Sample Paper 2

Biology (044)

Class XII Session 2022-23

Time: 3 Hours **Max. Marks: 70**

General Instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. Section—A has 16 questions of 1 mark each; Section—B has 5 questions of 2 marks each; Section—C has 7 questions of 3 marks each: Section—D has 2 case-based questions of 4 marks each; and Section—E has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION-A

1. Which of the following is incorrect regarding ZW-ZZ type of sex determination?

(a) It occcurs in birds and some reptiles

(b) 1 : 1 sex ratio is produced in the offsprings

(c) Females are homogametic and males are heterogametic

(d) All of these

2. Which of the following statements regarding the asexual reproduction is incorrect?

(a) It is uniparental and usually occurs in unicellular organisms.

(b) It does not contribute to evolution and speciation.

(c) Both mitotic and meiotic division occurs.

(d) There is no variation and the offsprings have the same phenotype and genotype.

3. DNA replication is

(a) semiconservative and discontinuous

(b) semiconservative and semi discontinuous

(c) conservative and discontinuous

(d) conservative

4. The site of origin of the new plantlets in potato, dahlia, ginger and banana is

(a) nodes of modified stem.

(b) internodes of modified stem.

(c) floral buds present on stem.

(d) adventitious buds present on root.

5. Plasmid has been used as vector because

(a) It transfer the piece of DNA attached to it.

(b) it can move between prokaryotic and eukaryotic cells.

(c) both its ends show replication.

(d) it has antibiotic resistance gene.

6. ABO blood group system is due to

(a) multiple allelism

(b) incomplete dominance

(c) multifactor inheritance

(d) epistasis

7. The linking of antibiotic resistance gene with the plasmid vector became possible with

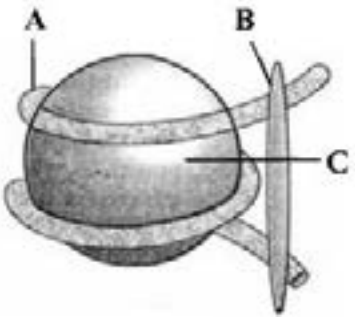
(a) DNA polymerase

(b) endonucleases

(c) DNA ligase

(d) exonucleases

8. Refer the given figure of nucleosome and select the option that correctly identifies the parts A, B and C.



	A	**B**	**C**
(a)	DNA	Histone octamer	H1 histone
(b)	Histone octamer	H1 histone	DNA
(c)	Histone octamer	DNA	H1 histone
(d)	DNA	H1 histone	Octamer

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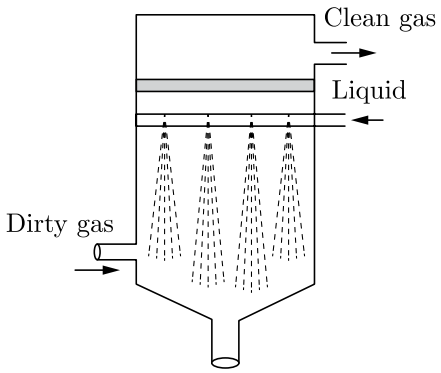
9. According to size of air pollutants, range and types of chemical the device given below is best used to control which of the following pollutants?



(a) Dissolved gases

(b) charged particulate matter

(c) large particulates

(d) fine particles

10. Inbreeding depression

(a) usually reduces fertility and productivity

(b) usually reduces productivity only.

(c) usually increases fertility only.

(d) usually increases fertility and productivity

11. The kangaroo rats of North American deserts do not need to drink water because

(a) they are able to concentrate urine, to minimize water loss.

(b) they meet their water requirement through internal fat oxidation when the water is a byproduct.

(c) they do not have sweat glands.

(d) all of the above

12. The 'mule' is the result of

(a) inbreeding depression

(b) inter-specific hybridization

(c) cross-breeding

(d) out-breeding

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DIRECTION : Q.No. 13-16: Consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

13. **Assertion:** Insects visit flowers to gather honey.
Reason: Attraction to flowers prevents the insects from damaging other parts of the plant.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is False but R is true.

14. **Assertion:** Curdling is required in the manufacture of cheese.
Reason: Lactic acid bacteria are used for the purpose.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is False but R is true.

