

SUBJECT : BIOLOGY

UNIT I: REPRODUCTION

Chapter : 1 (REPRODUCTION IN ORGANISMS)

Previous Years' Question (Reproduction in Organisms)

VSA-I

- Q1 Banana is a true fruit and also a parthenocarpic fruit. Justify. 1
- Q2 Pick out the ancestral line of Angiosperms from the list given below : 1
Conifers, seed ferns, cycads, ferns.
- Q3 The turkey usually produces females for several generations. How is this possible? 1
- Q4 In the whiptail lizards only female are born generation after generations. There are no males. How is this possible ? 1
- Q5 Name the part of flower that contributes to fruit formation in strawberry and guava Respectively. 1

SA-I

- Q6 Mention the site where syngamy occurs in amphibians and reptiles respectively. 2
- Q7 Offspring derived by asexual reproduction are called clones. Justify giving two reasons. 2
- Q8 Name the phase all organism have to pass through before they can reproduce sexually. 2
- Q9 Mention the role of cyanobacteria as a biofertiliser. 2
- Q10 Why 'water hyacinth' plant is called "Terror of Bengal" ? 2
- Q11 Mention unique flowering phenomenon exhibited by Strobilanthus Kunthiana. 2
- Q12 Banana is a parthenocarpic fruit where as oranges show polyembryony. How are they different from each other with respect to seeds ? 2
- Q13 Why is banana considered a good example of parthenocarpy ? 2
- Q14 Cucurbits and papaya plants bear staminate and pistillate flower? Mention the categories they are put under separately on the basis of the type of flowers they bear. 2
- Q15 How does the pollen grains of vallisneria protect themselves. 2
- Q16 Mention the unique feature with respect to flowering and fruiting in bamboo species. 2
- Q17 Name the vegetative propagules in the following : 2
(a) Agave
(b) Brophyllum.....
- Q18 Give an example of an organism that enters 'diapause' and why ? 2
- Q19 How do snails, seeds, bears, zooplanktons, fungi and bacteria adapt to condition unfavourable for their survival ? 2
- Q20 How many chromosomes do drones of honeybee possess ? Name the type of cell division involved in the production of sperm by them. 2
- Q21 Why do a moss plants produce very large number of male gametes ? Provide one reason. What are these gamaetes called ? 2

Higher Order Thinking Questions

- Q1 Name the organism w.r.t. to their diverse sexuality. 5
- 1 Bisexual animal
 - 2 Unisexual animal
 - 3 Monoecious plant
 - 4 Dioecious plant
 - 5 Bisexual flower
- Q2 Draw the life cycle of the following organisms: 5
- i) Marchantia ii) Pisum sativum
- Q3 Give the site of following events w.r.t. to sexual reproduction in plants. 2
- 1 Pollen formation
 - 2 Pollen reception
 - 3 Syngamy
 - 4 Zygote development
- Q4 Give example of following :- 5
- (i) Reproduction through conidia
 - (ii) Reproduction through buds
 - (iii) Reproduction through gametes
 - (iv) Reproduction through leaves
 - (v) Reproduction through rhizome
- Q5 Complete the following :- 5
- (i) Before reproduction phase
 - (ii) Non-primates have cyclic reproductive changes as
 - (iii) Primates have cyclic reproductive changes as
 - (iv) Two pre-fertilization events are
 - (v) Heterothallic and dioecious describe the

Value Based Question

- Q1 Your younger sister has seen a banana plant in backyard of a house. She could see the fruits but no seeds. She wants to know how a new plant of banana will be produced without seed. What will you explain to your sister ? What value your sister show in this situation ? 4

CHAPTER 2 : SEXUAL REPRODUCTION IN FLOWERING PLANTS

VSA (1 MARK)

1. In a young anther, a group of compactly arranged homogenous cells were observed in the centre of each microsporangium. What is the name given to these cells?
2. Give the scientific name of a plant which came to India as a contaminant with imported wheat and causes pollen allergy.
3. Pollen grains of water pollinated species have a special characteristics for protection from water. What is that?
4. Why are pollen grains produced in enormous quantity in Maize?
5. In some species of Asteraceae and grasses, seed are formed without fusion of gametes. Mention the scientific term for such form of reproduction.
6. Arrange the following in correct developmental sequence :
Male gamete, Potential pollen mother cell, sporogenous tissue, Pollen grains, Microspore tetrad.

7. If the diploid number of chromosomes in an angiospermic plant is 16. Mention number of chromosomes in the endosperm and antipodal cell.

SA-I :

8. In angiospermic plant before formation of microspore sporogenous tissue undergo cell division
 (a) Name the type of cell division.
 (b) What would be the ploidy of the cells of tetrad?
9. Outer envelop of pollen grain made of a highly resistant substance. What is that substance? At which particular point the substance is not present?
10. Fruits generally develops from ovary, but in few species thalamus contributes to fruit formation.
 (a) Name the two categories of fruits.
 (b) Give one example of each.
11. Among the animal, insects particularly bees are the dominant pollinating agents. List any four characteristic features of the insect pollinated flower.
12. Differentiate between geitonogamy and xenogamy.
13. In the given figure of a dicot embryo, label the parts (A) and (B) and give their function.

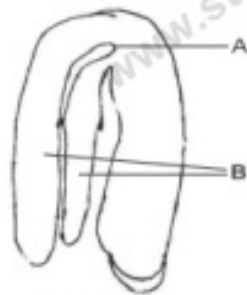
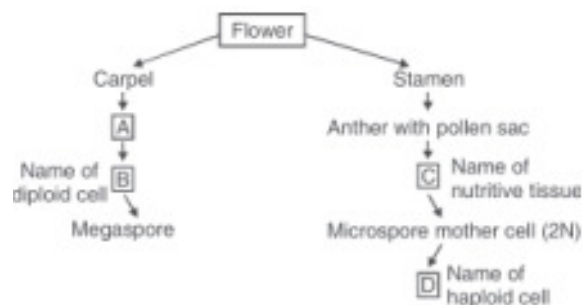


Figure 1



Figure 2

14. Name the parts A, B, C and D of the anatropous ovule (Figure 2) given above.
15. Given below is an incomplete flow chart showing formation of gamete in angiospermic plant. Observe the flow chart carefully and fill in the blank A, B, C and D.

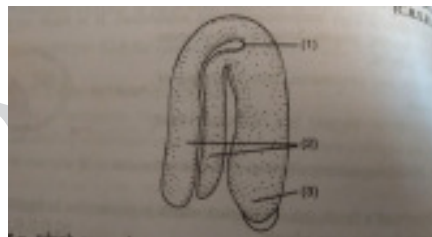


16. Name the blank spaces a, b, c and d in the table given below :
- | Item | What it represents in the plant |
|------|--------------------------------------|
| (i) | Pericarp a |
| (ii) | b Cotyledon in seeds of grass family |

- (iii) Embryonal axis c
- (iv) d Remains of nucellus in a seed.
- 17. Even though each pollen grain has two male gametes. Why are at least 10 pollen grains and not 5 pollen grains required to fertilise 10 ovules present in a particular carpel?
- 18. Draw well labelled diagram of grass emryo. 2
- 19. If the chromosome number of a plant species is 16, what would be the chromosome number and the ploidy level of the
 - (i) Microspore mother cell and 2
 - (ii) the endosperm cells ? 2

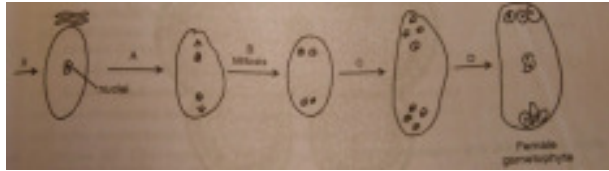
SA-II

- 19. Continued self pollination lead to inbreeding depression. List three devices, which flowering plant have developed to discourage self pollination?
- 20. What will be the fate of following structures in the angiospermic plant?
Ovary wall, Ovule, zygote, outer integument Inner integument and primary endosperm nucleus.
- 21. Differentiate between microsporogenesis and megasporogenesis. What type of cell division occurs during these events. Name the structure formed at the end of these two events.
- 22. In the T.S. of a mature anther given below "a" and "b" and mention their function. 2
- 23. In the adjacent figure of a typical dicot embryo, label the parts (1), (2) and (3). State the function of each of the labelled part.

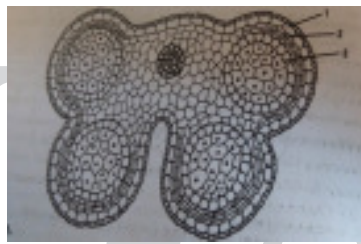


- 24. (a) Draw a labelled diagram of the internal structure of a mature embryo sac in an angiosperm.
 - (b) Trace the events that occur in a functional megaspore leading to the development of a mature embryo sac. 5
 - 25. Draw diagram of male gametophyte of an angiosperm. Label any four part. Why is spore Pollenin considered most resistant organic material ?
- Higher Order Thinking Questions
- i) Microsporangia
 - ii) Microspores
 - iii) Microsporogenesis
 - iv) Male gametophyte in angiosperm
 - v) Megaspoangium
 - vi) Female gametophyte
- a) Give the other name of following : 5
 - b) Give reasons of following : 5
 - i) Cells of tapetum have dence cytoplasm and more than one nucleus.
 - ii) Exine is made up of sporopollenin.

