CAREERS 360

PRACTICE Series

Maharashtra HSC

Biology Sample Paper 2025

Std. XII

BIOLOGY

QUESTION BANK

Std. XII BIOLOGY
Question Bank
Chapter 1 : Genetic Basis of Inheritance

1 Mark Questions

1 Define : Heredity

2 Define : Genetics

3 Who coined the term 'genetics' ?

4 Who gave the first scientific explanation regarding inheritance ? When ?

5 What is Mendel's law of Inheritance also known as ?

6 Why is Mendel known as "Father of Genetics"?

7 Who is known as father of Genetics ?

8 What are Mendelian factors also known as ?

9 In what capacity did Mendel join Augustinian Monastry of Brunn ?

10 What was the title of paper which Mendel presented in 1865 ?

11 It was based on Mendel's principles that three laws known as Mendel's Laws of Inheritance were postulated. Who postulated these laws ?

12 Which journal published the paper entitled "Experiments in plant hybridization". in 1866 ?

13 Name the scientists who rediscovered Mendel's work in the year 1900.

14 What is the botanical name of garden Pea ?

15 What is an Allele ?

16 What is emasculation ?

17 Give an example of incomplete dominance.

18 Give an example of multiple allele

19 Give an example of pleiotropy

20 Give an example of polygenic inheritance

2 Marks Questions

1. Define : a) Genotype b) Phenotype
2. Define the term - Dihybrid cross
3. Define the term Monohybrid cross
4. Explain the terms
   a) Factor
   b) Alleles
   c) Emasculation
   d) F_1 generation
   e) Dihybrid
5. Explain the statements.
   a) Test cross is a back cross, but back cross is not necessarily a test cross.
   b) Law of dominance is not universally applicable
   c) Law of segregation is universally applicable.
6. Distinguish between incomplete dominance and co-dominance
7. Distinguish between genotype and phenotype

3 Marks Questions

1. How many traits did Mendel study ? Enlist them.
2. Define Monohybrid cross. Give its typical graphic representation.
3. What is law of segregation also known as ?
   Explain why it is called so.
4. Distinguish between homozygous and heterozygous.
5. Explain - Why was Mendel successful.
6. Write a brief note on Mendel's life.
7. Describe Monohybrid Artificial Cross of the Selected parents to raise F_1 generation.

5 Marks Questions

1. What are characters or traits (2 or more) controlled by a single gene called ? Explain with an example. Why its phenotypic ratio is 2:1 instead of 3:1.?
2. Which plant did Mendel select for his experiments ? Why ? Explain any three characteristics of the same.
3. A plant with red flowers is crossed with a plant with white flowers and the plant does not show incomplete dominance or co-dominance. Predict diagrammatically the above and Add a note on type of cross.
4. Every time Mendel performed dihybrid cross he found two parental combinations and two new. Which principle did he apply ? And what law was established.
5. What did H.Nilsson - Ehle discover with reference to wheat kernel colour ?
   Give the graphic representation of the same.

Chapter 2 : Gene : It's nature, expression and regulation

1 Mark Questions

1 Why - DNA strands are considered antiparallel.

2. Why is DNA replication called semiconservative ?

3. What is the basic unit of DNA or RNA called ?

4. What are the components of a nucleotide ?

5. Why is the genetic code considered as commaless ?

6. What is the role of RNA primer during protein synthesis ?

7. What are polysomes ?

8. In an operon what is present in between the promoters and structural genes.

9. What is the process in which sequence of codons on mRNA are read and accordingly amino acids are attached to each other called ?

10. What is the difference in the first aminoacid in Prokaryotes and eukaryotes in a protein chain?

2 Marks Questions

1. When living R-type of bacteria were mixed with heat killed S-type, they converted or changed to 'S' type. What is this phenomenon called ?

2. What is a gene responsible for expression of a trait called ?

3. What are nucleotides named according to ?

4. The twisted ladder like structure of a double stranded DNA is also called ?

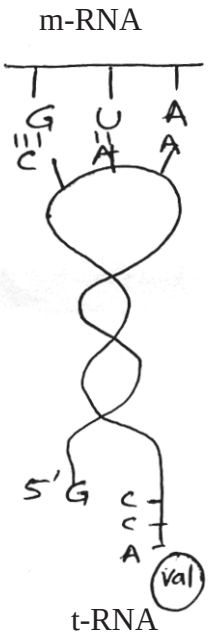
5. What is polarity with reference to double stranded DNA ?

6. Enlist the types of non-genetic RNA

7. What are nucleosomes in chromatin also known as ?

3 Marks Questions

1. What are the basic units of a deoxyribose nucleic acid called ? Sketch and label a monomer making the polymer DNA.
2. Which type of RNA carries information of sequence of amino acids ? Describe its structure.
3. Distinguish between DNA and RNA.
4. What are the characteristic features of transcripts on m-RNA ?
5.



Describe the hypothesis depicted in this diagram.

6. What is cluster of genes with related functions called ? Describe its structure.

Chapter 3 : Biotechnology

1 Mark Questions

1. Define Biotechnology.
2. Who developed the first recombinant DNA?
3. Name any two enzymes used in r-DNA technology.
4. What are vectors in genetic engineering ?
5. Give the significance of marker gene in vector.
6. What are transposons ?
7. Define Plasmids.
8. Name the transposons showing copy and paste mechanism.
9. Name the transposons showing cut and paste mechanism.
10. What are sticky ends in DNA ?
11. What are restriction fragments ?
12. Define genomic Library.
13. Define c-DNA Library.
14. Name the three steps of PCR-technique in proper sequence.
15. Mention the use of Gel-Electrophoresis in biotechnology
16. Mention two applications of biotechnology.
17. Give examples of two Genetically modified plants.
18. Give the advantage of Golden rice.
19. What is bio piracy ?
20. Name the two soil bacteria useful in biotechnology.

2 Marks Questions

1. Define genetic engineering. Give its applications.
2. Considering the therapeutic products made by recombinant DNA techniques match the Column A and Column B.

	Column 'A'		Column 'B'
a	Blood protein	i.	Lysozyme
b.	Human Hormone	ii.	Cytomegalovirus
c.	Immune modulator	iii.	Erythropoietin
d.	Vaccine	iv.	Insulin

3. Classify transposons explaining their mechanism.
4. Write a brief note on "transferable genetic elements".
5. Write a note on DNA library prepared by "Teminism" process.
6. Write a note on Flavr savr tomato.
7. Explain how *Agrobacterium tumefaciens* is useful in biotechnology.
8. Mention the basic requirements needed for PCR technique.

3 Marks Questions

1. Recombinant DNA technology deals with manipulating the genome of a cell or organism to obtain a desirable phenotype. Enlist the basic steps involved in this process.

   (Steps used in r-DNA technology)

2. What are restriction fragments ? How are these analysed, mention their uses ?
3. Restriction endonucleases make cut on some specific sites of DNA molecule. Give an account of such sites using suitable example ?
4. A soil bacterium that was traditionally used as an insecticidal spray is now being used in production of insect resistant GM crops. Give a brief account of this bacteria and its application in biotechnology.
5. Explain the terms bio-piracy and bio-patent giving examples.
6. What is DNA Library ? Describe how a c-DNA Library is constructed.
7. Explain nomenclature procedure of restriction endonucleases giving suitable example.
8. There are some sequences of DNA which can change their position within the genome of single cell. Give an account of such DNA sequences.

Chapter 4 : Enhancement in Food Production

1 Mark Questions

1) Why are plants obtained by protoplast culture called somatic hybrids ?
2) What is protoplast fusion ?
3) Why are proteins synthesized from *Spirulina* called single cell protein ?
4) A person who is allergic to pulses was advised to take a capsule of *Spirulina* daily. Give the reasons for the advise.
5) What is emasculation ? Why and when it is done ?
6) Give limitations of plant hybridization programme.
7) Give the names of the insect resistant varieties of crop.
8) What is IARI?
9) Explain the term germplasm
10) Who developed semi-dwarf varieties of wheat, which is high yielding and disease resistant ?
11) Name the commonly occurring deficient micronutrients in staple crops like wheat and rice.
12) Give the name of one secondary metabolite with its plant source.
13) Give reasons, in tissue culture technique when the explant is used from apical meristem, plants produced are diseases free.
14) Give the principle of plant tissue culture.
15) Give the name of an organism cultivated as a source of single cell protein.
16) Name any two crop diseases caused by fungi
17) How SCP is beneficial ? Explain.
18) What is Atlas 66?
19) Define SCP.
20) Explain how healthy plants are recovered from diseased plant.
21) State the importance of biofortification
22) Name any two diseases the Himgiri variety of wheat is resistant to.
23) Why are living plant cells said to be totipotent.

24) Give the basic purpose of performing plant breeding.

25) What is the major advantage of producing plants by micropropogation?

26) Name the agent which facilitate the fusion of protoplast.

27) Give an example of somatic hybrid.

28) Name the varieties of rice from which semi dwarf varieties have been developed.

29) Name the semi-dwarf variety of wheat which is high yielding and disease resistant.

30) Name any four hybrid varieties of crop plants which have been developed in India.

31) What is meant by "hidden hunger"?

2 Marks Questions

1) What is meant by germplasm collection ? What are its benefits ?

2) Name the improved characters of wheat that helped India to achieve green revolution.

3) Plants raised through tissue cultures are clones of the parent plant, discuss the utility of these plants.

4) Explain Dr. Norman Borlaug's contribution towards improvement of crop plants.

5) Explain i) "Hidden hunger" ii) Biofortification

6) Give the breeding methods used to bring biofortification

7) Which are the different types of tissue culture ?

8) Give advantages of micropropogation

9) Give the objectives of plant breeding

10) Name the disease resistant varieties of crop plants for the different pathogens like fungus, bacteria, virus respectively.

11) Explain the terms - Callus and Explants.

12) What are the applications of tissue culture?

13) Suggest four important steps to produce a disease resistant plant through conventional plant breeding method.

