of the foetus called?**
- (iii) What would be the result if all the doctors do not act in the same manner as above mentioned?**

UNIT 2: GENETICS & EVOLUTION

VERY SHORT ANSWER QUESTIONS

1 MARK

1. Mention the type of allele that expresses itself only in homozygous state in an organism.
2. Write the percentage of F₂ homozygous and heterozygous populations in a typical monohybrid cross.
3. In a dihybrid cross, when would the proportion of parental gene combinations be much higher than non-parental types, as experimentally shown by Morgan and his group?
4. How does the flow of genetic information in HIV deviate from the 'Central dogma' proposed by Francis Crick?
5. AUG codes for:
 - (a) glycine
 - (b) alanine
 - (c) leucine
 - (d) methionine.

SHORT ANSWER QUESTIONS

2, 3 Marks

1. (i) Why are grasshopper and *Drosophila* said to show male heterogamety? Explain.
(ii) Explain female heterogamety with the help of an example.
2. (a) Explain sex determination in humans.
(b) How do human males with 'XXY' abnormality suffer?

3. Draw a labelled schematic sketch of replication fork of DNA. Explain the role of the enzymes involved in DNA replication.
4. (a) Draw a schematic representation of the structure of a transcription unit and show the following in it:
 - (i) Direction in which the transcription occurs
 - (ii) Polarity of the two strands involved
 - (iii) Template strand
 - (iv) Terminator gene(b) Mention the function of promoter gene in transcription.
5. Describe the initiation process of transcription in bacteria.
6. In England, during the post-industrialised period, the count of melanic moths increased in urban areas but remained low in rural areas. Explain.
7. How do Darwin's finches illustrate adaptive radiation?
8. (a) How does the Hardy-Weinberg's expression ($p^2+2pq +q^2 =1$) explain that genetic equilibrium is maintained in a population?

(b) List any two factors that can disturb the genetic equilibrium.

LONG ANSWER QUESTIONS

5 Marks

1. A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds:
 - (i) What would be the phenotype and genotype of F_1 ?

- (ii) Work out the phenotypic ratio of F₂ generation with the help of a Punnett square.
2. (a) A garden pea plant bearing terminal, violet flowers, when crossed with another pea plant bearing axial, violet flowers, produced axial, violet flower and axial, white flowers in the ratio of 3:1. Work out the cross showing the genotypes of the parent pea plants and their progeny.
- (b) Name and state the law that can be derived from this cross and not from a monohybrid cross.
3. (a) Write the scientific name of the bacterium used by Frederick Griffith in his experiment.
- (b) How did he prove that some 'transforming principle' is responsible for transformation of the non-virulent strains of bacteria into the virulent form?
- (c) State the biochemical nature of 'transforming principle'.
- (d) Name the scientists who proved it.
4. Describe the Hershey-Chase experiment. Write the conclusion they arrived at after the experiment.

OR

How did Alfred Hershey and Martha Chase arrive at the conclusion that DNA is the genetic material?

5. Who proposed that DNA replication is semi-conservative? How was it experimentally proved by Messelson and Stahl?
6. (a) State the arrangement of different genes that in bacteria is referred to as 'operon'.
- (b) Draw a schematic labelled illustration of *lac* operon in a 'switched on' state.

(c) Describe the role of lactose in *lac* operon.

7. Two blood samples A and B picked up from the crime scene were handed over to the forensic department for genetic fingerprinting. Describe how the technique of genetic fingerprinting is carried out. How will it be confirmed whether the samples belonged to the same individual or to two different individuals?

HOTS (Higher Order Thinking Skills)

1. In a nucleus, the number of RNA nucleoside triphosphates is 10 times more than the number of DNA nucleoside triphosphates, still only DNA nucleotides are added during the DNA replication and not the RNA nucleotides. Why?

2. A single base mutation in a gene may not 'always' result in loss or gain of function. Do you think the statement is correct? Defend your answer.

VALUE BASED QUESTIONS

1. A child suffering from Thalassemia is born to a normal couple. But the mother is being blamed by the family for delivering a sick baby.

(a) What is Thalassemia?

(b) How would you counsel the family not to blame the mother for delivering a child suffering from this disease? Explain.

(c) List the values your counseling can propagate in the families.

UNIT 3: BIOLOGY IN HUMAN WELFARE

VERY SHORT ANSWER QUESTIONS

1 MARK

1. Name any two techniques that serve the purpose of early diagnosis of some bacterial/viral human diseases?
2. What happens in lymphoid organ with respect to immunity?
3. What are primary lymphoid organs?
4. What are interferons?
5. In what way are monocytes a cellular barrier in immunity?
6. What role do macrophages play in providing immunity to humans?
7. How do neutrophils act as a cellular barrier to pathogens in humans?
8. Given below are some human organs. Identify one primary and one secondary lymphoid organ: Liver, Thymus, Stomach, Thyroid, Tonsils?