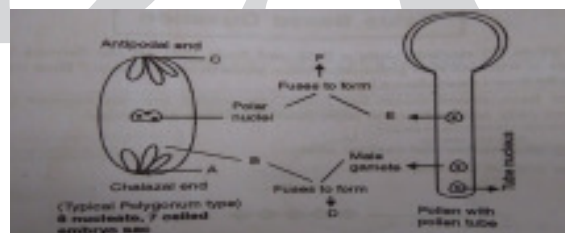
- iii) Pollen grain are well preserved fossils.
- iv) Pollen tablets are in market.
- c) Labels angiospermic ovule.
- d) Fill the following labels with type of cell function in the following female gametophyte formation. 5



- e) Identify 1, 2, 3 in given diagram 3



- f) Answer the following question in the given diagram. 5



- i) Label A, B, C, D, E, F.
- ii) What is the ploidy level of D and F ?
- iii) What are the phenomenon for formation of D and F are known as ?
- g) Complete the following : 5
 - i) MMC will always undergo cell division of
 - ii) Viola, Oxalis and Commelina produce two type of flowers
 - iii) Cleistogamous are invariably
 - iv) In corn Cobb, tassels are
 - v) Vallisneria, Hydrilla, Zostera are pollinated by
 - vi) Aquatic plants water hyacinth, water lily are pollinated by
 - vii) The dominating biotic pollinating agent is
 - viii) After double fertilization PEN changes to

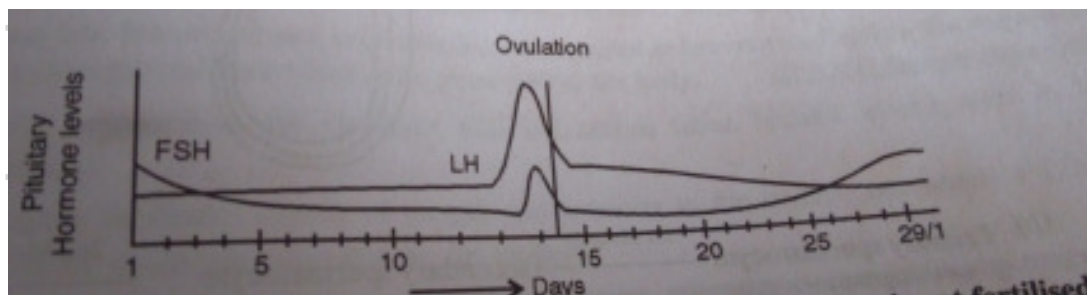
CHAPTER : 3 (HUMAN REPRODUCTION)

1. Offsprings produced by asexual reproduction are referred to as clones. Why? 1
2. Name the most invasive aquatic plant weed which is called as 'Terror of Bengal'. 1
3. How does Zygote usually differ from Zoospore in terms of ploidy? 1
4. Mention the main difference between the offspring produced by a sexual reproduction and progeny produced by sexual reproduction 2
5. Which characteristic property of Bryophyllum is exploited by gardeners and farmers? 2

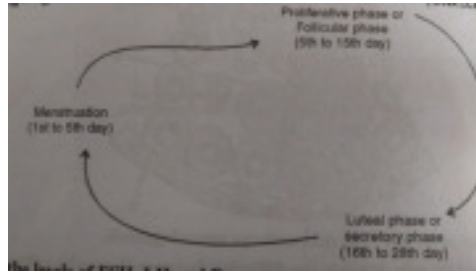
6. Higher organism have resorted to sexual reproduction inspite of its complexity. Why? 2
7. Tapeworms posses both male and female reproductive organs. What is the name given to such organism? Give two more examples of such organisms. 3
8. Study the relationship between first two words and suggest a suitable word for fourth place
- (a) Male flower : Stamens :: Female Flower : 3
- (b) Birds : oviparous :: Primates : 3
- (c) Chlamydomonas : Zoospores :: Penicilium : 3
9. Bryophytes and Pteridophytes produce a large number of male gametes but relatively very few female gametes. Why? 3
10. Mention the site of zygote formation in the ovule of a flowering plant. What happens to sepals, petals and stamens after fertilisation? State the fate of zygote, ovule and ovary in these plants. 3
11. Distinguish between gametogenesis and embryogenesis. 3
12. Fill the blank spaces a, b, c, and d given in the following table. 2
- | Organism | Organ | Gamete |
|-----------------------|-------------|---------------|
| a | Testes | Spermatozoa |
| Human female | b | Ovum |
| Plant (Angiosperm) | c | Pollen grains |
| Plant (pteridophytes) | antheridium | d |

Previous Years' Board Question

- 1 (a) Read the graph given below. Correlate the ovarian events that take place in the human female according to the level of the pituitary hormone during the following days : 3



- (i) 10-14 days
- (ii) 14-15 days
- (iii) 16-23 days
- (iv) 25-29 days (if the ovum is not fertilised)
- (b) What are the uterine events that follow beyond 29 days if the ovum is not fertilised ?
- Q2 (a) Draw a labelled diagram of the fine microscopic structure of a human sperm
- (b) Trace the development of spermatozoan from the primary spermatocytes in human testis. 5
- Q3 Name the types of immunity provided by vaccines and colostrum in humans. Mention one difference between them. 3
- Q4 The events of the menstrual cycle are represented below. Answer the question on the basis of following diagram. 3

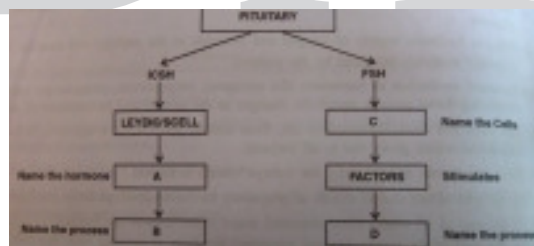


- i) State the level of FSH, LH and Progesterone simply by mentioning high or low, around 13th and 14th day 21st to 23rd day.
- ii) In which of the above mentioned phases does the egg travel to the fallopian tube ?
- iii) Why is there no menstruation upon fertilisation ?

Q5 At what stage of life is oogenesis initiated in human female ? When does the oocyte complete Oogenesis ? 3

Q6 Given below is an incomplete flow chart showing influence of hormones on gametogenesis in males. Observe the flow chart carefully and fill in the blanks A, B, C, and D.

Q7 Study the figure given below and answer the question that follow : 3



- (a) Name the stage of human embryo the figure represents.
- (b) Identify 'A' in the figure and mention its function.
- (c) Mention the fate Of the Inner Cell mass after implantation in the uterus.
- (d) Where are the stem cells located in this embryo ?

Q8 (a) In which part of the human female reproductive system do the following event take place ? 5

- I. Release of 1st polar body.
- II. Release of 2nd polar body.
- III. Fertilization
- IV. Implantation

- (b) From where do signal for parturition originate and does material pituitary release for stimulating uterine contractions for child birth ?

Q9 Where are fimbriae present in a human female reproductive system ? Give their function. 2

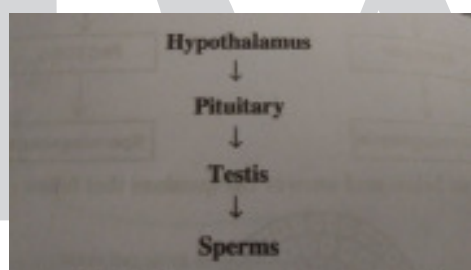
Q10 Mention the target cell of luteinising hormones in human males and female. Explain the effect and the changes which the hormones induces in each case. 3

Q11 (a) Draw a diagrammatical sectional view of human ovary showing different stages of oogenesis along with corpus luteum. 5

- (b) Where is morula formed in human ? explain the process of its development from zygote.

(OR)

- (a) Draw a sectional view of human ovary. Label the following parts :
(i) Primary follicle
(ii) Ovum
(iii) Graafian follicle
(iv) Corpus luteum
- (b) Name the hormones influencing (i) ovulation (ii) development of corpus luteum.
- (c) i) pituitary hormones attain a peak and stimulate of estrogen
ii) Progesterone
- 12 Name the muscular and the glandular layer of human uterus. Which one of these layers undergoes cyclic changes during menstrual cycle ? Name the hormone essential for the maintenance of this layer. 3
- 13 Study the flow chart given below. Name the hormones involved at each stage and explain their role. 3

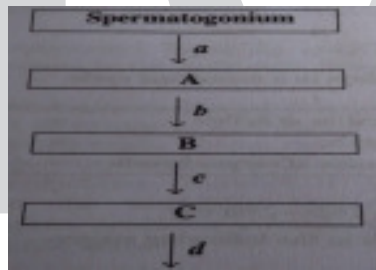


- 14 Name any two copper-releasing Intra Uterine Devices (IUDs). List two reasons that make them effective contraceptives. 3
- 15 (a) Draw a sectional view of seminiferous tubule of a human. Label the following cells in the seminiferous tubule : 3
(i) Cells that divide by mitosis to increase their number.
(ii) Cells that undergo Meiosis I.
(iii) Cells that Meiosis II.
(iv) Cells that help in the process of spermiogenesis.
- (b) Mention the role of Leydig cells.
- 16 (a) Explain the event taking place at the time of fertilization of an ovum in a human female. 5
(b) Trace the development of the zygote upto its implantation in the uterus.
(c) Name and draw a labelled sectional view of the embryonic stage that gets implanted.
- Q17 Differentiate between menarch and menopause. 2
- Q18 Placenta acts as an endocrine tissue. Justify. 2
- Q19 Differentiate between major structural changes in the human ovary during the follicular and Luteal phase of the menstrual cycle. 3
- Q20 Describe the post-zygote events leading to implantation and placenta formation in human. Mention any two function of placenta. 3
- Q21 Name the embryonic stage that get implanted in the uterine wall of a human female. 1
- Q22 (a) Where do the signal for parturition originate from in humans ? 3
(b) Why is it important to feed the newborn babies on colostrum ?
- Q23 Write the function of each one of the following : 3

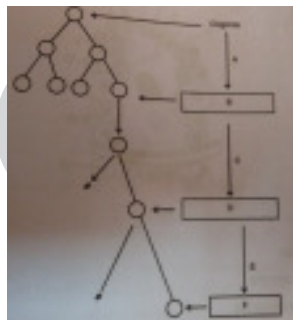
- (a) (oviducal) Fimbriae (b) Coleoptile (c) Oxytocin.
- Q24 State the advantages and one disadvantages of cleistogamy. 2
- Q25 Explain the function of each of the following :- 3
- (a) Coleorhiza
- (b) Umbilical cord
- (c) Germ pore.
- Q26 Why are the human testes located outside the abdominal cavity ? Name the pouch in which they are present. 3
- Q27 Name and explain the role of inner and middle walls of the human uterus. 2
- Q28 During the reproductive cycle of a human female, when, where and how does a placenta develops. What is the function of placenta during pregnancy and embryo development? 5

Higher Order Thinking Questions :

- Q1 What are the steps in sperm formation in seminiferous tubule ?