14) Large scale cultivation of *Spirulina* is highly advantageous for human population . Explain giving two reasons.

15) a) Why are the plants raised through micropropogation termed as somaclones? b) Mention two advantages of this technique.

16) List the two steps that are essentials for carrying out artificial hybridization in crop plant and why?

17) Why are the plants obtained by protoplast culture called somatic hybrid?

18) Why are biofortified maize and wheat considered nutritionally improved.

19) Enlist the characters that breeders have tried to incorporate into crop plant.

20) Selection process after hybridization is very crucial in breeding programmers. Give reasons.

21) State the objectives of breeding for improved nutritional quality of crops.

22) How does culturing of *Spirulina* solve the food problems of the growing population ?

23) Enumerate four objectives for improving nutritional quality of different crops for health benefits of the human population by process of Biofortification.

24) Identify two ways in which *Spirulina* is helpful to mankind.

25) What is meant by biofortification ? Explain

26) Which part of the plant is best suited for making virus free plants and why ?

3 Marks Questions

1) You are a Botanist working in the area of plant breeding. Describe the various steps that you will undertake to release a new variety.

2) What are the advantages of tissue culture methods over conventional method of plant breeding in crop improvement programme ?

3) a) Mutations are beneficial for plant breeding. Taking an example justify the statement.

   b) Discuss briefly the technology that made us self sufficient in food production.

4) Explain any three methods to increase food production ?

5) Explain importance of micropropogation and somatic hybridization.

6) What is plant breeding ? Describe the breeding of crop plant for disease resistance and high yielding varieties

7) Name the disease resistant varieties of crop plants for different pathogens like Fungi, Viruses and bacteria.

Name of Pathogen	Name of the disease resistant Plant	Name of the disease
Fungi	Himgiri of wheat	_____ & _____
_____	_____ of Cauliflower	Black rot
Virus	_____ of chilli	_____

8) What are the basic requirements of tissue culture ?

9) Explain SCP and Give its advantages

10) Describe the steps in plant tissue culture.

11) How was conventional plant breeding done ?

12) What are the factors responsible for the success of Green revolution ?

13) How is mutational breeding advantageous over conventional breeding ?

14) Mention the steps that are followed in developing new variety of crop under plant breeding programme.

15) What is biofortification ? Give its importance. Give two examples of plants developed in IARI.

16) What is single cell protein ? Give its importance and two examples of SCP.

17) How can crop varieties made disease resistant to over- come food crisis in India? Explain. Name one disease resistant variety in India of

a) Wheat to leaf and stripe rust

b) *Brassica* to white rust.

18) Name the plant source for the Secondary metabolite produced by Suspension culture.

Plant	Product
1) ———	Mentha
2) ———	Nicotine
3) ———	Anthocyanin

19) What is plant breeding ? List the two steps involved in classical plant breeding.

20) Discuss the production of wheat and rice varieties during green revolution?

21) Enumerate four objectives for improving the nutritional quality of different crops for the health benefits of the human population by the process of biofortification.

22) 'Give me few living cells of any plant and I will give you a thousands of plants of the same type' Is this only a slogan or is it scientifically possible? Write your comment and Justify .

23) Name the plant Source for the Secondary metabolite produced by Suspension culture.

Plant	Product
1) ———	Vincristin, Vinblastin
2) ———	Tropane
3) ———	Anthocyanin

Chapter 5 : Microbes in Human Welfare

1 Mark Questions

Fill in the blanks :

1. _____ & _____ isolated gibberellins from infected rice seedlings.
2. Traditionaly amylase, papain and _____ were used in food processing.
3. _____ bacteria show symbiotic association with bean.
4. _____ shows association with aquatic fern *Azolla*.
5. _____ is used in industrial production of wine.

Give one scientific name of organism for the following :

1. Free - living nitrogen fixing bacteria.
2. Major source of methanogens in production of biogas.
3. Microbe producing citric acid.
4. Bacteria that cause curdling of milk.
5. Microbes used in production of cellulase.

Answer the following in one sentence :

1. Give the full form of VAM.
2. Enlist the microbes used in dairy industry.
3. Name the cells in blue green algae that are sites of nitrogen fixation.
4. Name the bacteria forming symbiotic association with roots of pea plant.
5. Name the pathogenic fungi that are used as herbicide.
6. Which bacteria brings about anaerobic digestion in the biogas plant.
7. Enlist the steps involved in production of beer.
8. State the microbial source of gibberellins.
9. Which vitamins are fat soluble?
10. State the difference in the microbes used in secondary and tertiary treatment in sewage treatment.

2 Marks Questions

1. Match the products with their microbial souce.

	Column I		Column II
1.	Lipase	a.	*Streptomyces erythreus*
2.	Erythromycin	b.	*Rhizopus sp.*
3.	Gluconic acid	c.	*Pseudomonas denitrificans*
4.	Vitamin B_{12}	d.	*Aspergillus niger*

2. Give the chemical composition of biogas and state two advantages of using biogas.
3. Who discovered antibiotics ? On which bacteria was he working at that time.
4. Name some human diseases that can be controlled by using antibiotics.
5. Write a note on fungi as a source of food.
6. Distinguish between chemical fertilizers and bio-fertilizers.
7. What are weedicides? Give two examples of weedicides.
8. Describe association of *Azolla* and *Anabaena*.
9. What are gibberellins ? Give its applications.
10. Enlist the scientist who contributed to
    a) discovery of first antibiotic
    b) isolation of gibberellins from rice seedlings.
11. Explain the enrichment of soil fertility by using
    a) *Rhizobium* b) *Nostoc*
12. Give reason biogas plants are more often-built in rural areas.
13. State whether BOD will be high or low
    a) In water after primary treatment
    b) In water after secondary treatment.

Chapter 6 : Photosynthesis

1 Mark Questions

Fill in the blanks :

1. Cyclic photophosphorylation occurs when only light of _____ wavelength is available.
2. In chlorophyll molecule the porphyrin ring has metal atom _____ in the centre.
3. All pigments except _____ are called accessory pigments.
4. Visible light has wavelength ranging from _____ to _____.
5. Chl. a and b have same structure except chl.a has _____ group while chl.b has _____ group in side chain.
6. C_4 plants show _____ type of leaf anatomy.
7. The enzyme that accepts O_2 during photorespiration is _____.
8. Mesophyll Chloroplast of C_4 plants have higher concentration of _____ enzyme.

Answer the following in one sentence :

1. Which molecule in non-cyclic photophosphorylation donates electrons to PSII ?
2. Expand PEP Case.
3. Why NADP + H^+ is not synthesized during cyclic photo-phosphorylation ?
4. Who gave the law of limiting factors ?
5. Name the two photosynthetic pigments belonging to carotenoids.
6. Give the chemical equation of photosynthesis.
7. What is the first stable product of C_4 cycle ?
8. Which is the primary acceptor molecule of CO_2 during calvin cycle ?
9. Expand RuBisCO.
10. Name the reaction centre in PSI & PSII.
11. What is plastidome ?

2 Marks Questions

Answer the following :

1. Match the column I with Column II

	Column I		Column II
1.	*Kalanchoe*	a.	Photoautotroph
2.	*Amaranthus*	b.	CAM plant
3.	*Chromatium*	c.	Chemoautotroph
4.	*Nitrosomonas*	d.	Kranz Anatomy

2. How does light intensity affect the rate of photosynthesis ?
3. Why do the C_4 plants show better yield and high productivity than C_3 plants ?
4. What is the net consumption of ATP and $NADPH_2$ for every CO_2 molecule fixed in C_4 plants?
5. Give diagrammatic representation of cyclic photophosphorylation.
6. What are accessory pigments ? Give their role in photosynthesis.
7. Do 'dark reaction' of photosynthesis need light ? Explain.
8. CAM plants keep their stomata closed during the day to check transpiration. How do they fix CO_2?

3 Marks Questions

Answer the following :

1. Distinguish between
   a) Cyclic photophosphorylation and Non cyclic photophosphorylation.
   b) Bundle sheath chloroplast and Mesophyll chloroplast
   c) C_3 pathway and C_4 pathway.
2. a) What is absorption spectrum ?
   b) Which pigment forms reaction centre ?
3. Where does carboxylation take place in C_3 plants ? Explain the process.
4. Give an account of external factors affecting photosynthesis.
5. What is PEPA ? What is its role in biosynthetic phase ?
6. Why does the rate of photosynthesis decrease at high temperature ? Give reason 'chloroplast is said to be semi-autonomous cell organelle.'

5 Marks Questions

1. Mention the site of occurrence of the following events in sugarcane leaf.
   a) Regeneration of RUBP.
   b) RUBP + CO_2 $\rightarrow$ 3PGA.
   c) PEPA + CO_2 $\rightarrow$ OAA
   d) 4C acid formation
   e) 3C acid formation.
2. a) State the requirements of Chemiosmosis.
   b) Mention the features of bundle sheath cells associated with Kranz anatomy.
3. a) Mention the photosystems and other components involved in non cyclic photophosphorylation.
   b) Name the components involved in cyclic ETS.
   c) Which is the major limiting factor for photosynthesis ?
   d) Which abiotic factor affects the photosynthesis indirectly ?
   e) Who postulated chemiosmotic hypothesis ?
4. How are C_4 plants more efficient than C_3 plants ? Explain the fixation of CO_2 in C_4 plants.
5. a) Why photorespiration is not seen in C_4 plants ?
   b) Which is the most abundant enzyme in the world ?
   c) Explain the anatomical features found in the leaves of C_4 plants with diagram.
6. Why RuBisCo enzyme more appropriately called RuBP carboxylase - Oxygenase and what role does it play in photosynthesis ?
7. Which property of photosynthetic pigments is responsible for its ability to initiate the process of photosynthesis ?

   Why the rate of photosynthesis is higher in the red and blue regions of the spectrum of light ?