15. **Assertion:** Female mosquito is an example of temporary parasite.
Reason: Plasmodium is an endoparasite.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is False but R is true.

16. **Assertion:** Insulin is said to be anabolic hormone.
Reason: Failure of insulin secretion causes diabetes.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is False but R is true.

SECTION-B

17. Write about the importance of family planning programme in India ?

18. Why are angiosperm anthers called dithecous? Describe the structure of microsporangium and draw a well labelled diagram.

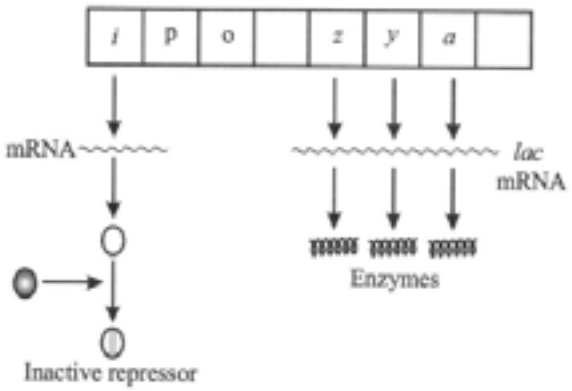
19. What is meant by transgenic animal? List any four areas in which transgenic animals have wide applications.

20. Make a list of any three outbreeding devices that flowering plants have developed and explain how they help to encourage cross-pollination.

21. Sex determination is based on particular chromosomes in both birds and humans. State two points of difference between their mechanisms of sex determination.

SECTION-C

22. Study the figure given below and answer the questions.



(a) What does the figure express?
(b) When does the transcription of lac mRNA stop?
(c) Name the enzymes transcribed by the genes 'z' and 'a'.

or

(a) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides. Explain the basis on which he arrived at this conclusion.
(b) Name two salient features of genetic code.

23. Name a disorder, give the karyotype and write the symptoms where a human male suffers as a result of an additional X-chromosome.

24. "Stability of a community depends on its species richness." Write how did David Tilman show this experimentally.

25. (a) A mixture of fragmented DNA was electrophoresed in an agarose gel. After staining the gel with ethidium bromide, no DNA bands were observed. What could be the reason?
(b) Do eukaryotic cells have restriction endonucleases? Justify your answer.

26. Explain adaptive radiation and convergent evolution by taking example of some of Australian marsupials and Australian placental mammals.

or

Australian Marsupials and placental mammals are suitable examples of adaptive radiation and convergent evolution. Explain giving reasons.

27. (i) Write the scientific name of most common species of honeybee reared.
(ii) Mention the kind of areas that are suitable for bee keeping practices.
(iii) Mention any two uses of bee-wax.

28. (i) Explain the events taking place at the time of fertilisation of an ovum in a human female.
(ii) Trace the development of the zygote up to its implantation in the uterus.
(iii) Name and draw a labelled sectional view of the embryonic stage that gets implanted.

SECTION-D

29. Read the following and answer any four questions from 29(i) to 29(iv) given below:

Events of Menstrual Cycle:

The major events of the menstrual cycle are as follows as the cycle starts with the menstrual phase, when menstrual flow occurs and it lasts for 3-5 days. The menstrual flow results due to breakdown of endometrial lining of the uterus and its blood vessels which forms liquid that comes out through vagina. Menstruation only occurs if the released ouvm is not fertilised. Lack of menstruation may be indicative of pregnancy. However, it may also be caused due to some other underlying causes like stress, poor health etc. The menstrual phase is followed by the follicular phase.

During this phase, the primary follicles in the ovary grow to become a fully mature Graafian follicle and simultaneously the endometrium of uterus regenerates through proliferation. These changes in the ovary and the uterus are induced by changes in the levels of pituitary and ovarian hormones. The secretion of gonadotropins (LH and FSH) increases gradually during the follicular phase, and stimulates follicular development as well as secretion of estrogens by the growing follicles. Both LH and FSH attain a peak level in the middle of cycle (about 14th day). Rapid secretion of LH leading to its maximum level during the mid-cycle called LH surge induces rupture of Graafian follicle and thereby the release of ovum (ovulation). The ovulation (ovulatory phase) is followed by the luteal phase during which the remaining parts of the Graafian follicle transform as the corpus luteum.