- In the above question fill the type of process in a, b, c, d. 5
- Q2 Complete the following in the process of oogenesis. 5

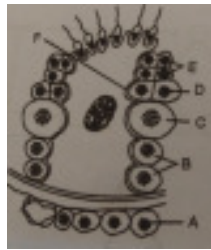


- (i) Maturation of follicle =
- (ii) ovulation =
- (iii) Regression of corpus luteum =
- Q3 Give the span in term of days in a menstrual cycle. 3

EMBRYONIC STAGES	NO. OF CELLS
1 Zygote
2 Blastomeres
3 Morula
4 Blastocyst

- Q4 Mention the number of cell in the following stages - 2

- Q6 In the diagram of a portion of a seminiferous tubule identify the marked alphabets and mention the function of F. 3



Value Based Question :

- Q1 Kavita was watching a TV serial in the evening along with her family. An advertisement flashed on the screen was promoting use of sanitary napkins, during a commercial break. Her parent get embarrassed and changed the channel. She objected to her parent's behaviour and being a biology student explained the need for such advertisement. 4
- (a) What values dis Kavita show ?
- (b) Briefly describe the phase of menstrual cycle with diagram.
- Q2 Sunita's bhabhi is not allowed to enter the kitchen during the days of her menstrual cycle. Sunita's mother thinks that she is impure and food prepared by her is also unhygienic. Give your opinion about such traditional belief providing any two values. 4

CHAPTER : 4 (REPRODUCTIVE HEALTH)

Previous Years' Board Questions

- Q1 What are RCH programmes ? 1
- Q2 What are major task carried out in reproductive & child health care programme ? 1
- Q3 Where was an oral contraceptive 'Saheli' Developed ? 1
- Q4 What is current status of population in India ? 1
- Q5 What are oral contraceptives ? 1
- Q6 How vasectomy is different from tubectomy ? 1
- Q 7 In the table given below, select and enter one correct device out of the following: 1
- | METHOD OF BIRTH CONTROL | DEVICE |
|--|--------|
| Barrier | |
| IUD | |
| Surgical Technique | |
| Administering Hormones | |
| Oral pill, condom, copper T, Saheli, Vasectomy, Diaphragm, Tubectomy, Cervical cap | 2 |
- Q8. How are assisted reproductive technology helpful to humans ? How are ZIFT and GIFT different from intra uterine transfer ? Explain. 2
- Q9. Name two STDs which can be transmitted through contaminated blood. 2
- Q10. Explain the zygote intra fallopian transfer technique (ZIFT). How is intrauterine transfer Technique (IUT) different from it ? 2
- Q11. How do copper and hormone releasing IUDs act ad contraceptives ? 2
- Q12. Mention one positive and one negative application of amniocentesis. 2

- Q13. Name an oral pill used as a contraceptive by human female. Explain how does it prevent pregnancy. 3
- Q14. Why is cu-T considered a good contraceptive device to space children ? 2
- Q15. If implementation of better technique and new strategies are required to provide more efficient care and assistance to people, then why is there a statutory ban a amniocentesis ? Write the use of this technique and give reason to justify. 2
- Q16. A woman has certain queries as listed below, before starting with contraceptives pills. Answer them 2
- (a) What do contraceptive pills contain and how they act as contraceptives ?
- (b) what schedule should be followed for taking this pills ?
- Q17. What measures government has taken to check the population growth rate ? 2
- Q18. Why treatment and detection of sexually transmitted disease is usually delayed? 2

Higher Order Thinking Questions

- Q19 (a) Classify the following contraceptive measures. 3
- (b) Identify the surgical process .
- | | |
|-------------------------|-------------------------|
| (i) Periodic abstinence | (ii) Cu T, Cu |
| (iii) Progestasert | (iv) Diaphragms |
| (v) Cervical caps | (vi) Coitus interruptus |
| (vii) Saheli | (viii) Sterlization |
| (ix) Vaults | (x) Tubectomy |
| (xi) Vasectomy | (xii) Condoms. |
- Q20 (a) In the birth rate is represented by 'b' , the death rate by 'd' the emigration by 'E' and Immigration by 'I' then represent the following case (i-ii) with the help of above symbols 3
- (i) Population is stable (ii) population is increasing
- (iii) population is decreasing.

Value based Questions

- Q21 Anita believes that breastfeeding her new born baby would spoil her figure and also make her Weak. Do you think Anita is right ? if not How would you convince her ? what values would You use to convince her ? (4)
- Q22 A popular TV programme shows in some village girl are killed soon after their birth. What impact does it have on pollution ? What values such programmes transmit to public ?
- Q23 A group of biology students arranged a campaign programme in their locality to make the People aware about use of contraceptive methods. Some elderly people rebuked them and asked them not to talk on such thing in public. They convinced the elder about the need for The programme and further elders also joined the campaign.
- (a) What value did the biology students show on the occasion ?
- (b) Why is such awareness programme necessary ?
- (c) Suggest any three efforts to make the campaign successful ?

UNIT II : GENETICS AND EVOLUTION

CHAPTER : 5 : PRINCIPLES OF INHERITANCE AND VARIATION

VSA (1 MARK)

1. Give any two reasons for the selection of pea plants by Mendel for his experiments.
2. Name any one plant that shows the phenomenon of incomplete dominance during the inheritance of its flower colour.
3. Name the base change and the amino acid change, responsible for sickle cell anaemia.
4. Name the disorder with the following chromosome complement.
(i) 22 pairs of autosomes + X X Y
(ii) 22 pairs of autosomes + 21st chromosome + XY.
5. A haemophilic man marries a normal homozygous woman. What is the probability that their daughter will be haemophilic?
6. A test is performed to know whether the given plant is homozygous dominant or heterozygous. Name the test and phenotypic ratio of this test for a monohybrid cross.

SA-I

7. Identify the sex of organism as male or female in which the sex chromosome are found as
(i) ZW in bird (ii) XY in Drosophila
(iii) ZZ in birds. (iv) XO in grasshopper
8. Mention two differences between Turner's syndrome and Klinefelter's syndrome.
9. The human male never passes on the gene for haemophilia to his son. Why is it so?
10. Mention four reasons why Drosophila was chosen by Morgan for his experiments in genetics.
11. Differentiate between point mutation and frameshift mutations.

SA-II

12. A woman with O blood group marries a man with AB blood group (i) work out all the possible phenotypes and genotypes of the progeny. (ii) Discuss the kind of dominance in the parents and the progeny in this case.
13. Explain the cause of Klinefelter's syndrome. Give any four symptoms shown by sufferer of this syndrome.
14. In Mendel's breeding experiment on garden pea, the offspring of F₂ generation are obtained in the ratio of 25% pure yellow pod, 50% hybrid green pods and 25% green pods State
i) Which pod colour is dominant
ii) The Phenotypes of the individuals of F₁ generation
iii) Work out the cross.

LA (5 MARKS)

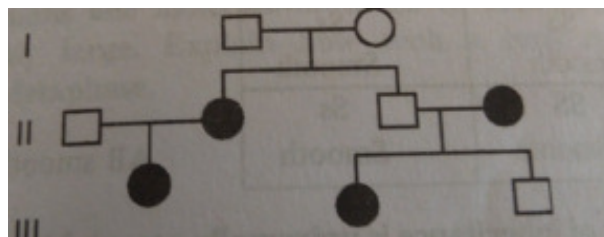
15. A dihybrid heterozygous round, yellow seeded garden pea (*Pisum sativum*) was crossed with a double recessive plant. (i) What type of cross is this? (ii) Work out the genotype and phenotype of the progeny. (iii) What principle of Mendel is illustrated through the result of this cross?

Previous Years' Board Question

- Q1 (a) How many alleles are involved in the inheritance of blood groups in humans ? 2
 (b) There is a boy with blood group A, whose mother has blood group B. Give the possible Genotype(s) and the phenotype of the father.
- Q2 (a) How does a haemophiliac patient suffer ? 3
 (b) A haemophiliac son is born to a 'normal couple'. Explain the mechanism of this inheritance. What is the probability of a haemophiliac daughter being born to this couple ?
- Q3. A man with 'A' blood group married a woman with 'B' blood group. Their first child is with 'O' Blood group. Work out the possible blood group in their future progeny. 3
- Q4. A man with AB blood group married a woman with O blood group. Work out the cross to show the possible blood of their progeny. How many alleles are involved in the inheritance of these Blood group in humans ? 3
- Q5. (a) Work out a cross between two plants of Antirrhinum, one with red flower and the other with white flowers. Show the f1 and f2 generation with genotypes and phenotypes and their Ratios. Explain the pattern of inheritance. 3
 (b) How will you fill up the blank (1), (2), (3) and (4) in the table given below with reference to sex determination ?

Organism	Male	Female
(i) <i>Drosophila melanogaster</i>	(1)	XX
(ii) Grasshopper	XO	(2)
(iii) Fowl	(3)	ZW
(iv) <i>Homo sapiens</i>	XY	(4)

- Q6. Differentiate between a nucleotide and a nucleoside. 2
- Q 7. A women with B blood group married a man with a blood group. They had two sons and both had O group. Show the possibility of such an inheritance. List the alleles involved in determining The blood group. 3
- Q8. Study the pedigree chart given below showing the inheritance pattern of a human trait and answer the question that follow : 3



- (a) Give the genotype of the parents show in generation (I) and of the son and daughter show in Generation (II).
 (b) Give the genotype of the daughter shown in generation (III).
 (c) Is the trait sex-linked or autosomal ? Justify your answer.
- Q9. The gene I that control the ABO blood grouping in human being has three alleles I^A, I^B and i . 2
 (a) How many different genotype are likely to be present in the human population ?
 (b) Also, how many phenotype are possible present ?