Chapter 7 : Respiration

1 Mark Questions

1. Name the openings in plants through which exchange of gases takes place ?
2. Write the overall reaction of respiration
3. Why does anaerobic respiration yields less energy than aerobic respiration
4. Name the first step in cellular respiration
5. What are end products of alcoholic fermentation
6. Pyruvic acid the key end product of glycolysis has many metabolic fates, what does it form under aerobic condition.
7. How many $NADH_2$ molecules are produced from one molecule of acetyl CoA in TCA cycle?
8. Mention the step of citric acid cycle which is not mediated by dehydrogenase enzyme.
9. What does glycolysis means ?
10. Why does Krebs cycle turn twice for every glucose molecule.
11. Why O_2 is an ultimate acceptor of electrons in ETS.
12. What is the name given to oxidation found in aerobic respiration occuring towards the end of catabolic process involving the passage of both electrons & protons of reduced coenzymes to oxygen.
13. What is oxidative phosphorylation ?
14. What is respiratory quotient when fats are used in respiration ?
15. Name site of oxidative phosphorylation.
16. What is an amphibolic pathway ?
17. Which substrate has respiratory quotient less than one.
18. Name the enzyme involved in oxidative decarboxylation reaction.
19. Where does the formation of acetyl co-A take place in cell ?
20. Which enzyme is required for synthesis of ATP ?
21. In what form the energy released by oxidation is stored in body ?
22. What does glycolysis literally means ?
23. What is phosphorylation ?
24. What is photophosphorylation ?
25. Name the substance or product common to both aerobic as well as anaerobic pathway ?

26. How much energy is released when one molecule of ATP is hydrolysed to ADP + Pi?
27. Give reason. Respiration is catabolic process.
28. Give chemical composition of ATP ?
29. What is the site of Krebs cycle in mitochondria ?
30. Where are F_1 particles located ?
31. What are cristae ?
32. Give structure of F_1 particles ?
33. Where does dehydration occur in glycolysis ?
34. What is EMP pathway ?
35. Define oxidative phosphorylation ?
36. Give chemical equations representing the conversion of pyruvic acid into end products of fermentation.
37. Give reason, Respiration helps in recycling of carbon ?
38. Why is the respiratory quotient in anaerobic respiration infinity ?
39. Name the different types of respiratory substrates ?
40. What does ETS stand for ? where is it found ?
41. What are alternative names for Krebs cycle ?
42. Where do most of the Krebs cycle enzymes occur in mitochondria ?
43. What is cytoplasmic respiration ?
44. Name the molecule which is terminal acceptor of electron ?
45. Name the enzyme which convert sugar into glucose and fructose ?
46. Define the term respiratory substrate ?
47. Name the first product formed in Krebs cycle ?
48. Which intermediate undergoes lysis in glycolysis ?
49. Write other two names of Krebs cycle ?
50. What is electron transport chain ?

2 Marks questions

1. What are respiratory substrates ? Name the most common respiratory substrate ?
2. Explain the term energy currency, which substance acts as energy currency in living cells ?
3. Write two energy yielding reactions of glycolysis ?
4. What are the main steps in aerobic respiration ? Where does it take place ?
5. What is meant by the statement 'aerobic respiration is more efficient' ?
6. Differentiate between EMP pathway & TCA Cycle ?
7. How does glycolysis take place in an anaerobic environment ?
8. Where is cytochrome C located ? What is its function ?
9. i) Where is the respiratory electron transport system located in a cell ?
   ii) What compound is the terminal electron acceptor in aerobic respiration ?
10. State the role of FAD in TCA cycle ?
11. Why most living cells cannot survive without O_2 ?
12. What happens to energy released in respiration ?
13. Name the various respiratory substrates ?
14. When does cell require energy ?
15. Enlist functions of mitochondria ?
16. With diagram describe structure of F_1 particles ?
17. What is respiration ? Give the general equations of aerobic and anaerobic respiration ?
18. Give connecting link between glycolysis and Krebs cycle ?
19. Why does anaerobic respiration produces less energy than aerobic respiration ?
20. Give an account of ATP generating steps during terminal oxidation ?
21. Explain. The fermentation can be aerobic or anaerobic process ?
22. Enlist significance of respiration ?
23. Give RQ for carbohydrates, fats and proteins ?
24. Give economic importance of fermentation ?
25. What is substrate level phosphorylation ? Where does it occur in Krebs cycle ?
26. Give balance sheet of ATP formed in aerobic respiration ?
27. Define respiratory quotient and explain why is it one in carbohydrates ?
28. How cellular respiration resembles combustion ?
29. What is glycolysis ? Where does it occur ?

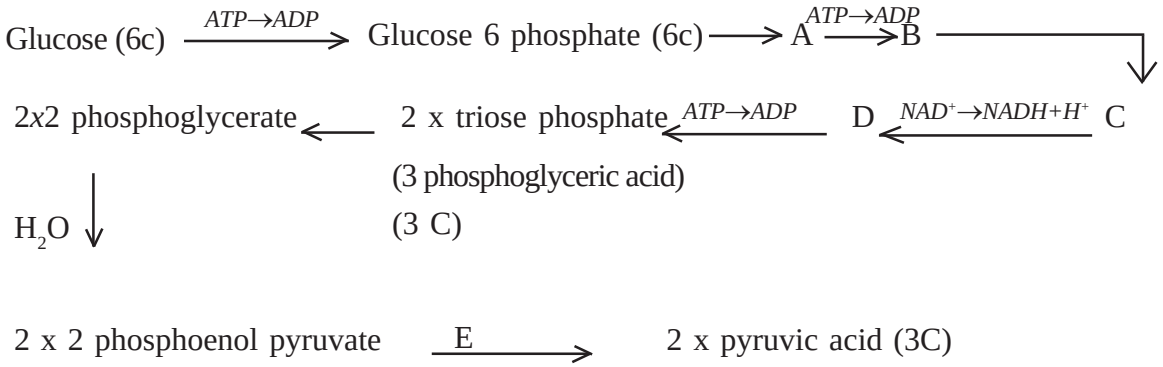
30. What are chemical changes taking place in a pyruvic acid molecule before it enters in mitochondria ?

31. Oxygen is an essential requirement for aerobic respiration but it enters the respiratory process at the end ? Discuss ?

32. Comment on the statement, 'respiration is an energy producing process but ATP is being used in some steps of the process'.

33. Why is respiratory pathway referred to as an amphibolic pathway ?

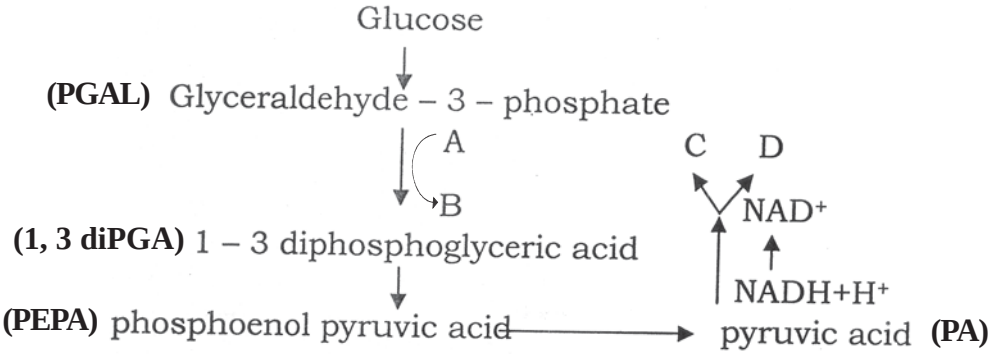
34. The figure given below shows the steps in glycolysis. Fill in the missing steps A, B, C, D and also indicate where ATP is being used up or released at step E.



3 Marks questions

1. What is the significance of stepwise release of energy in respiration ?
2. What are the two types of respiration. Differentiate between the two ?
3. Does pyruvic acide enter the Krebs cycle directly ? Explain.
4. Name the end product of aerobic and anaerobic fate of end products of glycolysis. List two steps in which molecule of ATP produced in glycolysis during aerobic respiration in a cell ?
5. Represent schematically the pathway of fermentation in which lactic acid is produced ?
6. Which pathway of respiration is common in all living organisms ? Where does it occur inside the cell ?
7. Define respiratory quotient ? What is its value for fats ?
8. Discuss, 'the respiratory pathway is an amphibolic pathway'.
9. Give steps during ATP synthesis ?
10. Give a brief account of structure of ATP molecule ?
11. Describe the ultra structure of mitochondria ?
12. Give schematic representation of Embden, Meyerhof and Parnas pathway?
13. Give schematic representation of Terminal oxidation and also its significance ?
14. Differentiate between glycolysis and Krebs cycle ?
15. Differentiate between Alcoholic and lactic acid fermentation ?
16. Give a brief account of ATP molecule and also explain its role in respiration ?
17. Give schematic representation of citric acid cycle ?
18. Give detailed account of lactic acid fermentation ?
19. Respiratory pathway is believed to be a catabolic pathway ? However nature of TCA cycle is amphibolic ? Explain ?
20. Describe mechanism of respiration ?
21. Give difference between aerobic and anaerobic respiration ?
22. Why ATP is known as energy currency of cell ?
23. Write the significance of citric acid cycle ?
24. Enlist the significance of Respiration.
25. How many ATP molecules are produced by complete aerobic and anaerobic respiration of one glucose molecule ?
26. Where does electron transport system operate in mitochondria ? Explain the system giving the role of oxygen ?

27. Study the following figure and write A, B, C and D steps in the pathway of anaerobic respiration in yeast ?



5 Marks questions

1 Give schematic representation of EMP pathway ?

2 Explain the major steps of Kreb's cycle, where does this process occur in a cell ?

3 Describe the output of TCA cycle in terms of its end products. Also discuss its importance in the metabolism of living cell.

4 Write explanatory notes on Glycolysis

5 Write all reactions of TCA cycle ?

6. Explain ETS with graphic representation.

7. Explain the process of fermentation by Yeast.

8. Give the diagrammatic representation of citric acid cycle or Krebs cycle ?

9. It is necessary to calcuate and study the respiratory balance sheet occuring during respiration, why ? What are the factors taken into account for this study ?