SHORT ANSWER QUESTIONS

2, 3 MARKS

1. Explain the advantages of inbreeding in cattle population. What effect does inbreeding depression have on population and how is it overcome?
2. Describe the technology that has successfully increased the herd size of cattle in a short time to meet the increasing demands of growing human population?
3. Name the blank space *a*, *b*, *c*, and *d* given in following table:

Types of microbe	Name	Commercial product
<i>Bacterium</i>	a	Lactic acid

<i>Fungus</i>	b	Cyclosporin A
<i>c</i>	<i>Monascus purpureus</i>	Statins
<i>Fungus</i>	<i>Penicillium notatum</i>	<i>d</i>

4. Mention the product produced and its use by each of the microbes listed below:

(i) Streptococcus (ii) lactobacillus (iii) Saccharomyces cerevisiae

5. Name the blank spaces *a*, *b*, *c*, and *d* given in the following table:

Types of microbes	Name	Commercial product
Bacterium	<i>a</i>	Clot buster enzyme
<i>b</i>	<i>Aspergillus niger</i>	Citric acid
Fungus	<i>Trichoderma polysporum</i>	<i>c</i>
Bacterium	<i>d</i>	Butyric acid

6. Name the blank space *a*, *b*, *c*, and *d* from the table given below:

Types of microbe	Scientific name	Product	Medical application
(i) Fungus	<i>a</i>	Cyclosporin	<i>b</i>
(ii) <i>c</i>	<i>Monascus purpureus</i>	Statin	<i>d</i>

7. Name the enzyme produced by *streptococcus* bacterium. Explain its importance in medical sciences.

8. (a) Why are the fruit juices bought from market clearer as compared to house made at home?

(b) Name the bioactive molecules produced by *Trichoderma polysporum* and *Monascus purpureus*.

HOTS (Higher Order Thinking Skills)

1. What does the Ganga Action Plan tend to achieve?

Value Based Questions

1. Aditi went to a super market with her mother to buy rice. They saw that two types of products are available-one is organically grown and second is conventionally grown. The organically grown crops are costlier so Aditi's mother does not want to purchase it. Aditi explained to her mother the importance of organically grown crops.

Answer the following questions based on the above information:

- (i) Which rice should be purchased? Why?
- (ii) What values are exhibited by Aditi?

2. Municipal Corporation has deputed personnels to check for mosquito breeding in your school.

Answer the following questions based on the above information:

- (i) Which are the places they should check for mosquitoes and there larvae?
- (ii) Name two diseases which are spread by mosquitoes.
- (iii) Name any two biological agent which can be used to control mosquitoes

UNIT 4: BIOTECHNOLOGY AND ITS APPLICATION

VERY SHORT ANSWER QUESTION

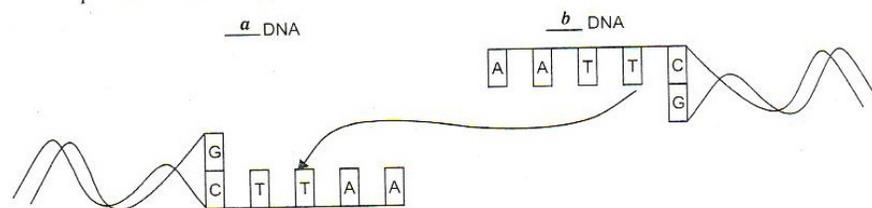
1MARK

1. How is the action of exonuclease different from that of endonuclease?
2. Name the technique used for separating DNA fragments in the laboratory.
3. What is the host called that produces a foreign gene product? What is this product called?
4. Why is it essential to have 'selectable marker' in a cloning vector?
5. Biotechnologists refer to *Agrobacterium tumifaciens* as a natural genetic engineer of plant. Give reasons to support the statement.
6. Why is the enzyme cellulase needed for isolating genetic material from plant cell and not from the animal cells?
7. How does an alien DNA gain entry into a plant cell by 'biolistics' method?

SHORT ANSWER QUESTIONS

2, 3 MARK

1.



Study the linking of DNA fragments shown above:

- (i) Name 'a' DNA and 'b' DNA.
- (ii) Name the restriction enzyme that recognizes this palindrome.
- (iii) Name the enzyme that can link these two DNA fragments.

2. How can DNA segments, separated by gel electrophoresis, be visualised and isolated?
3. Name the natural source of agarose. Mention one role of agarose in biotechnology.
4. A recombinant DNA is formed when sticky ends of vector DNA and foreign DNA join. Explain how the sticky end are formed and get joined.
5. Why do the toxic insecticidal proteins secreted by *Bacillus thuringiensis* kill the insect and not the bacteria itself?
6. Name the source organism from which Ti plasmid is isolated. Explain the use of this plasmid in biotechnology.
7. (a) What is plasmid?
(b) What is meant by ADA deficiency? How is gene therapy a solution to this problem? Why is it not a permanent cure?
8. Name the process involved in the production of nematode-resistant tobacco plants, using genetic engineering. Explain the strategy adopted to develop such plants.
9. (a) List any four beneficial effects of GM plants.
(b) Explain how *Bacillus thuringiensis* has contributed in developing resistance to cotton bollworms in cotton plants.