- Q10. The human male and female birds are heterogametic while the human female and male bird are homogametic. Why are they called so ? 2
- Q11. In a pea plant, smooth seed coat is dominant over wrinkled seed coat. What will be the expected ratio of phenotype of the offspring in a cross between : 2
- (i) Heterozygous smooth Heterozygous smooth
(ii) Heterozygous smooth Heterozygous wrinkled
(iii) Heterozygous smooth Heterozygous smooth
- Q12. Which Mendel's law of inheritance is universally acceptable and without any expectation ? 2
- Q13. What is pedigree analysis? Explain by taking an example of autosomal dominant disease. 3
- Q14. One chromosome contains one molecule of DNA In eukaryotes the length of the DNA molecule is enormously large. Explain how such a long molecule fits into the tiny chromosomes seen at metaphase. 3
- Q15. AaBb was crossed with aabb. What would be the phenotypic ratio of the progeny ? Mention the term to denote this kind of cross. 3
- Q16. I) The following table shows the genotype for ABO blood grouping and their phenotype. Fill in the

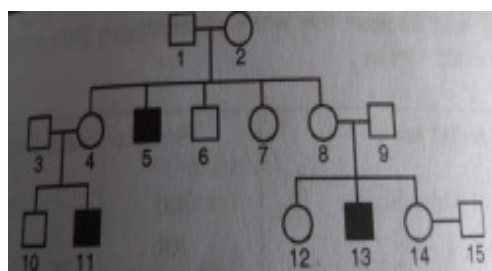
S.NO.	Genotype	Blood group
1.	$I^A I^A$	A
2.		A
3.	$I^B I^B$	A
4.		B
5.	$I^A I^B$	
6.		O

Gaps left in the table :

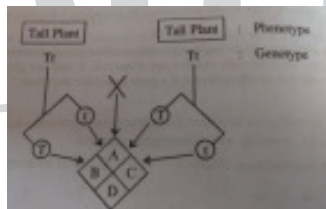
3

ROHTAK

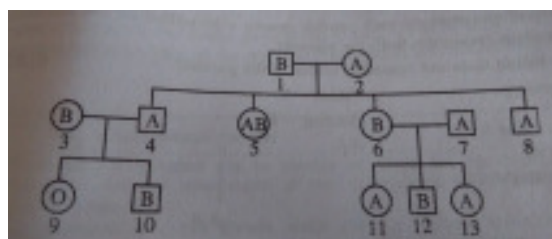
- ii) Which blood group is not according to Mendelian inheritance
- Q17. A true breeding tall plant is crossed with a true breeding dwarf plant. F_1 progeny is 100% tall and F_2 has tall : dwarf in the ratio 3 : 1 (i) Explain why F_1 shows only one type of parental Phenotype ; (ii) Name the patterns of inheritance in which the ratio deviates from above. Also mention the deviated phenotype ratio. 3
- Q18. Haemophilia is a sex linked recessive disorder of humans. The pedigree chart given below shows the inheritance of haemophilia in one family. Study the pattern of inheritance and answer the question given. 3



- (a) Give all the possible genotype of the members 4, 5 and 6 in the pedigree chart.
- (b) A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered 15 has recently married the member numbered 14. What is the probability that their first child will be a haemophiliac male ?
- Q19. Inheritance pattern of ABO blood groups in humans shows dominance, codominance and Multiply allelism. Explain each concept with the help of blood group genotypes. 3
- Q20. Inheritance pattern of flower colour in garden pea plant & snapdragon differ Why is this difference observed ? Explain showing the crosses upto F_2 generation.
- Q21. What is linkage ? Explain with the help of example. 3
- Q22. (a) Why do the symptoms of malaria not appear immediately after the entry of sporozoites Into the human body when bitten by female Anopheles? Explain 3
- Q23 Recently a girl baby has been reported to suffer from haemophilia. How is it possible ? Explain with the help of a cross. 3
- Q24. A particular garden pea plant produced only violet flowers. It may or may not be homozygous dominant for that trait. How would you ensure its genotypes? Explain with crosses. 3
- Q25. In one family each of the four children has different blood group. Their mother is a group A and The father is group B. explain this pattern of inheritance with the help of a cross long with the Genotypes. 3
- Q26. Who proposed chromosomal theory of inheritance ? Point out any two similarities in the behaviour of chromosomes and genes. 3
- Q27. Differentiate between Turner's syndrome and Kleinifelters syndrome? 3
- Q 28. A person suffering from sickle cell anaemia never suffers from malaria. Why? 3
- Q 29. Explain the mechanism of sex etermination in Drosophila and Grass hopper. 3
- Q30. How does thalassemia differ from sickle cell anaemia? 3



- Q31 Look at the above diagram and answer the following question :
- (a) Write the genotype of A, B, C, D.
- (b) Write the phenotypes of A, B, C, D.
- (c) Write phenotypic ratio of progeny.
- (d) Write genotypic ratio of progeny.
- Q.32. Study the pedigree chart given above, showing the inheritance pattern of blood groups in a family And answer the following questions.

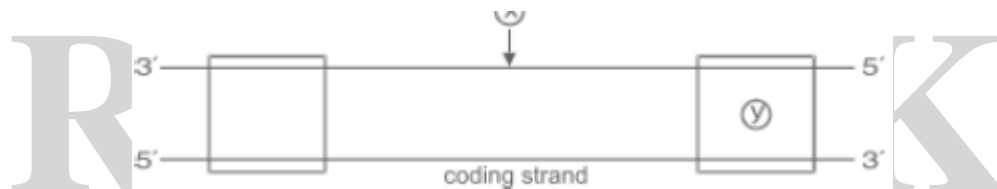


- (a) Give the possible genotypes of the individuals 1 and 2.
 (b) Which antigen or antigens will be present on the plasma membranes of the RBC's of individual 5 and 9 ?
 (c) Give the genotype of the individual 3 and 4. 3
- Q33. A haemophiliac son was born to normal parents. Give the genotypes of the parents. 2
- Q34. When tall pea plants were selfed, some of the offspring were dwarf. Explain with the help of a Punnet square. 2
- Q35. With the help of one example each provided genetic explanation for the following observation:
 (i) F_1 -generation resembles both the parents.
 (ii) F_1 -generation does not resemble either of the parents. 3
- Q36. (a) Provide genetic explanation for the observation in which the flower colour in F_1 -generation of snapdragon did not resemble either of the two parents. However, the parental characters reappeared when F_1 -progenies were selfed.
 b) State the three principle of mendel's law of inheritance. 3

CHAPTER : 6 (MOLECULAR BASIS OF INHERITANCE)

VSA (1 MARK)

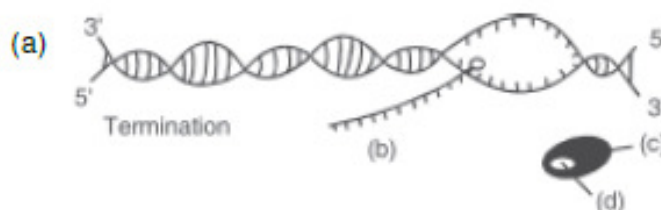
- Name the factors for RNA polymerase enzyme which recognises the start and termination signals on DNA for transcription process in Bacteria
- Mention the function of non-histone protein.
- During translation what role is performed by tRNA 4. RNA viruses mutate and evolve faster than other viruses. Why?
- Name the parts 'X' and 'Y' of the transcription unit given below.



- Mention the dual functions of AUG.
- Write the segment of RNA transcribed from the given DNA –
 3' – A T G C A G T A C G T C G T A – 5' – Template Strand
 5' – T A C G T C A T G C A G C A T – 3' – Coding Strand.

SA-I

- The process of termination during transcription in a prokaryotic cell is being represented here. Name the label a, b, c and d.
 (a)



9. Complete the blanks a, b, c and d on the basis of Frederick Griffith Experiment.
S Strain '!' inject into mice '!' (a)
R strain '!' inject into mice '!' (b)
S strain (heat killed) '!' inject into mice '!' (c)
S strain (heat killed) + R strain (live) '!' inject into mice '!' (d)
10. Give two reasons why both the strands of DNA are not copied during transcription.
11. Mention any two applications of DNA fingerprinting.
12. State the 4 criteria which a molecule must fulfill to act as a genetic material.

SA-I I

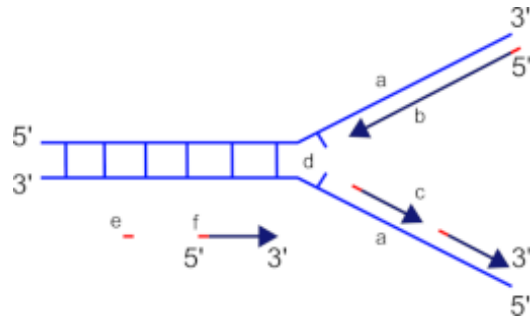
13. Give six points of difference between DNA and RNA in their structure/ chemistry and function.
14. Explain how does the hnRNA becomes the mRNA. OR Explain the process of splicing, capping and tailing which occur during transcription in Eukaryotes.
15. Name the three major types of RNAs, specifying the function of each in the synthesis of polypeptide
16. Enlist the goals of Human genome project.
17. A tRNA is charged with the amino acid methionine. (i) Give the anti-codon of this tRNA. (ii) Write the Codon for methionine. (iii) Name the enzyme responsible for binding of amino acid to tRNA.
18. Illustrate schematically the process of initiation, elongation and termination during transcription of a gene in a bacterium.