The corpus luteum secretes large amounts of progesterone which is essential for maintenance of the endometrium. Such an endometrium is necessary for implantation of the fertilised ovum and other events of pregnancy. During pregnanacy, all events of the menstrual cycle stop and there is no menstruation. In the absence of fertilisation, the corpus luteum degenerates. This causes disintegration of the endometrium leading to menstruation, marking a new cycle. In human beings, menstrual cycles cease around 50 years of age; that is termed as menopause. Cyclic menstruation is an indicator of normal reproductive phase and extends between menarche and menopause.

(i) What causes menstrual flow?
(ii) Why secretory phase is also known as luteal phase?
(iii) What happen if LH secreted rapidly?
(iv) Which of the hormone has no role in menstruation?

30. Read the following and answer any four questions from 30(i) to 30(iv) given below:

Bt Cotton:

Some strains of Bacillus thuringiensis produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes). B. thuringiensis forms protein crystals during a particular phase of their growth. These crystals contain a toxic insecticidal protein. Why does this toxin not kill the Bacillus. Actually, the Bt toxin protein exist as inactive protoxins but once an insect ingest the inactive toxin, it is converted into an active form of toxin due to the alkaline pH of the gut which solubilise the crystals. The activated toxin binds to the surface of midgut epithelial cells and creates pores that cause cell swelling and lysis and eventually cause death of the insect. Specific Bt toxin genes were isolated from Bacillus thuringiensis and incorporated into the several crop plants such as cotton (Figure 12.1). The choice of genes depends upon the crop and the targeted pest, as most Bt toxins are insect-group specific. The toxin is coded by a gene named cry. There are a number of them, for example, the proteins encoded by the genes cryIAc and cryIIAb control the cotton bollworms that of cryIAb control corn borer.

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(i) What is role of cry II Ab and cry I Ab?
(ii) Specific Bt toxin gene was isolated from which organism?
(iii) Name the gene that encodes for Bt protein specific to cotton bollworm?
(iv) Consider the following statements (A-D) about organic farming
  (A) utilizes genetically modified crops like Bt cotton
  (B) uses only naturally produced inputs like compost
  (C) does not use pesticides and urea
  (D) produces vegetables rich in vitamins and minerals.

Which of the above statements are correct?
(a) B, C and D
(b) C and D only
(c) B and C only
(d) A and B only

SECTION-E

31. Mr. Oberoi angrily says to his daughter not to marry Mohan since their family is known to inherit haemophilia. The daughter objected to her father's order. Mr. Oberoi was adamant and threatened also. Brijmohan's daughter explained the biological interpretation of his fear and convinced her father.
(a) Briefly discuss the inheritance pattern of haemophilia.
(b) Mohan was not haemophilic though his father is haemophilic. Explain the condition of Mohan by considering following three conditions of his mother:
  (i) Normal mother
  (ii) Carrier mother
  (iii) Haemophilic mother
(c) Is there any fear of haemophilia if Mr. Oberoi daughter marries Mohan (non-haemophilic)?

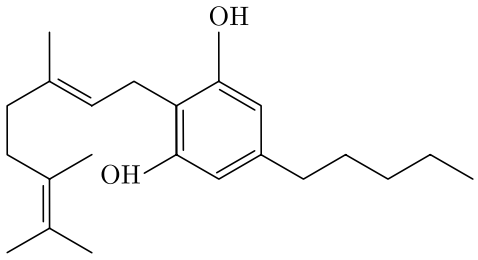
or

How Hershey and Chase proved that DNA is the genetic material?

32. Briefly explain the lifecycle of plasmodium. What measures would you take to control malaria?

or

(a) What measures do you suggest for prevention and control of alcohol and drug abuse among adolescents?
(b) The outline structure of a drug is given below.



(i) Which group of drugs does this represent? Name the plant from which it is obtained.
(ii) What are the modes of consumption of these drugs?
(iii) Name the organ of the body which is affected by consumption of these drugs.

33. Mention the factors which cause changes in the size of population of a species.

or

(a) State how ex-situ conservation helps in protecting biodiversity. Name four types of ex-situ methods.
(b) Explain the importance of sacred groves.

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