LONG ANSWER QUESTIONS

5 MARKS

1. (a) Why are engineered vectors preferred by biotechnologists for transferring the desired genes into another organism?
(b) Explain how do “ori”, ”selectable markers” and “cloning sites” facilitate cloning into a vector.

2. (i) Describe the characteristics that a cloning vector must possess.
(ii) Why DNA cannot pass through the cell membrane? Explain.
How a bacterial cell is made ‘competent’ to take up recombinant DNA from the medium?

3. If a desired gene is identified in an organism for some experiments, explain the process of the following:
 - (i) Cutting this desired gene at specific location.
 - (ii) Synthesis of multiple copies of this desired gene.

H.O.T.S (Higher Order Thinking Skills)

1. Gene therapy is an attempt to correct a genetic defect by providing a normal gene into the individual. By this the normal function can be restored. Alternate method would be to provide the gene product (protein\enzyme) known as enzyme replacement therapy, which would

also restore the function. Which in your opinion is a better option?
Give reason for your answer.

VALUE BASED QUESTIONS

1. A group of scientists are working on creating transgenic cows to produce milk with medicinal properties. But there are adverse side-effects on the cows due to this procedure. Their life span shortens; they become prone to diseases and die very early.

Answer the following questions based on the above information:

- (i) What values are being neglected by the scientists in the above situation?
- (ii) Should they continue with their production of transgenic cows? Give reason.

2. A newspaper reported that an American company has patented turmeric. Indian government is fighting against this patent.

Answer the following questions based on the above information:

- (i) What will you call this act of American company?

- (ii) How would patenting of turmeric affect India?
- (iii) What values are exhibited by the newspaper?

UNIT 5 - ECOLOGY AND ENVIRONMENT

Very Short Answer Questions

1 Mark

1. Define carrying capacity.
2. What are ectotherms?
3. What is Allen's rule?
4. Lichen is considered a good example of obligate mutualism. Explain.
5. What is meant by 10% law?
6. Name an organism found as secondary carnivore in an aquatic ecosystem.
7. What is the difference between gaseous and sedimentary cycles?
8. What are biodiversity hot spots?
9. Which historic convention on biological diversity was held in Rio de Janeiro in 1992?
10. Which is the world's most problematic aquatic weed?
11. Why is CNG said to be a better fuel than diesel?
12. How is snow-blindness caused in humans?

Short Answer Questions

2, 3 Marks

1. What is brood parasitism? Explain with an example.

2. What does S-shaped pattern of a population growth represent? How is J-shaped pattern different from it and why?
3. Explain why very small animals are rarely found in polar region.
4. What is meant by saying that the energy flow in an ecosystem is unidirectional?
5. Distinguish between pioneer community and climax community.
6. What is the primary productivity? How is it different from net primary productivity?
7. Describe what are sacred groves.
8. List any four factors which may lead to loss of biodiversity.
9. Give difference between in situ and ex situ approaches of conserving biodiversity.
10. Alien species are a threat to native species. Justify taking examples of an animal and a plant alien species.
11. Why are CO₂ and CH₄ known as greenhouse gases?
12. Explain accelerated eutrophication. Mention any two consequences of the phenomenon.

LONG ANSWER QUESTIONS

5 Marks.

1. Describe the exponential growth model of a population.
2. What is ecological succession? What is climax community? How is climax community established?
3. Write a note on the efforts for the conservation of biodiversity in India.
4. What is ozone shield and why is it important? Name the gases that cause stratospheric ozone depletion.

5. Explain the cause and effects of global warming. What measures need to be taken to control global warming?
6. (a) Explain bio-magnification with example.
(b) How is BOD related to extent of pollution in water body?

Value Based Questions

1. Sampat and Ganpat are partners and established a factory. After a few months electrostatic precipitator became out of order. Ganpat wanted to replace it but Sampat expressed the view that they have no effect of it on productivity as well as income; therefore they should not waste money to replace it.

Answer the following questions based on the above information:

- (i) Out of these partners whom do you support and why?
 - (ii) Suggest any two measures to stop such negligence.
 - (iii) What values are exhibited by Sampat?
2. A team of research workers observed that the population of fish eating birds is declining every year after the establishment of a pesticide factory nearby five years ago.

Answer the following questions based on the above information:

- (i) What may be the possible reason in your opinion? Explain.

(ii) Can you suggest alternative to pesticide so that factory may be stopped?