LA (5 MARKS)

19. What is meant by semi conservative replication? How did Meselson and Stahl prove it experimentally?
20. What does the lac operon consist of? How is the operator switch turned on and off in the expression of genes in this operon? Explain.
21. State salient features of genetic code.
22. Describe the process of transcription of mRNA in an eukaryotic cell.
23. Describe the various steps involved in the technique of DNA fingerprinting.

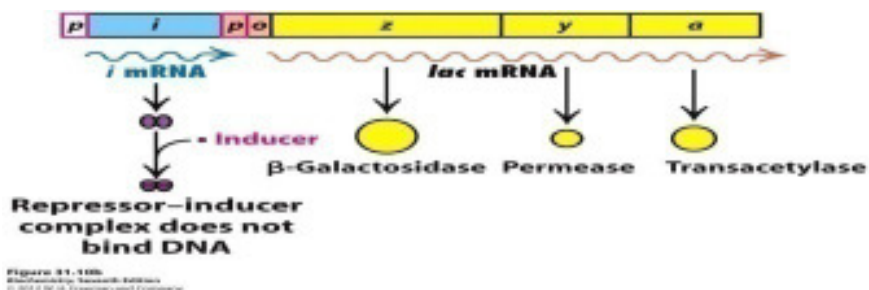
PREVIOUS YEAR QUESTIONS

- | | |
|--|---|
| Q1. Why is hnRNA require splicing? | 1 |
| Q2. Mention two functions of codon AUG. | 1 |
| Q3. How does HIV differ from bacteriophage? | 1 |
| Q4. How is the length of DNA usually calculated? | 1 |
| Q5. How are the two strands of DNA are held together | 1 |
| Q6. How do histone acquire positive charge? | 1 |
| Q7. Differentiate between a template strand and a coding strand. | 1 |
| Q8. How is the translation of mRNA terminated? Explain. | 1 |
| Q9. Genetic code is universal and specific. Justify. | 1 |
| Q10. Write two uses of single nucleotide polymorphism. | 1 |
| Q11. Describe two major approaches to sequencing of genome. | 1 |
| Q12. Give two reasons why both strands of DNA are not copied during transcription? | 2 |
| Q13. Why RNA is regarded as the first genetic material? Explain. | 2 |
| Q14. a) In the given figure label a,b,c,d | |
| a) Explain the mechanism the figure represents? | |

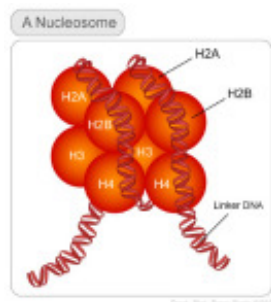


3

Q15. Given below is a schematic representation of a lac operon



- a) Identify *i* and *p* 3
 - b) Name the inducer for this operon 3
 - c) Mention the function of each enzymes. 3
- Q16. Why is DNA considered to be a better genetic material? 3
- Q17. Describe Griffith's experiment on *Streptococcus pneumoniae*. Discuss the conclusion he arrived at. 3
- Q18. Who proposed the DNA replication is semi conservative? Who proved it experimentally and how? 3
- Q19. Briefly describe post transcriptional changes in hnRNA. 3
- Q20. What is DNA fingerprinting? Mention its application. 3
- Q21. Why RNA is said to be an adaptor molecule? 3
- Q22. a) Expand H2A and H2B in the given diagram. 3
- b) How many bp are involved in one nucleosome formation? 3

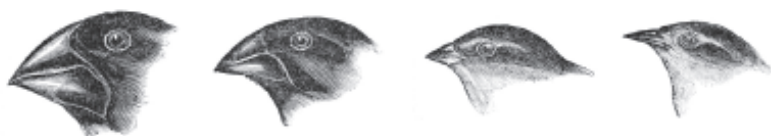


- Q23. What is translation? Explain the mechanism of translation with the help of diagram. 5
- Q24. Explain and draw a well labelled diagram of DNA as proposed by Watson and Crick. 5
- Q25. What is genetic code? Name the scientist and their contribution in deciphering the genetic code. 5

CHAPTER : 7 EVOLUTION

PREVIOUS YEAR QUESTIONS

1. Name one fish like reptile that evolved from land reptile about 200 million years ago? 1
2. For a long time, it was believed that life originated from decaying matter. What is this theory known as? Name the scientist who experimentally disproved this theory. 1
3. If a biotic origin of life is in progress on a planet other than earth, what should be the conditions there? 1
4. Name the person who proposed that population tends to increase geometrically while food production increases arithmetically. 1
5. Name the scientist who had also come to similar conclusion as that of Darwin about natural selection as a mechanism of evolution. Which place did he visit to come to conclusions? 1
6. Explain Oparin-Haldane theory of chemical evolution of life. 3
7. Distinguish between convergent and divergent evolution giving one example of each. 3
8. What is adaptive radiation? Explain with an example. 3
9. How did Louis Pasteur disprove spontaneous generation theory? 3
10. (i) State the Hardy-Weinberg principle. (ii) When there is a disturbance in the Hardy-Weinberg equilibrium, what would it result in? (iii) According to this principle, what is the sum total of all allelic frequencies? 3
11. Classify the following as examples of homology and analogy– (i) Hearts of fish and crocodile (ii) Wings of butterfly and birds (iii) Eyes of Octopus and Mammals (iv) Tubers of potato and Sweet potato (v) Thorns of Bougainvillea and spines of Opuntia. 3
12. Stanley Miller and Harold Urey performed an experiment by recreating in the laboratory the probable conditions of the atmosphere of the primitive earth.
 - (i) What was the aim of the experiment?
 - (ii) In what forms was the energy supplied for chemical reactions to occur?
 - (iii) For how long was the experiment run continuously? Name two products formed.3
13. 'Industrial Melanism' in peppered moth is an excellent example of 'Natural selection'. Justify the statement. 3
14. (i) In which part of the world, Neanderthal man lived?
(ii) What was his brain's capacity?
(iii) Mention the advancement which Neanderthal man showed over Homo erectus. 3
16. Figures given below are of Darwin's finches?



- (a) Mention the specific geographical area where these were found.
- (b) Name and explain the phenomenon that has resulted in the evolution of such diverse species in the region. 3

- (c) How did Darwin visit the particular geographical area?
17. Give examples to show evolution by anthropogenic action. 3
 18. Is evolution a 'process' or the end result of a 'process'? Discuss. Describe various factors that effect Hardy-Weinberg equilibrium. 5
 19. How do Darwin and Hugo de Vries differ regarding Mechanism of Evolution? 5
 20. With the help of suitable diagram, represent the operation of natural selection on different traits. 5

UNIT III: BIOLOGY AND HUMAN WELFARE
CHAPTER 8: HUMAN HEALTH AND DISEASE

PREVIOUS YEAR QUESTIONS

VSA-I

1. Name the diagnostic test which confirms typhoid. 1
2. Name the two major groups of cells required to attain specific immunity. 1
3. You have heard of many incidences of Chickengunya in our country. Name the vector of the disease
4. Breast fed babies are more immune to diseases than the bottle fed babies. Why? 1
5. Name the pathogen which causes malignant malaria. 1
6. Which microorganism is used to produce hepatitis B Vaccine? 1
7. What is the reason of shivering in malarial patient? 1

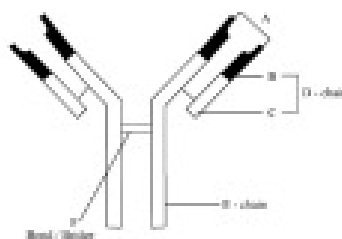
SA –I

8. Where are B-cells and T-cells formed? How do they differ from each other? 2
9. Given below are the pathogens and the diseases caused by them. Which out of these pairs is not correct matching pair and why? 2

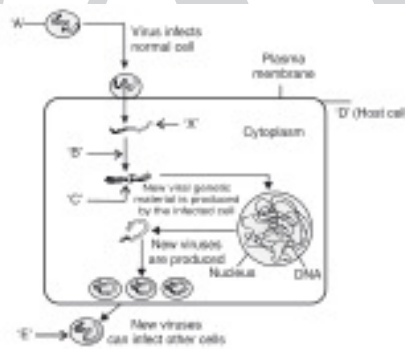
(a) Wuchereria – Filariasis	(b) Microsporium – Ringworm
(c) Salmonella – Common Cold	(d) Plasmodium – Malaria
10. What would happen to the immune system, if thymus gland is removed from the body of a person? 2
11. Lymph nodes are secondary lymphoid organs. Describe the role of lymph nodes in our immune response. 2

SA-II

12. What is the role of histamine in inflammatory response? Name few drugs which reduce the symptoms of allergy. 3
13. What are Cannabinoids? From which plant Cannabinoids are obtained? Which part of the body is affected by consuming these substances? 3
14. In the figure, structure of an antibody molecule is shown. Observe it and Give the answer of the following questions.