10. Discuss respiratory pathway is an amphibolic pathway. Give the processes involved when respiratory substrates are carbohydrates, fats and proteins.

11. Give an account of glycolysis. Where does it occur ? What are the end products ? Trace the fate of these products in both aerobic and anaerobic respiration ?

12. Oxygen is critical for aerobic respiration. Explain its role with respect to ETS ?

13. Describe various steps involved in glycolysis ?

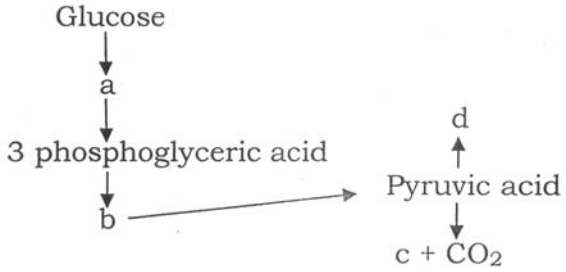
14. What is tricarboxylic acid cycle ? Discribe its different steps ?

15. Illustrate the mechanism of electron transport system ?

16. Illustrate mechanism of anaerobic respiration ?

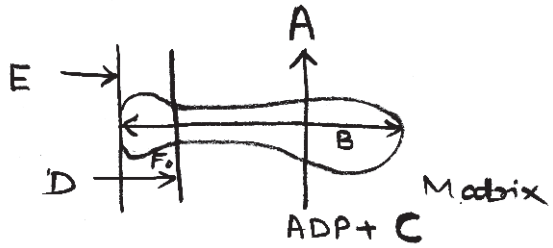
17. What is oxidative phosphorylation ? Name and describe the step where utilization of O_2 formation of H_2O and ATP takes place in aerobic respiration ?

18. In the following flow chart replace the symbols a, b, c and d with appropriate, intermediates. Briefly explain the process and give any two applications of it ?



19 Given below is a diagram showing ATP synthesis during aerobic respiration, replace the symbols A. B, C, D and E by appropriate terms as given below.

F_1 particle, addition of Pi, 2H+, inner mitochondrial membrane, ATP, ADP, F_1 particle, ADP, outerside



Chapter 8. Reproduction In Plants

1 Mark Questions

1 What is an'eye'of potato?

2. Define 'Apomixis'.

3. What are stem tubers?

4. What is the main significance of reproduction?

5. What are the two major modes of reproduction in plants?

6. What is 'Amphimixis'?

7. Asexual and sexual are the two methods of reproduction in plants. How does asexual reproduction occur in Angiosperms?

8. Lower organisms carry out asexual reproduction by many ways. Name any two methods with suitable example.

9. Lower organisms such as Yeast, *Chlamydomonas* carry out reproduction by asexual and sexual methods. Which is the more common method followed by them?

10. Sporulation is one of the methods of asexual reproduction during which spores like zoospores and conidia are produced. Write difference between zoospores and conidia?

11. In Angiosperms during vegetative reproduction propagules are produced. What are the characteristic features of propagules.

12. What are 'slips' produced by tuberous roots during vegetative reproduction?

13. The tuberous roots are produced singly or in bunches. How are they referred differently?

14. Sweet potato and Asparagus, both produce tuberous roots for vegetative propagation. How these roots differ from each other?

15. Sweet potato and *Albizzia*, both carry out vegetative propagation by roots. What is the difference in their methods of propagation?

16. How an 'eye' of potato helps in vegetative propagation?

17. State any two subaerial modifications for vegetative propagation.

18. What are the buds on *Kalanchoe* leaf are called? Write their significance.

2 Marks Questions

1. Name the cells of an egg apparatus and state their functions.
2. Write the wall layers of anther in correct sequence from outside inwards and name the layer having multinucleated cells.
3. If the chromosomal number in the nucleus of nucellus cells of an ovule is 24, then what will be the chromosomal number in the nuclei of an egg, secondary nucleus, synergid and antipodal cell of the same ovule?
4. Parthenocarpic fruits are without seeds. Give reason.
5. Explain the development of seeds without fertilization with suitable example.
6. After pollination, if the 2-celled pollen grain comes across dry stigma, then there will not be germination of pollen grain. Give reason.
7. Pollination between two plants can be self-pollination. Explain.
8. Self-pollination is the most economic method for the plant. Give reason.

3 Marks Questions

1. Name the different cells of the Embryo sac of Angiosperms and state their role.
2. Describe the three different ways by which the post fertilization product can develop after triple fusion.
3. If the sequence of the arrangement of wall layers of anther is reversed, then what will be the difficulties in the functioning of anther?
4. Are pollination and fertilization necessary in apomixis? Why?
5. Describe the two methods of dichogamy with suitable example.
6. Describe the features of exine and intine of pollen grain of Angiosperms. Write their significance.

5 Marks Questions

1. Give a brief account of natural vegetative propagation in Angiosperms.
2. Describe T.S. of anther.
3. Explain the process of megasporogenesis and development of embryo sac in Angiospermic ovule.
4. Describe structure of an Embryo Sac of an Angiospermic ovule and mention functions of different cells of it.
5. Describe the development of male gametophyte in Angiosperms.
6. Describe the process of double fertilization and give its significance.
7. How does the second fusion in the process of double fertilization takes place. Describe the different ways of development of the product of this fusion.
8. Describe development of dicotyledonous embryo.
9. Explain the merits and demerits of self and cross pollination.
10. Describe the structure of a mature anatropous ovule.
11. Give an account of different outbreeding devices.

Chapter 9 : Organisms and Environment I

1 Mark Questions

Answer in one sentence :

1. Name the two possible fates of carbon when a plant or animal dies.
2. Name the simplest of nutrient cycles operating in an ecosystem.
3. Phosphorous is always present as part of the organism, dissolved in water or in the form of rock but never goes to the atmosphere why ?
4. Why do we call the organisms of a first seral stage of ecological sucession as pioneers ?
5. What is climax community ?
6. Name the two patterns of ecological secessions according the amount of water available ?
7. Why do we use bio-pesticides and bio-fertilizers in organic farming ?
8. Name the pioneer species in a water body and on a bare rock ?
9. Why the pyramid of energy is always upright ?
10. Define ecological succession.
11. Name the conditions which inhibit decomposition.
12. What are 'guano deposits'?
13. What is meant by ozone hole ?
14. Name the treaty signed in 1987 to control emission of ozone depleting substances mainly CFC's.
15. What are natural ecosystems ?
16. Mention the significance of the concept of ecological niche.
17. What is bio-accumulation?

2 Marks Questions

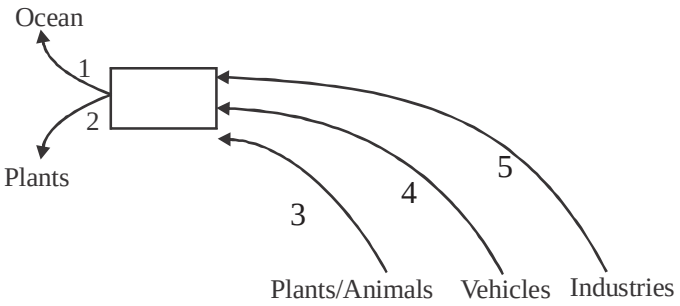
1. Enlist biotic and abiotic components of an ecosystem.
2. Name and define two recognized spatial Patterns of an ecosystem.
3. What is net productivity ? How is it expressed ?
4. Name any two factors each which accelerate and inhibit the decomposition of organic matter.
5. Arrange the following organisms to form an upright pyramid of numbers as well as energy ?
   grass, grasshoppers, frog, snake
6. Construct a food chain of the following organisms showing undirectional flow of energy.
   rabbits, hawk, cobra, grass
7. A volcano erupted in Hawaii and lava covered land for centuries. Eventually new lichens and then plants grew on the lava. Is this primary or secondary succession ? Justify your answer.
8. Match the following processes :

1.	Humification	a)	Precipitation of salts into soil
2.	Catabolism	b)	Formation of a dark coloured amorphous substance
3.	Leaching	c)	break down of organic matter into smaller particles.
		d)	Enzymatic degradation of detritus.

9. Enlist any four hazardous effects on the environment due to global warming ?
10. The sanitary land fills are inadequate in the metro cities. Give reasons.

3 Marks Questions

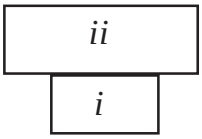
1. The following diagram shows a nutrient cycle.



   a) Name the element whose cycle is depicted.

   b) Name 1, 2, 3, 4, 5 as various processes involved in the cycle.

2. In the pyramid of biomass drawn below name (i) the producers and (ii) consumers. Which ecosystem does it represent ?



3. Explain how CFCs bring about ozone depletion in the stratosphere.
4. Enlist various causes of deforestation and important effects of deforestation on environment.
5. Give a graphic representation of phosphorous cycle.
6. Where do you find over abundance of phosphorous due to the usage of fertilizers ? How does it affect the ecosystem?
7. Explain the important steps in the decomposition of organic matter.
8. Write briefly on the components of ecosystem.
9. What are decomposers ? Explain important steps in decomposition.

Chapter 10 : Evolution

1 Mark Questions

1. The evolution of man has passed through monkey like to apelike forms to man . The evolution includes both physical and intellectual changes. Which stage in evolution is popularly termed as connecting link between ape and man because it had ape like body but man like brain.
2. Hugo de Vries was working with plant *O. lamarkiana*. He was responsible for proposing which theory of evolutionary processes ?
3. While touring Galapagos islands, Charles Darwin came across some birds which exhibited variation in beaks due to variation in feeding habits. Which birds were these ?
4. What are protoproteins ?
5. Urey and Miller's spark discharge apparatus was designed to provide experimental support for whose theory of evolution.
6. Modern man is placed in the order Primates of class Mammalia. Which family is he included in?
7. Which stage in human evolution lies between propliopithecus and Ramapithecus ?
8. Burial of dead with due rites is considerd to be important step in human evolution. Which human was first to perform these ceremonies ?
9. Which period is known for origin of amphibians ?
10. Rise of first primates was in which epoch ?