- (i) Label the parts A, B and C.
(ii) (ii) Which cells produce these molecule?
(iii) State the function of these molecules. 3
15. Mention any three causes of drug abuse. Suggest some measures for the prevention and control of drug abuse. 3
16. A person shows unwelcome immunogenic reactions while exposed to certain substances. (a) Name this condition. (b) What common term is given to the substances responsible for this condition? (c) Name the cells and the chemical substances released which cause such reactions. 3
17. Fill in the blanks in the different columns of the table given below to identify the nos 1 to 3.
- | Name of disease | Causative organism | |
|-----------------|--------------------|---|
| Pneumonia | sreptococcus | 3 |
| Typhoid | | 1 |
| Ascaris | | 2 |
| | | 3 |
18. In the given flow diagram, the replication of retrovirus in a host cell is shown. Examine it and answer the following questions



- (a) Why is virus called reterovirus? (b) Fill in (A) and (B) 3
(c) Can infected cell survive while viruses are being replicated and released by host cell?
19. What is innate immunity? List the four types of barriers which protect the body from the entry of the foreign age 3
- LA-5
20. Answer the following with respect to Caner. (a) How does a cancerous cell differ from a normal cell? (b) Benign tumor is less dangerous than malignant tumor. Why (c) Describe causes of cancer. (d) mention two methods of treatment of the disease. 5
21. The pathogen of a disease depends on RBCs of human for grwoth and reproduction. The person with this pathogen suffers with chill and high fever. (a) Identify the disease. (b) Name the pathogen. (c) What is the cause of fever? (d) Represent the life cycle of the pathogen diagrammatically. 5
22. The immune system of a person is supressed. He was found positive for a pathogen in the diagnostic test ELISA. (a) Name the disease, the patient is suffering from. (b) Which pathogen is identified by ELISA test? (c) Which cells of the body are attacked by the pathogen (d) Suggest preventive measures. 5

UNIT IV: BIOTECHNOLOGY

CHAPTER 9: STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION

PREVIOUS YEAR QUESTIONS

VSA 1

1. Why is inbreeding necessary in animal husbandary? 1
2. Name two fungal diseases of Crop plants. 1
3. Which product of Apiculture is used in cosmetics and polishes? 1
4. Semi-dwarf varieties of a crop plant were derived from IR-8. Name that crop 1
5. Write two qualities of *Saccharum officinarum* (Sugarcane) grown in South India. 1

SA-I

6. A new breed of sheep was developed in Punjab by crossing two different breeds of Sheep. Name the two breeds which were crossed & the new breed developed. 2
 7. Study the table given below and fill in the blanks marked A, B, C and D 2
- | S.No. | Crop | Variety | Resistant to Disease |
|-------|----------|------------|---|
| 1 | Wheat | Himgiri | A |
| 2 | Brassica | B | White rust |
| 3 | C | Pusa Komal | Bacterial blight |
| 4. | Chilli | D) | Chilly Chilly chilly and mosaic Virus, Tobacco mosaic Virus and leaf curl |
8. Why are proteins synthesized from *Spirulina* called Single celled Proteins? What is the significance of such a protein? 2
 9. Differentiate between inbreeding and outbreeding in animals. 2

SA –II

10. Expand MOET. Explain the procedure of this technology in catytle improvement. 3
11. What is micropropagation? Why are plants produced by this technique called somaclones? Name any two food plants which are produced on commercial scale using this method. 3
12. What is mutation? Explain the significance of mutation in plant breeding. Give an example of a disease resistant variety of cultivated plant induced by mutation. 3
13. How can we improve the success rate of fertilisation during artificial insemination in animal husbandry programmes? 3
14. Biofortification is the most practical means to improve public health. Justify the statement with examples. 3
15. What is meant by germplasm Collection? Describe its significance in plant breeding programmes. 3
16. To which product, following products are related (a) Blue revolution (b) white revolution (c) Green revolution 3
17. Does apiculture offer multiple advantages to farmers? List its advantages, if it is located near a place of commercial flower cultivation. Name the most common species of bee which is reared in India. 3

LA 5

18. What is somatic hybridisation? Describe the various steps in producing somatic hybrids from protoplasts. Mention any two uses of somatic hybridisation. 5

CHAPTER 10: MICROBES IN HUMAN WELFARE

PREVIOUS YEAR QUESTIONS

VSA 1

- 1) Drinks like Whisky and Rum are more intoxicating than wine. Why? 1
- 2) Can we imagine a world without antibiotics? Explain briefly. 1
- 3) Which gases are produced in sewage treatment plant. 1
- 4) Which one of these is a proteinaceous infecting agent? 1
a) Viroids, b) prions, c) proteron,
- 5) An organic farmer requires a bio control agent which is species specific and has no negative impact on non-target organism. Suggest the name of such a bio control agent. 1
- 6) Scientists have succeeded in introducing toxin gene of *Bacillus thuringiensis* into plants like cotton. What purpose is achieved through this action? 1
- 7) A small amount of curd was added to cold milk for converting it into curd. But milk did not get curdled. Why? 1
- 8) Consuming curd keeps the gastro-intestinal tract intact. Give reason. 1
- 9) On fermentation the dough of idli and dosa puffs up. Which metabolic pathway is responsible for this process? 1
- 10) How do lactic acid bacteria help in increasing the nutritional quality of curd? 1
- 11) The excreta of cattle do not contain any cellulose but human excreta may contain cellulose. Why? 1
- 12) Antibiotics are always sold in combination with *Lactobacillus*. Why? 1
- 13) Why are some microbes useful in detergent formulation? 1
- 14) Microbes release gases during metabolism. How will it help in the production of energy? 1
- 15) Why does 'Swiss-cheese' contain large holes?. 1

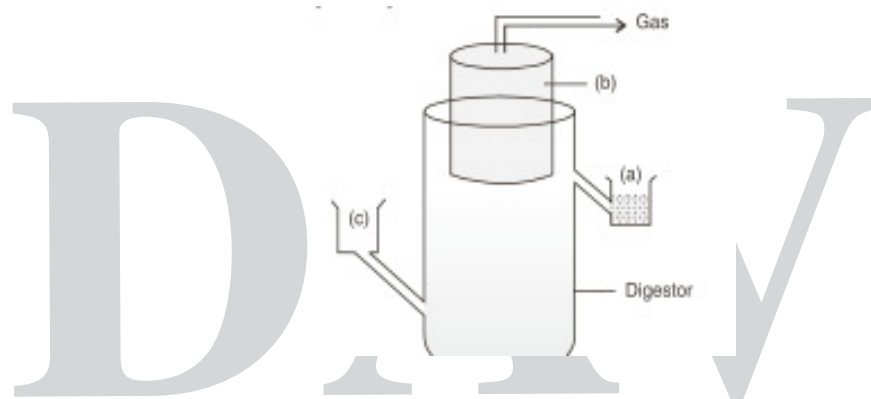
SA I

- 16) In what way the relationship between BOD and organic matter in Sewage will be useful in ecology? 2
- 17) Why do bottled fruit juices appear clearer than the home made ones 2
- 18) What is the principle behind the conversion of milk into curd and partial digestion of milk protein performed by Lactic Acid Bacteria? 2
- 19) Wine and beer are different from whisky and brandy though they are all alcoholic beverages. What is the name of the process that brings out this difference? 2
- 20) Name the group of bacteria that are capable of living at high temperature above 100°C. How does it become possible by these bacteria? $\frac{1}{2} + \frac{1}{2} = 1$
- 21) Why do doctors prescribe Streptokinases for brain hemorrhage patients? Mention the source of industrial production of this biomolecule. $\frac{1}{2} + \frac{1}{2} = 1$
- 22) How are the holes produced in bread and cheese? 2

SA II

- 23) A farmer was suggested to apply certain microbial culture in his field to increase the yield. Suggest the types of microbes he could use in his paddy field and how do they help in increasing the yield. 3
- 24) It was observed that certain plant roots are infected by fungus. in spite of this infection the plant showed increased growth and development. Give reason. 3
- 25) Arrange the steps in sewage treatment in proper sequence. 3

- a) Anaerobic sludge digestion
 - b) 'Floc' formation
 - c) Primary effluent in aeration tank
 - d) Formation of biogas
 - e) Constant agitation in presence of oxygen.
 - f) Digestion by anaerobic bacteria
- 26) Bacteria that convert effluent into activated sludge play one more beneficial side. Mention the role 3
- 27) In the given figure label a, b and c and explain the functioning of the below plant. 3



- 28) How does Monascus help in lowering blood-cholesterol? Name 2 other bioactive molecules with their source. 3
- 29) Complete the given table 3
- | Name of the organism | Product/Enzyme/Bioactive molecule |
|----------------------|-----------------------------------|
| Aspergillus niger | (i) |
| (ii) | Ethanol |
| (iii) | Cyclosporin-A |
| (iv) | Acetic acid |
| Monascus purpureus | (v) |
| Streptococcus | (vi) |
- 30) For what significant properties the Baculoviruses are considered as best Biological control agent?. Mention its importance in organic farming. 3
- 31.) Give one example and one use of the following: 3
- i) Free living fungi
 - ii) Symbiotic fungi
 - iii) Free living bacteria

LA 5

- 32) Why is organic farming favoured these days? Describe the methods employed in the process. 5
- 33.) i) Three water samples namely river water, untreated sewage water and secondary effluent discharge from a sewage treatment plant were subjected to BOD test. The samples were labeled A, B and C but the lab attendant did not note which BOD is for which water. The BOD values of three samples A, B and C were recorded as 20mg/L, 8mg/L and 400mg/L respectively. Which sample of the water is most polluted?
- ii) You assign the correct label to each, assuming that the river water is relatively clean. 5

1. A restriction enzyme digests DNA into fragments. Name the technique used to check the progression of this enzyme and separate DNA fragments. 1
2. Name two commonly used vectors in genetic engineering. 1
3. Some enzymes are considered as molecular scissors. in genetic engenrring. What is the name assigned to such enzymes? 1
4. Write conventional nomenclature of EcoRI. 1
5. A linear DNA fragment and a plasmid has three restriction sites for EcoRI how many fragments will be produced from linear DNA and plasmid respectively. 1
6. An extra chromosomal segment of circular DNA of a bacterium is used to carry gene of interest into the host cell. What is the name given to it? 1
7. Identify the recognition sites in the given sequences at which E.coli will be cut and make sticky ends. 1

5'–GAATTC–3'
3'–CTTAAG–5'

SA I

8. Name two main steps which are collectively referred to as down streaming process. Why is this process significant? 2
9. How does plasmid differ from chromosomal DNA? 2



10. A bacterial cell is shown in the figure given below. Label the part 'A' and 'B'. Also mention the use of part 'A' in rDNA technology. 2
11. Mention two classes of restriction enzymes. Suggest their respective roles. 2
12. In the given process of separation and isolation of DNA fragments, some of the steps are missing, Complete the missing steps – 2

A : Digestion of DNA fragments using restriction endonucleases

B :

C : Staining with ethidium bromide

D : Visualisation in U.V. light

E :

F : Purification of DNA fragments.

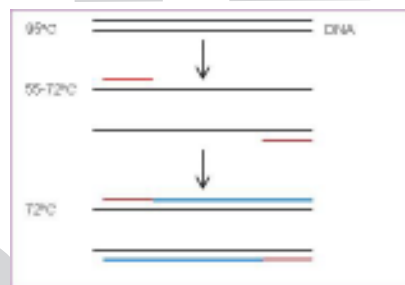
SA II

13. Since DNA is a hydrophilic molecule, it cannot pass through cell membranes. Name and explain the technique with which the DNA is forced into (i) a bacterial cell (ii) a plant cell (iii) an animal cell. 3
14. How will you obtain purified DNA from a cell? 3
15. In recombinant DNA technology, vectors are used to transfer a gene of interest in the host cells. Mention any three features of vectors that are most suitable for this purpose. 3

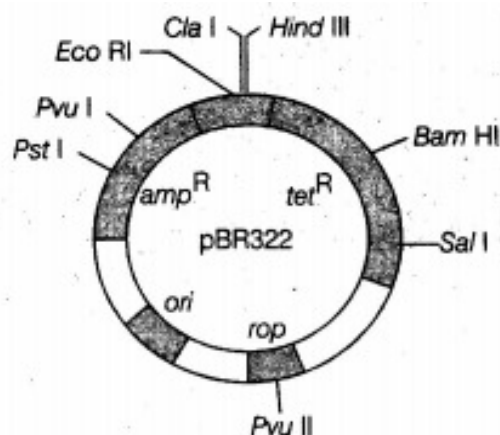
16. Why is "Agrobacterium-mediated genetic engineering transformation" in plants considered as natural genetic engineering? 3
17. Observe the given sequence of nitrogenous bases on a DNA fragment and answer the following question 3
 – 5' – CAGAATTCTTA – 3'
 3' – GTCTTAAGAAT – 5'
- (a) Name a restriction enzyme which can recognise this DNA sequence.
 (b) Write the sequence after digestion.
 (c) Why are the ends generated after digestion called sticky ends?
18. A selectable marker is used in the section of recombinants on the basis of their ability to produce colour in presence of chromogenic substrate. 3
- (a) Mention the name of mechanism involved
 (b) Which enzyme is involved in production of colour?
 (c) How is it advantageous over using antibiotic resistant gene as a selectable marker?

LA 5

19. The development of bioreactors is required to produce large quantities of products. (a) Give optimum growth conditions used in bioreactors. (b) Draw a well labelled diagram of simple stirred – tank bioreactor. (c) How does a simple stirred – tank' bioreactor differ from sparged stirred – tank' bioreactor? 5



20. In the given figure, one cycle of polymerase chain reaction (PCR) is shown– 5
- (a) Name the steps A, B and C.
 (b) Give the purpose of each of these steps.
 (c) State the contribution of bacterium *Thermus aquaticus* in this process.
21. Study the figure of vector pBR322 given below in which foreign DNA is ligated at the Bam H1 site of tetracycline resistance gene. 5



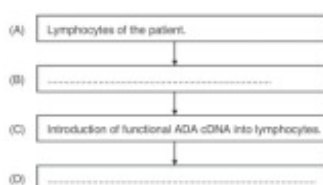
Answer the following questions :

- (a) Mention the function of rop.
- (b) What will be the selectable marker for this recombinant plasmid and why?
- (c) Explain transformation

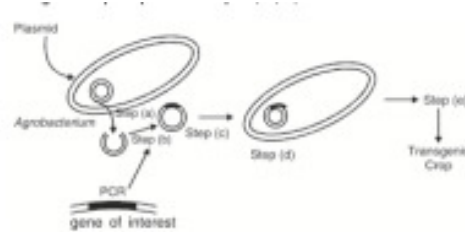
CHAPTER 12: BIOTECHNOLOGY AND ITS APPLICATION

PREVIOUS YEAR QUESTIONS

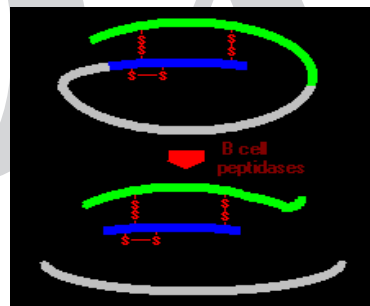
1. Name the technique based on the principle of antigen-antibody interaction used in detection of a virus (HIV). 1
2. Development of a transgenic food crop may help in solving the problem of night blindness in the developing countries, name this crop plant. 1
3. Which nematode infects the roots of tobacco plant and causes a great reduction in yield? 1
4. The first transgenic cow, produced human protein – enriched milk. Name the cow and the protein found in milk. 1
5. The insulin produced using recombinant DNA technology is more advantageous than the insulin extracted from pancreas of slaughtered cattle and pigs. How? 1
6. Name two pest resistant plants produced by using recombinant DNA technology.
7. What are the two methods for correcting ADA deficiency in a child? 2
8. Some crop plants are modified genetically by manipulating their genes. How are they made beneficial? 2
9. GEAC is one of the organisation set up by Indian Government. Write its full form. Give its two objectives. 2
10. "Industrialised nations are exploiting the bioresources of under industrialised nations". Justify the statement with a suitable example. 2
11. Some multinational companies and other organisations are using bioresources for commercial benefits, without proper authentication and compensation to concerned authorities 3
 - (a) Give the term for this unauthorised act
 - (b) Suggest any two ways to get rid of this.
12. A bacterium *Bacillus thuringiensis* produces a toxic protein named 'cry protein' that is lethal to certain insects but not to bacterium 3
 - (a) Why this toxin does not kill the bacteria?
 - (b) What type of changes occur in the gut of insects on consuming this protein?
 - (c) How man has exploited this protein for his benefit?
13. Given below is an incomplete flow chart showing the process of production of nematode resistant tobacco plants based on RNAi technique 3
 - (i) Write the missing steps in proper sequence
 - (ii) At which level RNAi silences the gene?
14. The clinical gene therapy is given to a 4 years old patient for an enzyme which is crucial for the immune system to function.



- Observe the therapeutical flow chart and give the answer of the following: 5
- Complete the missing steps(B) and (D)
 - Identify the disease to be cured.
 - Why the above method is not a complete solution to the problem?
 - Scientists have developed a method to cure this disease permanently. How?



15. In the given figure, Agrobacterium is utilized for the production of a transgenic crop. Explain the steps a, b, c, d and e shown in the figure.



16. In the given figure, Form (A) and Form (B) represents different forms of a proteinaceous hormone secreted by pancreas in mammals. 5
- What type of bonding is present between chains of this hormone?
 - What are these form (A) and form (B). How these forms differ from each other?
 - Explain how was this hormone produced by Eli Lilly, an American company, using rDNA technology.

UNIT V: ECOLOGY

CHAPTER 13: ORGANISM

PREVIOUS YEAR QUESTIONS

VSA (1 MARK)

- Which are the factor responsible for the wide variety of habitat formed within each biome? 1
- Fresh water animals are unable to survive for long in sea water. Give reason. 1
- With which population growth model is the Verhulst Pearl equation associated? 1
- Define diapause. Which organisms exhibit it? 1
- Calculate the death rate if 6 individuals in a laboratory population of 60 fruit flies died during a particular week. 1
- In biological control method, one living organism is used against another to check its uncontrolled growth. Which kind of population interaction is involved in this? 1

7. An organism has to overcome stressful condition for a limited period of time. Which strategies can it adopt to do so? 1
8. Write what do phytophagous insects feed on? 1

SA I

9. What are the four levels of biological organisation with which ecology basically deals? 2
10. Differentiate between stenohaline and euryhaline organisms. 2
11. List four features which enable the Xeric plants to survive in the desert conditions. 2
12. Mention the attributes which a population has but not an individual organism. 2
13. Differentiate between stenothermal and eurythermal organisms. 2
14. What are the four ways through which the living organisms respond to abiotic factors? 2
15. Why do clown fish and sea anemone pair up? What is this relationship called? 2

SA II

16. How does the shape of age pyramid reflect the growth status of a population? 3
17. Darwin showed that even a slow growing animal like elephant could reach enormous number in absence of checks. With the help of your understanding of growth models, explain when is this possible? Why is this notion unrealistic? 3
18. How will you measure population density in following cases? (i) fish in a lake (ii) tiger census in a national park (iii) single huge banyan tree with large canopy. 3
19. Species facing competition might evolve mechanism that promotes coexistence rather than exclusion. Justify this statement in light of Gause's competitive exclusion principle, citing suitable examples. 3

LA 5

20. What is altitude sickness? What its causes and symptoms? How does human body try to overcome altitude sickness? 5
21. Orchid flower, Ophrys co-evolves to maintain resemblance of its petal to female bee. Explain how and why does it do so? 5