2 Marks Questions

1. Formation of protein molecules is considered as a landmark in the origin of life. Explain, in brief, how it happened.
2. What were the objections to Darwin's theory of natural selection ?
3. How gene flow differs from genetic drift ?
4. *Biston betularia* and *Biston carbonaria* population was known to show variation due to industrial revolution. Explain how natural selection was operative for this effect.
5. Give molecular evidences which support evolution.
6. Explain Hardy - Weinberg's principle.
7. Human evolution passed through four stages as Ape stage, Ape-man stage, Primitive men stage and modern man stage. Give name of one representative ancestor from each stage.
8. Which are the prominent differences between skull of ape and that of man.
9. Define analogous organs. Give any two examples.
10. Homologous organs have lot of significance in evolution. Give its definition and two examples.

3 Marks Questions

1. Describe, in brief, Oparin and Haldane theory of chemical evolution.
2. Give the main features of mutation theory propossed by Hugo de Vries.
3. Struggle for existance is one of the prime feature of Darwins' theory. Explain its different types.
4. Haldane described 'Hot dilute soup' in his theory. Describe how this soup led to formation of some important molecules.
5. Describe Urey - Miller's experiment.
6. Isolation is important for evolution. Describe how pre-zygotic mechanism operates.
7. How is it possible to establish phylogenetic relationship between ape and man?
8. What place Lemurs and Tarsiers hold in primate evolution?
9. What role is played by gene mutation, genetic recombination and chromosomal abberation in evolution?
10. How formation of ammonia, water and methane helped chemical evolution ?

Chapter 11. CHROMOSOMAL BASIS OF INHERITANCE

1 Mark Questions

1. What is heterogamesis?
2. What happens if the gene for production of factor VIII and IX becomes recessive ?
3. What is the number of linkage groups found in honey bee?
4. Name the term for genes located on non homologous region of Y chromosome.
5. Give the pair of sex chromosomes in male and female birds.
6. Which type of chromosomal disorder shows monosomy?
7. Give two examples of chromosomal disorders showing trisomy.
8. What is the cause of Thalassemia?
9. Define homologous chromosomes.
10 What is the term for presence of whole set of chromosomes?
11. Which part of sex chromosome does not show crossing over?
12. Give two examples of incomplete linkage.
13. What is the term for addition or deletion of one or two chromosomes in diploid chromosome number?
14. What is the cause of colour blindness?
15. What happens if the gene for formation of cones in retina becomes recessive?

FILL IN THE BLANKS (1 mark each)

1. In honey bees, females are ——— having ——— chromosomes and males are ——— having ——— chromosomes
2. The disorder Thalassemia is due to ——————— abnormality of haemoglobin.
3. The genes responsible for sex linked characters are located on———————
4. A human male has ——————— autosomes with ——— sex chromosomes.
5. Number of linkage groups in human is ——

   (diploid. haploid. 16, 32, sex chromosome, quantitative, 23,44,2)

2 MARKS QUESTIONS

1 Give different types of chromosomes.

2 Explain in brief, two types of sex linkages.

3 Explain the inheritance of colour blindness, if colour blind man marries a normal female.

4 Explain the pattern of inheritance of colour blindness, if carrier female marries a normal male

5 "X linked inheritance is criss -cross inheritance" Justify.

6 Differentiate between X and Y chromosome.

7 Differentiate between complete linkage and incomplete linkage.

8. "Possibility of female becoming a haemophilic is extremely rare" Justify.

9. Rakesh's parents have normal colour vision. But his maternal grandfather is colour blind. What is the possibility of Rakesh and his siblings becoming colour blind'?

10. Match the following :

	Column I		Column II
A	Turner's syndrome	i.	Holandric genes
B	Down's syndrome	ii.	AA+ XO
C	Y chromosome	iii	Quantitative abnormality of haemoglobin
D	Thalassemia	iv	Simian crease

11. Find the mismatched pair

a) Haemophilia — sex linked recessive

b) Down's syndrome — Trisomy 21

c) Klinefelter's syndrome —— monosomy of sex chromosome

d) Incomplete sex linkage —— Nephritis

12. Match the following

Column I		Column II	
A	Turner's syndrome	i	32
B	Down's syndrome	ii	46
C	Normal woman	iii	45
D	Queen bee	iv	47

13. Write note on Sex chromosome, crossing over, linkage, recombination

3 Marks Questions

1 Describe the structure of metaphasic chromosome.

2 Explain the mechanism of sex determination in human being. How does it differ from birds?

3 Explain chromosomal theory of inheritance.

4 What is criss-cross inheritance?

5 Describe the haplo diploid type of sex determination.

6 Sketch and label the structure of chromosome

7 "In man father is responsible for sex of the offspring" explain

8 Write a note on thalassemia.

9 What are the conclusions of Morgan's experiment on *Drosophila*?

10 Differentiate between Turner's syndrome and Klinefelter's syndrome.

11 Explain the inheritance of colour blindness.

12 Explain the inheritance of haemophilia.

13 Write short notes *on* Down's syndrome

Chapter 12 : Genetic Engineering and Genomics

2 Mark Questions

1) What is the probability of having similar sets of VNTRs in any two individuals?
2) Though we inherit parental genes, we differ a lot from our parents. Justify the statement in one sentence.
3) On which technique DNA fingerprinting is based?
4) Identify the word which is so called for the unique genetic make up of every individual.
5) Suggest the word when DNA sample is subjected to restriction endonuclease.
6) dsDNA is split into ssDNA by alkaline chemicals. Identify the steps involved in this technique.
7) Discuss in short the technique developed in India for DNA fingerprinting.
8) The total no. of genes present on the haploid set of chromosomes is called ____ .
9) Which new field was explored in biology by human genome project?
10) Interpret the use of Genetic linkage maps and Physical maps in Human Genome Project.
11) Identify the name and use of maps generated in Human Genome Project.
12) What is the impact of human genome project for human welfare.
13) Give any two examples of organism in HGP involved in mapping and sequencing genomes.
14) Explain in short the metabolic function of insulin in human body.
15) Formerly insulin was extracted and purified from pancreas of _____ and _____ animals.
16) "The development of vaccines to protect against disease is one of the hallmarks of modern medicine." Justify.
17) Give the use of taxoids in animal body.
18) Give uses of gene therapy.
19) Give any two examples of genes used in gene therapy.
20) Narne the technique used to develop a transgenic animal.
21) What is genomics?

2 Marks Questions

1) Give different applications of DNA fingerprinting.
2) How are DNA with variable length fragments formed in the process of DNA fingerprinting ? What is its significance ?
3) What are the applications of HGP ?
4) Explain the role of insulin in decreasing blood glucose level.
5) In which microorganism insulin producing gene is inserted ? What are the advantages of the same ?
6) Explain the role of toxoid and adjuvant during vaccine production.
7) Give four examples of genes used in gene therapy.
8) Give commercial benefits of transgenic animals.
9) Give scientific benefits of transgenic animals.
10) Mr. Raj is a villager. His father died in Gangotri yatra. To claim fathers insurance, Mr. Raj is in search of the concepts of DNA finger printing. Which major steps you will suggest ?
11) Explain genetic linkage map and physical map.
12) Transgenic animals are beneficial for man.
    Write in short any two examples of above.
13) State any four examples of genes involved in gene therapy.
14) i) What is vaccine ?
    ii) Who produced vaccine firstly ?
15) i) State the role of insulin.
    ii) Genetically engineered insulin can be prepared on large scale by using which organism ?
16) i) State the primary goal of human genome project ?
    ii) Enlist any three organisms used in study of human genome project ?

17) Name the following

i) Animal used by Dr. Lalji Singh to develop DNA finger printing technique.

ii) Appropriate transgenic animal

18) Expand the following :

i) RFLP

ii) TPA

iii) TGF-B

iv) HUMULIN

19) Draw a flow diagram showing summary of vaccine production.

Chapter No. 13: Human Health And Disease

2 Marks Questions

1} Typhoid is food and water borne disease. Comment.

2) Typhoid is food and water borne disease. Justify your answer.

?) Enlist any two major symptoms of typhoid.

4} Define the following terms health and disease.

5) Flying insect is the vector of typhoid. Justify.

6) What is immunity? Enlist it's types.

7) Enlist the barriers of non specific immunity.

8) Enlist the features of acquired immunity.

9) What are lymphocytes?

10) Define pathogen and parasite.

11) What is AIDS?

12) What is HA ART ?

13) Define antigen and antibody.

14) Innate immunity is called as non specific immunity. Comment.

15) How antibodies are transferred in natural acquired passive immunity?

16) What is artificial acquired passive immunity?

17) What is haematopoiesis?

18) Define pathogenesis?

19) What is HDN?

20) What is erythroblastosis foetalis ?

21) How is malaria transferred from person to person?

22) What is dermatophytosis?

23) Enlist the preventive measures of dermatophytosis

24) What is cancer?

25) What is melanoma? Give its symptoms.

26) What are the notable marks of oral cancer ?

27) How HIV is transmitted?

28) Name the causative agents of dermatophytosis.

29) Enlist the medicated preventive measures of AIDS?

30) Give the educational preventive measures of AIDS?

2 Marks Questions

1) As per your view which are the good preventive measures to prevent typhoid?

2) What is innate immunity? How it differs from acquired immunity ?

3) What is amoebiasis? Give it's causative agent and mode of transmission.

4) How is malaria transmitted?

5) Enlist any two groups of filariasis.

6) What is ascariasis? Give the preventive measures on it.

7) What is Pneumonia? Enlist the symptoms of pneumonia.

8} Vaccination is important for preventing pneumonia. Give reason.

9) Enlist the symptoms of common cold.

10) Comment on the non medicated prevention for common cold.

11) How dermatophytosis is prevented?

11) What is cancer? Add a note on metastasis.

12) How does carcinoma differ from sarcoma?

13) Differentiate between lymphoma & sarcoma.

14) Distinguish between carcinoma & lymphoma.