CHAPTER 14: ECOSYSTEM

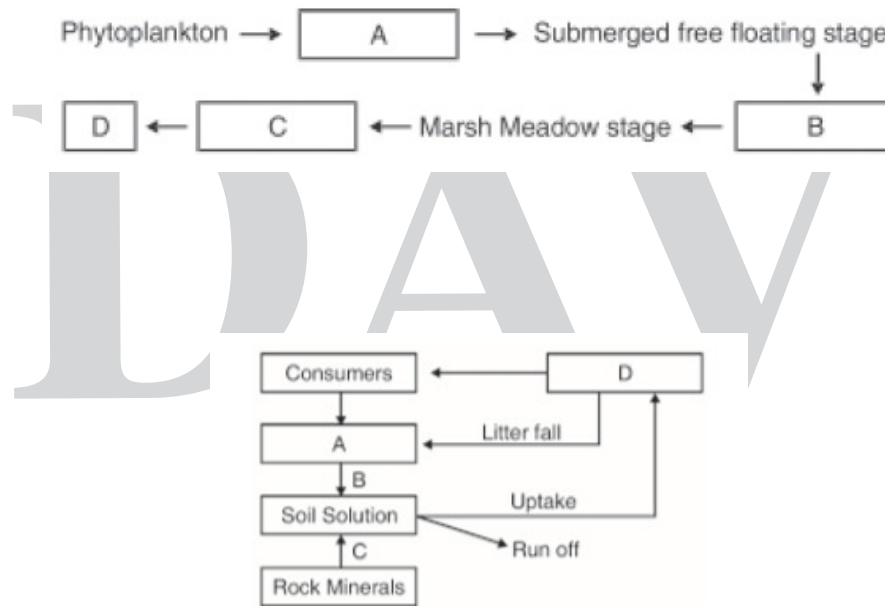
PREVIOUS YEAR QUESTIONS

VSA 1

1. Decomposition is faster if detritus is rich in nitrogen and water soluble substance like sugars. When is the decomposition process slower? 1
2. If we count the number of insects on a tree and number of small birds depending on those insects as also the number of larger birds eating the smaller, what kind of pyramid of number would we get? 1
3. Differentiate between Sere and Seral communities. 1
4. Who are generally the pioneer species in a Xerarch succession and in a Hyararch succession? 1
5. Which metabolic process causes a reduction in the Gross Primary Productivity? 1
6. What percentage of photosynthetically active radiation is captured by plants? 1
7. Name the pioners of primary succession in water. 1

SA 1

8. What is the shape of pyramid of biomass in sea? Why? 2
9. Give an example of an ecological pyramid which is always upright. Justify your answer. 2
10. Differentiate between primary succession and secondary succession. Which one occurs faster? 2
11. Gaseous nutrient cycle and sedimentary nutrient cycles have their reservoir. Name them. Why is a reservoir necessary? 2
12. Fill up the missing links depicted as A, B, C and D in the given model of primary succession. 2



13. In the model of phosphorus cycle given below, what does A, B, C and D refer to? 2
14. Differentiate between Hydrarch and a Xerarch succession. 2
15. What is the effect on decomposition rate if :- 2
 - a) Detritus is rich in lignin and chitin
 - b) Detritus is rich is nitrogen and sugars
16. What are the limitations of ecological pyramids? 2
17. Name any four ecosystem services. Who gave the price tags on nature's life support services? Which is the most important ecosystem service provider? 2
8. Study the table given below and fill the blanks from 'A' to 'F'. 2

S.No	Component of the ecosystem	Position of the trophic level	Organism present in the food chain
1.	E	Fourth trophic level	F
2.	Secondary	D	Bird, fish, wolf
3.	B	Second trophic level	C
4.	Primary producer	A	Phytoplankton, grass, tree
19. In the pyramid of biomass drawn below, name the two crops (i) one which is supported (ii) one which supports in which ecosystem is such a pyramid found? 2

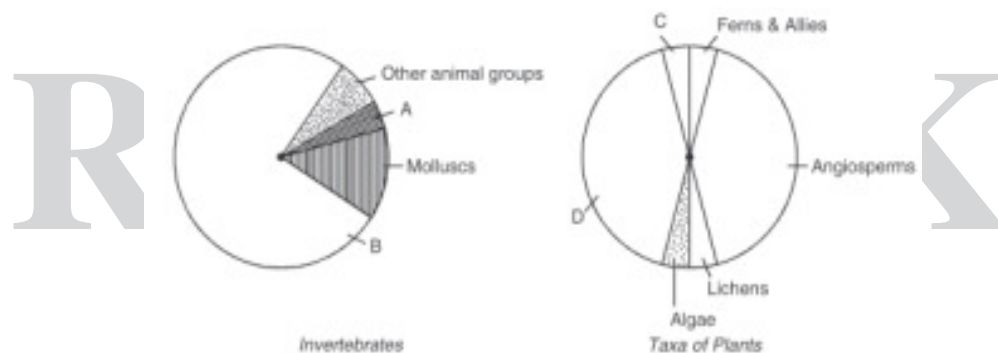
LA 5

20. Detrivores like earthworm are involved in the process of decomposition of dead plants and animals. Describe the different steps involved in the process of decomposition. 5

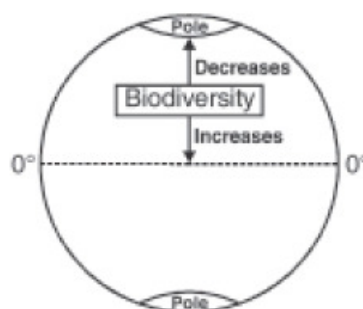
CHAPTER 15: BIODIVERSITY AND ITS CONSERVATION

PREVIOUS YEAR QUESTIONS

- Habitat loss and fragmentation has caused severe damage to a particular type of ecosystem. Name it. 1
- What trend is observed in respect of species diversity when we move from equator to poles? 1
- Which region is considered as the one with highest biodiversity on earth? What is the name given to such region. forests? 1
- Ecologists have discovered that value of $\frac{1}{Z^2}$ lies in range of 0.1 to 0.2 regardless of taxonomic group or region. When will the slope of line steeper in species area relationship? 1
- Define cryopreservation. Why is it useful in conserving biodiversity? 1
- What is the reason for genetic variation shown by medicinal plant Rauwolfia vomitoria? 1
- How many species of plants and animals have been described by IUCN in 2004? What is global species diversity according to Robert May? 1
- Explain co-extinction with a suitable example. 1
- Study the pie-diagram and answer the questions which follows : What do A, B, C and D represent in these diagrams. 1



10. Hot spots are the regions of exceptionally high biodiversity. But they have become regions of accidental habitat loss too. Name the three hot spots of our country. Why are they called 'Hot spot'? 3



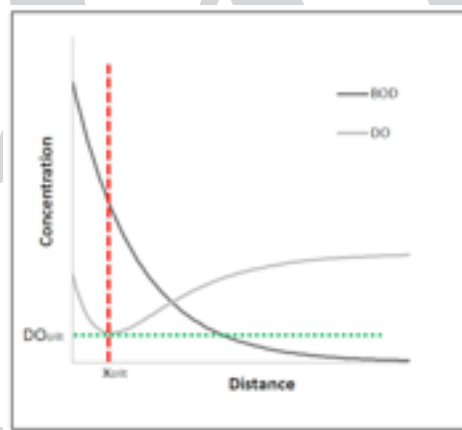
11. Study the diagram of the earth given below. Give the name of the pattern of biodiversity therein. Suggest any two reasons for this type of occurrence. 3
12. What is so special about tropics that might account for their greater biological diversity? 3
13. Why is the sobriquet 'The Evil Quartet' used in context of biodiversity? Name the members of this quartet. Why do we grieve for the genes when a species is lost? 3
14. Describe at least two approaches each for ex-situ conservation and in situ conservation as a strategy for biodiversity conservation. 3

CHAPTER 16: ENVIRONMENTAL ISSUES

PREVIOUS YEAR QUESTIONS

1. Why should the velocity of air between the plates of an electrostatic precipitator be low? 1
2. PM_{2.5} is responsible for causing greatest harm to human health. What is it? How is it harmful? 1
3. What is the noise level that can cause permanent impairment of hearing ability of human beings? 1
4. Why was the Montreal Protocol signed? 1
5. Jhum cultivation has been in practice from earlier days, but its considered more problematic these days. Why? 1
6. A radiation causes ageing of skin, skin cancer, and inflammation of cornea called snow blindness. It also damages DNA. Name the radiation. 2
7. Landfills are not much a solution for getting rid of solid wastes. Why? 2
8. Electrostatic precipitator can remove over 99% particulate matter present in exhaust from a thermal power plant. How? 2
9. Why is a scrubber used? Which spray is used on exhaust gases passing through a scrubber? 2
10. There is a sharp decline in dissolved oxygen downstream from the point of sewage discharge. Why? What are its adverse effects? 2
11. Catalytic converters use expensive metals as catalysts. (a) Name the metals generally used. (b) What precaution should be observed while using catalytic converter. 2
12. What are e-wastes? Why are they creating more problem in developing countries in comparison to developed countries? 2
13. Water logging and salinity are some of the problems that have come in the wake of Green revolution. How does water logging create problems of salinity? 2
14. What is the relationship between BOD, micro-organisms and amount of biodegradable matter? 2
15. Deforestation is creating a lot of problems in the environment. List the consequences of deforestation. 3
16. Enlist four harmful effects caused to the humans living in areas having polluted air. Suggest two measures to reduce air pollution. 3
17. People have been actively participating in the efforts for the conservation of forests 3
 - (i) Name the award instituted in respect of Amrita Devi to promote such efforts.
 - (ii) Name the movement launched to protect the trees by hugging them.

- (iii) Name the step Government of India has undertaken in 1980's to work closely with the local communities for protecting and managing forests.
18. Pollutant released due to human activities (like effluents from industries and homes) can radically accelerate the ageing process of the water body. (a) Explain how does this process occurs during natural ageing of lake. (b) Give the term used for accelerated ageing of water bodies. Also give the term used for the natural ageing of lake. 5
19. In Arcata, the town's people have created an integrated waste water treatment process within a natural system. A citizen group called FOAM helps in upkeep of this project. 5
- (a) What are the main steps in waste water management done in this way?
- (b) 'Ecosan' in Kerala and Sri Lanka is also an initiative for water conservation. How?
20. What are the contribution of Ahmed Khan in Bangalore and Ramesh Chandra Dagar in Sonipat? 5



21. Study the given graph and answer the following questions: 5
- a) The graph above shows the effect of sewage on biological oxygen demand (BOD) and dissolved oxygen (DO) in a flowing stream. Explain where the smallest fish population would most likely be found and why it would be found there.
- b) When the level of BOD increases and decreases?
22. Although levels of CFCs in the atmosphere are much lower than those of CO₂. Why are CFCs still a potent greenhouse gas? 5
23. a) What is a greenhouse gas that is exclusively anthropogenic? 5
- b) What is a greenhouse gas that is found in the lower troposphere that is formed by a photochemical reaction?