15) Enlist the characteristic features of adenoma.

16) Why malignant tumor is more dangerous than benign tumor?

17) Why prevention is better than cure for AIDs?

18) Give the importance of inborn immunity.

19) What are the characteristic features of acquired immunity?

20) What is vaccination? Which type of immunity is provided by vaccination?

21) What is the role of Rh factor in ABO blood group system?

22) What is AIDS? Where HIV is found?

23) How HIV infection is not spread by?

24) Enlist various modes of transmission of HIV.

25) Why prevention is better than cure for AIDS?

26) How HAART is effective in the treatment of AIDS?

27) What are the primary / common symptoms of AIDS?

28) What are the characteristics of adolescence?

29) Common cold is the most frequent infectious disease in humans. Justify the statement.

30) HIV is a contagious disease. Justify.

31) Define Health and Disease.

32) What is immunity? Mention two types of immunity.

33) Explain in brief barriers of innate immunity.

34) Explain unique features of acquired immunity,

35) What is acquired immunity? Mention it's type.

36) Explain in brief the action of T lymphocytes to antigens.

37) Draw neat labelled diagram of an 'Antibody'.

38) Explain any two defensive mechanisms of innate immunity.

39) Give the modes of transmission & preventive measures of Malaria.

40) Enlist the symptoms of following diseases.

    a) Ascariasis

    b) Typhoid

41) Name any four broad groups of cancer.

42) Sketch & label structure of HIV.

43) What is adolescence?

44) Write a note on drugs having effect on cardio-vascular system.

45) Explain the way to increase the immunity after birth.

46) Define the following terms

    1) Adenoma

    2) Carcinoma

Chapter 14 : Animal Husbandry

1 Mark Questions - Answer in One Sentence

1. What is the aim of farm management ?
2. Enlist exotic breeds used for dairy farms ?
3. Name Indian cow breeds.
4. Enlist Indian breeds of buffaloes.
5. Enlist the components of silage.
6. What is the supplementary food for silage ?
7. Enlist various milk products.
8. What are layer chicken ?
9. What are Broilers ?
10. Name any one viral diseases of poultry.
11. Name any one bacterial diseases of poultry.
12. Enlist fungal diseases of poultry.
13. Enlist parasitic diseases of poultry.
14. Define the term 'Breed'.
15. What is inbreeding ?
16. What is outbreeding ?
17. Give the demerits of inbreeding.
18. Enlist products of Apiculture.
19. Name the suitable domesticated bee species for rearing.
20. Define fishery.
21. Enlist fresh water fishes.
22. Define sericulture.
23. Which is the best silk ?
24. Name the silk of inferior quality.
25. Give scientific name of silk moth.
26. Give scientific name of lac culture.
27. Enlist different poultry breeds.

2 Marks Questions

1. Enlist different products obtained from cattle farms.
2. Enlist supplementary food products for silage,
3. Which bird species are included in poultry ?
4. Enlist the principles of farm management.
5. Name different allied professions of poultry management.
6. What precautions should be taken during poultry farming ?
7. Match the pairs :

Causative agent	**Disease**
Bacteria	Pullorum
Virus	Round worm
Fungus	Bronchitis
Parasite	Thrush

8. Write a note on inbredding.
9. Write a note on outbreeding.
10. Write a note on crossbreeding.
11. Write a note on interspecific hybridization.
12. Describe artificial insemination technique.
13. Write a note on Multiple Oulation Embryo Transfer (MOET)
14. Enlist products of Apiculture.
15. Give the uses of honey.
16. Name four species of honey bees commonly found in India.
17. Match the pairs :

Scientific Name	Common Name
Apis dorsata	Little bee
Apis florea	Indian bee
Apis mellifera	Rock bee
Apis indica	Europena bee

18. Enlist the equipments required for bee keeping.
19. Write a note on bee keeping.
20. Enlist the plants preferable for bee keeping.

21. Name any two fresh water fishes.

22. Give the names of marine fishes.

23. Match the pairs :

Fish common name	Scientific name
Bombay duck	*Stromateus*
Sardine	*Rastrelliger*
Mackerel	*Herpedon*
Pomphret	*Sardinella*

24. Write a note on maintenance of fish farm.

25. Give economic importance of apiculture.

26. Give economic importance of fishery.

27. Write a note on life cycle of silk moth with diagrammatic representation.

28. With the help of diagrammatic representation, describe life cycle of lac insect.

29. Name the plants on which lac insect feeds ?

30. Give economic importance of lac culture.

Chapter 15 : Circulation

1 Mark Questions

Answer in one sentence :

Define : Haematology, erythropoiesis, polycythemia, erythrocytopenia, diapedesis, Leucopoiesis, leucocytosis, leucopenia, leukemia, thrombopoiesis, thrombocytosis, thrombocytopenia, blood coagulation, pericardium, pace maker, cardiac cycle, sinus arrhythmias, angiology, double circulation, heart beat, heart rate, stroke volume, cardiac output, pulse, Atherosclerosis, Lymph, Trachycardia, Bradycardia.

1. Name the cells which produce thrombocytes.
2. Why does left ventricle possess thicker wall than the right ventricle ?
3. Which structure in heart is called pace maker ?
4. Give importance / functions of
   a) Erythrocytes, f) Pericardial fluid
   b) Pericardium, g) Thrombocytes
   c) Valves in heart h) Coagulation of blood
   d) Chordae tendinae i) Lymph
   e) Lymphatic system
5. Why pulse rate is higher in children than adults ?
6. Pulse rate increases during exercise. Why ?
7. Raju was suffering from following symptoms; heaviness in the chest, severe pains in chest, also in the region of neck, lower jaw, left arm and left shoulder. What does this indicate ?
8. What is the normal clotting time ?

2 Marks Questions

1. Write short notes on -

   Plasma, erythrocytes, platelets, Lymphocytes, monocytes, Blood coagulation, pericardium, Heart wall, pulse, hypertension, coronary artery diseases, Angina pectoris, Heart failure.

2. Distinguish between

i) Atrium and ventricle

ii) T.S. of artery and T.S. of vein

iii) Artery and vein

iv) S.A. Node and A. V. Node

v) Eosinophils and Basophils

vi) Neutrophils and Eosinophils

vii) Lymphocytes and monocytes

viii) Systolic blood circulation and diastolic blood circulation

ix) Hypertension and hypotension

x) Pulmonary circulation and systemic circulation

xi) Granulocytes and agranulocytes

xii) R.B.C. and W.B.C.

xiii) Atrio ventricular valves and semilunar valves.

3. Give Reasons (2 Marks Each)

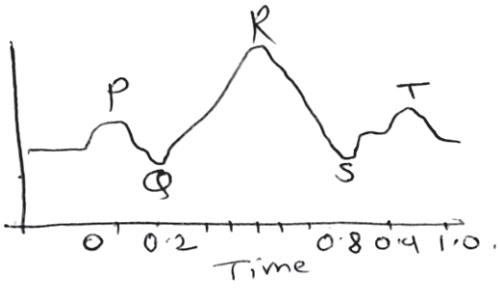
1. Human heart is myogenic
2. Pericardium acts as a defence wall for the heart
3. Human beings exhibit double circulation
4. Valves are present in veins.
5. Atria are thin walled than ventricles.
6. In normal human heart, there is no mixing of oxygenated and deoxygenated blood.
7. S-A node is called pace maker.
8. Blood pressure is inversely related to the elasticity of the blood vessels.
9. In human heart, the blood flows only in one direction.
10. Raju met with an accidant. His friend took him to hospital. Doctor preferred intravenous injection of medicine and saline for treatment.
11. Most of the medicines / saline are administered through veins than anteries.

3 Marks Questions

1. Give an account of granulocytes.
2. Describe various valves in the human heart.
3. Write a note on ECG.
4. Explain double circulation in human heart.
5. Explain the mechanism / process of co-agulation of blood.
6. With the help of labelled diagram, describe T.S. of artery / T.S. of vein.
7. With the help of neat labelled diagram, describe ventral view / dorsal view of human heart.
8. Define cardiac cycle. Describe various events of cardiac cycle.
9. Enlist various functions of blood.
10. Describe significance of ECG.
11. Distinguish between artery and vein.
12. Write a note on blood pressure.

5 Marks Questions

1. With the help of neat, labelled diagram, explain conducting system of human heart.
2. With the help of neat, labelled diagram, describe internal structure of human heart.
3. With the help of neat, labelled diagram describe ECG. Add a note on it's significance.
4. Give an account of Lymphatic system.
5. Give an account of polymorphism in leucocytes.
6. Give an account of histology of artery and vein.
7. Define double circulation. Describe it.
8. a. Is this ECG of normal healthy person ?
   b. Which electrical activity does QRS wave represent ?
   c. From which part of the heart QRS signal initiates ?
   d. Describe structure of the same.
   e. Give the significance.



9. Match the pairs :

Location	**Valve**
Opening of coronrary sinus	Tricuspid valve
Base of pulmonary aorta	Bicuspid valve
Opening of inferior vena cava	Semilunar valve
Between left atrium and L.V.	Thebesian valve
Between right atrium and R.V.	Eustachian valve

10. a. Which of the following is agranulocyte ?

a b c d

b. Describe it's origin and structure

c. Mention its types.

d. Explain its function.

Chapter 16 : Excretion and Osmoregulation

One Mark Question

1. Where is urea formed in human body ?
2. What is uremia ?
3. Name two hormones produced by kidney.
4. Give two examples of guanotelic animals.
5. Name the bile pigments.
6. Name smooth muscles of urinary bladder.
7. What is GFR ?

2 Marks Questions

1. Sketch and label the Malpighian body.
2. Write a note on kidney transplantation.
3. What is dialysis ?
4. Write a note on ammonotelism.
5. Write a note on blood clotting.
6. Write a note on kidney failure.
7. What is diabetes mellitus ? How does kidney control the level of glucose in blood ?
8. Kidneys play a major role as an excretory organ and help in elimination of nitrogenous waste in the form of urine. Which other two important functions are performed by kidneys ?
9. Kidneys produce about 180 liters of filtrate per day, but the actual urine production is about 1.2 to 1.5 liters per day. How this reduction takes place ?
10. Kidney diseases or kidney failure has a side effect. These patients also show decreased RBC production. Why ?

3 Marks Questions

1. Describe the role of kidney in regulation of blood pressure
2. What is EFP ? Explain its role.
3. Explain the mode of excretion found in mammals and birds.
4. Sketch and label the V.S. of Kidney.
5. Write a note on mechanism of urine formation.
6. Sketch and label the nephron.
7. How kidney functions are regulated ?

Chapter No. 17 : Control & Co-ordination

1 Mark Questions

1) Name the fluid which prevents the brain cells from desiccation.
2) Pia mater is nutritive in function. Give reason.
3) Autonomic Nervous System is semi-independent in function. Justify.
4) a) In which age the brain develops to it's full size?
   b) How many neurons are found in brain during that age?
5) Which part of the brain is called Telencephalon?
6) 'The increase in gyri & sulci in cerebrum increases the intelligence in human'. Justify the statement.
7) Both cerebral hemispheres are interconnected by corpus callosum. Why?
8) Cerebral cortex and cerebral medulla are the parts of cerebrum. Name the cells which helps in conduction of impulses through these parts.
9) Which effect is observed due the small size of olfactory lobes?
10) Enlist the areas located on temporal lobe of cerebral hemisphere.
11) Name the part of the brain completely covered by cerebral hemispheres.
12) Serotonin is a hormone involved in metabolic activities of human body. Which part of brain helps in the secretion of it ?
13) A blind person moves his head towards right side due to sound created by a koel. Name the stimulus involved in this movement.
14) Give the function of arbor vitae.
15) Injury to medulla oblongata causes sudden death. Justify.
16) Give the function of ascending tract found in spinal cord.
17) In an accident ascending tracts of spinal cord of a person was damaged. Which activity will be hampered ?
18) Name the cranial nerve involved in rotation of eye ball.
19) Enlist the cranial nerves involved in the functioning of tongue.
20) Vagus nerve is mixed nerve. Justify.
21) Which part of the axon is electronegative during rest?
22) A child is a expert in swimmer. Which type of reflex plays role in this act ?

2 Mark Questions

1) How do living organisms show response to stimuli?
2) a) Define meninges.
   b) Enlist parts of meninges of human brain.
3) Give the functions of Diencephalon.
4) Explain in short the mechanism of reflex action.
5) a) Sketch L. S. of human brain.
   b) Label corpus callosum and arbor vitae.
6) a) Sketch T. S. of spinal cord.
   b) Label any three parts.
7) a) Sketch ultra structure of synapse.
   b) Label synaptic vesicle and receptor.
8) a) Sketch lateral view of human brain.
   b) Label any three major parts.
9) a) Sketch simple reflex arc.
   b) Label receptor organ, sensory neuron and effector organ.
10) Explain in short the human spinal cord as appears externally.
11) Enlist the functions of cerebellum.
11) Enlist the functions of medulla oblongata.
12) Enlist the functions of Hypothalamus.
13) Hypothalamus is the coordinator between nervous system and endocrine system. Comment.
14) Enlist the any four functional areas of cerebral cortex.
15) Enlist the name and type of any four cranial nerves.
16) Describe in brief Autonomic Nervous System.
17) Distinguish between conditional and unconditional reflexes.
18) Which functional similarity is found in meninges and ventricles of brain?

3 Marks Questions

1) a) Which is the largest part of fore brain?

   b) Enlist the functions of Diencephalon.

2) a) Define reflex action.

   b) How simple reflex arc is formed?

3) a) What is synaptic cleft ?

   b) How neurotransmitters are involved in the transmission of impulses ?

4) Explain the transmission of impulse through synapse.

5) Explain the excitation and conduction of nerve impulse through neuron.

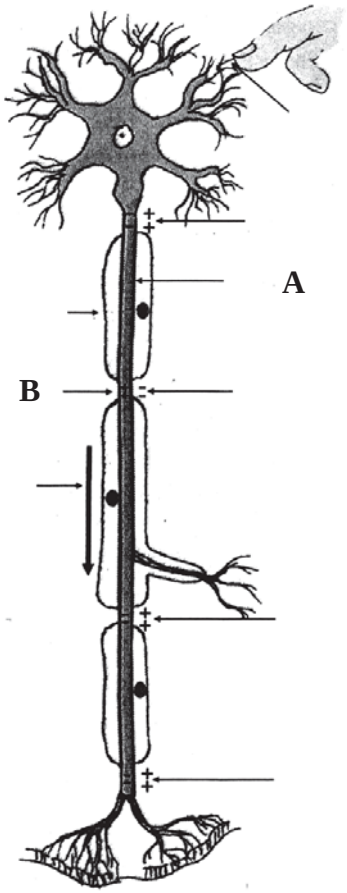
6) With the help of neat & labelled diagram explain the ultra structure of Synapse.

7) Hormonal system is different from nervous system. Justify.

8) Give three ways in which nervous system is different from hormonal system.

9) Name the three parts of the hind brain. Mention their functions.

10) The diagram given alongside shows conduction of nerve impulse.



   a) Name 'A' and 'B'.

   b) Write the function of 'A'.

11) a) Name the sulcus which separates the following parts of cerebral hemisphere.

i) Frontal and parietal lobe

ii) Parietal and occipital lobe

b) Which part of neuron is present in cerebral cortex and cerebral medulla?

c) Name the area which controls voluntary activities of body.

12) a) Which choroid plexus is located in diencephalon of brain?

b) Enlist any two parts and functions of diencephalon.

13) a) Enlist the name and functions of two lobes of corpora quadrigemina.

b) Give the functions of crura cerebri of mesencephalon.

14) Write in short on :

i) Pons Varolii

ii) Medulla oblongata

15) a) Draw T.S. of spinal cord.

b) Label any four parts of it.

c) Which cells line the central canal?

16) a) As per origin, enlist any four names and no. of pairs of spinal nerves.

b) Which part of the body is innervated by ramus dorsalis and ramus ventralis.

17) a) Draw diagram of formation of typical spinal nerve.

b) Label dorsal root ganglion and ramus communicans.

c) Explain the formation of typical spinal nerve.

5 Marks Questions

1) a) Enlist the different parts of the human brain.

b) Sketch and label cerebellum,

c) Explain in detail the structure of cerebellum with its functions.

2) a) Define reflex action.

b) Complete the table given below by putting a tick (✓) in the boxes where applicable.

Sr. No.	Action	Reflex	Voluntary
1	Touching a hot object		
2	Releasing saliva on smelling food		
3	Applying a car's brakes in an emergency		
4	Blinking of eyes when a small insect touches the eye		

c) Explain the mechanism of reflex action.

3) a) Complete the following table

Sr.No.	Name	Type of nerve	Function
1	Optic nerve		
2	Facial		
3	Hypoglossal		
4	Trigeminal		
5	Auditory		
6	Glossopharyngeal		

b) Name any two spinal nerves and give their region of origin from vertebral column.

c) What is synaptic cleft ?

4) a) Explain in detail the major part of forebrain with functions.

b) Sketch lateral view of human fore brain.

c) Label any four areas.

5) a) Name the three parts of hind brain.

b) Explain in detail the second largest part of hind brain with its functions.

c) Sketch L. S. of brain and label the parts of hind brain.

6) a) Name the parts of mid brain.

b) Explain in detail the parts with their functions.

c) Give the functions of spinal cord and CSF.

Chapter 17. (Continued...)

1 Mark Questions

Fill in the blanks

1. Calcitonin is secreted by ————
2. Calorigenic effect is due to ———— hormone
3. Amino acid ———— is required for synthesis of thyroxine
4. Hyposecretion of corticosteroids causes ———— disease
5. ——— and ———— hormones regulate gene expression
6. —— and ——— receptors of vestibular apperatus are responsible for maintenance of body posture.

   (crista, macula, thyroid, steroid, Addison's, tyrosine, parafollicular cells)

Answer in one sentence

1. Enlist different endocrine glands of human body.
2. Enlist different hormones secreted by adenohypophysis.
3. Name the disorder/s caused due to hyposecretion of thyroid gland.
4. Name the disorder/s caused due to hyposecretion of adrenal gland.
5. Name the disorder/s caused due to hypersecretion of thyroid gland.
6. Name the disorder/s caused due to hypersecretion of adrenal gland.
7. Name the hormones released from neurohypophysis.
8. Which hormone is secreted by heart when blood pressure increases?
9. Name different regions of Adrenal cortex
10. Name two hormones secreted by Adrenal medulla
11. Name different peptide hormones of gastrointestinal tract
12. Which hormone stimulates erythropoiesis ?
13. Which part of adrenal gland secretes androgen hormone?
14. Which cells of pancreas secrete hormones?
15. Give names of hormones secreted by pancreas.
16. Name the cells which secrete testosterone.

2 Marks Questions

1. Which cells secrete hormones of pancreas? Give names of hormones
2. Give names and role of hormones of gastrointestinal tract.
3. Explain the role of Testosterone.
4. What is the role of thymosin ?
5. What is sella turcica ?
6. What is the role of oxytocin?
7. Differentiate between blind spot and bright spot
8. "Blind spot of the eye is devoid of the ability of vision". Give reason
9. Differentiate between dwarfism and cretinism
10. Match the following

Column I	Column II
A Glucagon	i Adrenaline
B Neurohypophysis	ii Acromegaly
C Somatotropins	iii ADH
D Hypertension	iv Islets of Langerhans

11. From which chemical compounds are all steroid hormones derived? Mention at least two steroid hormones.
12. Distinguish between diabetes mellitus and diabetes insipidus

3 Marks Questions

1. Explain the role of hormone secreted by parathyroid gland
2. Give different properties of hormones
3. Give disorders of thyroid gland secretions
4. Explain the mechanism of hormone action
5. "Hypothalamus controls the functioning of pituitary". Justify.
6. Explain the role of hormones secreted by thyroid gland
7. Distinguish between rods and cones.
8. Name the hormone which performs following functions
   - i) Inhibition of growth hormone secretion
   - ii) Decrease in blood calcium level
   - iii) Secondary sexual characters in male
   - iv) Increase in blood sugar level
   - v) Maintenance of pregnancy
   - vi) Spermatogenesis in male

5 Marks Questions

1. Describe the role of hormones produced by adenohypophysis.
2. Describe role of different gonadotropins secreted by pituitary and sex organs.
3. Explain the anatomy and working of human eye.
4. Explain the anatomy and working of human ear.

Chapter 18 : Human Reproduction

1 Mark Questions

1) Which cell aggregate during gemmule formation in spongilla ?
2) What is agamogenesis ?
3) What is cryptorchidism ?
4) Which gland secrete fluid with fructose ?
5) Write the names of different parts of Fallopian tube ?
6) Which skeletal disorder is seen during menopause ?
7) Write the function of acrosome in human sperm.
8) Why human egg is microlecithal ?
9) What is the site of fertilization in human ?
10) State the function of Zona Pellucida
11) Give the significance of implantation.
12) Which extra embryonic membrane is involved in formation of placenta ?
13) What are fraternal twins ?
14) When one can call embryo as foetus ?
15) When cesarean section /process is essential ?
16) Expand RCH
17) Which is the causative organism of Gonorrhoea ?
18) Mention the names of any two IUCD ?
19) A person is suffering from fever, inflamed joints, loss of hairs. Also shows rash any where on body. What may be name of disease ?
20) A woman noticed defect in foetus at 2nd month of pregnancy. What will be proper advice after medical check up.
22) Give full form of IVF.
23) The entrance to oviduct of a lady is blocked she wants child. Which method will help her ?
24) How many primary spermatocytes and oocytes are required for formation of 100 spermatozoa and ova ?
25) What is the role of birth control pills ?
26) What is mesovarium ?

27) Which hormonal secretion is inhibited by birth control pills ?

28) Name, the germ layer which gives rise to heart and blood vessels.

29) Note the relationship between 1st two words and suggest suitable term.
Ovary : mesovarium, uterus :

30) Differentiate between Vasa efferentia and vasa deferentia.

31) What will happen if Zona Pellucida gets damaged accidently ?

2 Marks Questions

1) What is reproduction ? Name the mode of asexual reproduction in sycon, and planaria.

2) Differentiate between asexual and sexual reproduction.

3) "Testes are extra abdominal in position". Give reason. What will happen if testis fail to descend from abdomen ?

4) a) Sketch human sperm and label the following parts.
a) Acrosome b) Nucleus c) Centriole d) Mitochondria

OR

b) Draw a neat labelled diagram of parts of head region only of a human sperm.

5) Write the function of seminal vesicle and also mention the role of prostate gland.

6) List the different parts of human oviduct through which the ovum travels till it meets the sperm for fertilization and then carried to uterus.

7) What are the differences beteween menarch and menopause ?

8) What is ovulation ? What happens to Graafian follicle after ovulation ?

9) Why proliferative phase is called follicular phase ?

10) In which organ are Leydig cells and Sertoli cells located ? State their functions.

11) What is implantation ? Name the site of implantation.

12) What is cleavage ? Mention its characteristics.

13) Mention the number of cells in following stages and time after fertilization.

Embryonic State		No. of cells	Time after Fertilization
i)	1st clevage	-	-
ii)	3rd cleavage	-	-
iii)	Morula	-	-
iv)	Blastocyst	-	-

14) What is gastrulation ? Enlist organs derived from endoderm ?

15) Sketch and label structure of human unfertilized ovum.

16) Name the stage of human embryo that gets implanted in the uterus. Describe different cells in it and name the cavity found in it.

17) Name an oral pill used as a contraceptive by human female ? Explain how does it prevent pregnancy ?

18) What is RCH program ? What are their goals ?

19) What are the chemical means of birth control ? How do they work ?

20) A childless couple has agreed for test tube baby program. Explain the procedure of IVF and ZIFT.

21) Write in brief about types of mechanical contraceptives. Mention side effects of Birth control pills.

3 Marks Questions

1) What are the different modes of asexual reproduction studied by you.

2) Enlist the glands associated with male reproductive system and mention their role.

3) Sketch and label female reproductive system in human.

4) Explain the events in a normal woman during her menstrual cycle on the following days.
   - i) Ovarian event from 13-15 days.
   - ii) Ovarian hormones level from 16 to23 days.
   - iii) Uterine events from 24 to 29 days.

5) Give schematic representation of spermatogenesis.

6) Explain the development of on ovum from an oogonium in a human female.

7) Describe the process of parturation in human.

8) i) What is artificial insemination ?
   ii) Write an account on semen

9) Name and describe a technique by which genetic disorder in the developing foetus can be detected ?

10) What are changes observed in developing embryo during three trimesters of pregnancy ?

11) Name the surgical method advised to male and females as means of birth control. Mention it's disadvantage.

12) How syphillis differs from Gonorrhea with respect to causative agent and symptoms ?

13) Enlist the methods of temporary and permanent birth control.

14) Which is the method of temporary birth control that reduces the chances of pregnancy by 80%. Write the fact on which this method is based.

15) i) Which is the name given to human placenta ? Why ?

ii) State the importance of placenta.

16) A seminar on Reproductive health is arranged in your college. What important points should be mentioned in it ?

17) What is parturation ? In brief explain the events in parturation.

5 Marks Questions

1) Sketch Human male reproductive system.

Label the following parts :

1) Gubernaculum
2) Epididymis
3) Vas deferens
4) Glans

Write the role of components in fluid secreted by seminal vesicles.

2) a) Draw diagram of female reproductive system of human Label the following parts.

1) Site of secondary oocyte development.
2) Structures help in collection of ovum.
3) Site of fertilization.
4) Site where implanlation of embryo occures.

b) Name the hormones secreted by ovary. Also state their functions.

3) a) Describe the changes seen in cortex part of human ovary with suitable diagram.

b) Mention the role of hormones secreted by corpus luteum.

4) Schematically represent similarities and differences between spermatogenesis and oogenesis.

5) 1) Give schematic representation of spermatogenesis in human.

2) Mention stages in spermatogenesis where haploid / n-number of chromosomes are observed.

3) Write the name of organ where spermatogenesis is completed ?

6) Sketch and label T.S. of testis

Write the role of Sertoli cells and cells of Leydig. What is rete testis.

7) Explain the ovarian and uterine changes during various phases of menstrual cycle.
Also mention the role of pituitary and ovarian hormones.

8) a) Where does fertilization occur in human ?
b) Explain the events during fertilization with suitable diagram.

9) Explain the different stages of Oogenesis in human starting from foetal life till it's completion.
When and where the process of Oogenesis get completed in human body ?

10) Write the names of hormones and their role involved at each stage given below :

Ovulation
↓
Pregnancy
↓
Foetal growth
↓
Parturation
↓
Lactation

11) With the help of suitable diagram mention the changes occuring in zygote up to blastocyst formation.

12) What is implantation ? when it occurs ?
i) Give it's significance.
ii) What is placenta ? Mention it's role.

13) Suggest various contraceptive to space children for a couple from rural area.'
Also explain drawbacks.

14) The veneral diseases constitute a major problem in India ?
Mention the names of veneral diseases studied by you.
Write causative agent. Mode of transmission, signs symptoms and prevention.

15) i) Explain the process of GIFT.
ii) What is the significance of MTP
iii) 'MTP has important role in controlling population' How ?
iv) What is test tube baby ?

16) How are ZIFT and GIFT different from intra uterine transfer ? Explain.
What is amniocentesis ?

Chapter 19 : Organism and Environment II

1 Mark Questions

1) Koel lays egg in nest of crow.
   Name the type of interaction
2) Give the advantages of unleaded petrol in automobile as fuel.
3) Suggest any two ways to reduce vehicular pollution.
4) What will happen if predator population becomes more efficient ?
5) State the interaction in two leopard running to catch a deer as their food.
6) What is demography ?
7) Introduction of an exotic breed destroyed a lawn.
   What may be the name of possible species ?
8) What is the effect of tobacco smoke on respiratory tubules in man ?
9) State the cause of Minamata disease.
10) What is the role of NEERI ?
11) In a village youngsters have migrated to city for job.
    Majority of people are more than 55 year old.
    What is the type of population.

2 Marks Questions

1) Sujeet and Suraj are in search of a car for company.
   Sujeet insisted on buying a CNG car with a better milage. But Suraj insisted on buying a diesel car of a high version with better music system and AC but low milage.
   State the reason to convince Suraj about his opinion as a responsible person.
2) Expand IUCN. Mention its role.
3) Need to conserve biodiversity is necessary for mankind. Give reason.
4) *In situ* conservation can help endangered species. Justify the statement.
5) State the function of a catalytic converter in automobile.
6) How will you differentiate interactions between Lichen and Barnacles on the back of whale ?
7) Many people died in Bhopal Gas tragedy in year 1984. State the reason and its after effects.

8) Which are the four catagories of species classified by IUCN ?

9) How Lead and Arsenic affects human health ?

10) What are physicochemical techniques for removal of radiobiological pollutants from water ? Which will be useful to desalinate brackish water ?

3 Marks Questions

1) As an individual, explain any three control measures to reduce air pollution.

2) Cockroach can run with better speed in kitchen.
   - i) What special structure it is having ?
   - ii) What type of adaptation it is ?

3) Explain the concept of
   - i) Growing population
   - ii) Declining population
   - iii) Steady population

4) There is a need for conservation of bio diversity. What are it's major aims.

5) Differentiate between Natility and mortality.

6) Expand the following :
   - i) IUCN
   - ii) NEERI
   - iii) WHO

7) Sketch the situation showing -
   - a) Growing population
   - b) Steady population
   - c) Declining population

8) With the help of suitable example, explain the following interaction in brief.
   a) Competition b) Mutualism c) Predation

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