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CLASS X, MODEL EXAMINATION (2022-23)
BIOLOGY (CODE – 044)

Time: 3 Hours **Maximum Marks: 70**

General Instructions:

(i) All questions are compulsory.

(ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.

(iii) Section–A has 14 questions of 1 mark each and 02 case-based questions of 4 mark each. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.

(iv) 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.

(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

Section – A

1. Name the component cells of the 'egg apparatus' in an embryo sac.

2. Write the location and function of the Sertoli cells in humans.

3. Why is that the father never passes on the gene for haemophilia to his sons?

4. Mention the type of allele that expresses itself only in homozygous state in an organism.

5. Name the negatively charged and positively charged components of a nucleosome.

6. Suggest a technique to a researcher who needs to separate fragments of DNA.

7. Mention two functions of the codon AUG.

8. Mention the role of cyanobacteria as a biofertilizer.

9. Write the scientific names of the causal organisms of elephantiasis and ringworm in humans.

10. Name one primary and secondary lymphoid organ in the human body.

Question No. 11 to 14 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

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

11.Assertion: An organ transplant patient if not provided with cyclosporin A may reject the transplanted organ.

Reason: Cyclosporin A inhibits activation of T-cells and interferes with destruction of non-self-cells.

12. Assertion: In Mirabilis, selfing of F1 pink flower plants produces same phenotypic & genotypic ratio.

Reason: Flower colour gene shows incomplete dominance.

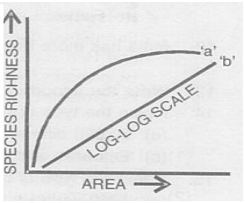
13. Assertion: DNA is a Semiconservative in nature.

Reason: In each cycle of replication the complimentary strands of parental double helix is conserved.

14. Assertion: The endometrium undergoes cyclical changes during the menstrual cycle.

Reason: Perimetrium contracts strongly during delivery of the baby.

15. The following graph shows the species-area relationship. Answer the following questions as directed.



i. Name the naturalist who studied the kind of relationship shown in the graph.
ii. Write the observations made by him.
iii. Write the situations as discovered by the ecologists when the value of 'Z' (slope of the line) lies between (a) 0.1 and 0.2 (b) 0.6 and 1.2. What does 'Z' stand for?
iv. When would the slope of the line 'b; become steeper?

16. Refer to the diagram of maturation of proinsulin into insulin to answer the following questions.

i. How are two short polypeptide chains of insulin linked together?

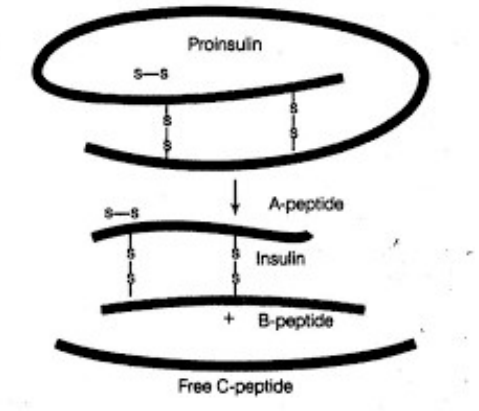
ii. State the role of C- peptide in human insulin.

iii. Mention the chemical change that proinsulin undergoes, to be able to act as mature insulin.

iv. Assertion: Human insulin is produced in E. coli.

Reason: In mammals, insulin is synthesised as a pro-hormone which contains an extra stretch of protein.

a. Both assertion and reason are true and the reason is the correct explanation of the assertion.
b. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
c. Assertion is true but reason is false.
d. Both assertion and reason are false.



Section- B

17. Identify a, b, c and d in the following table:

S.No.	Name of the human disease	Name of the casual bacteria/ virus	Specific organ or its part affected
i.	Typhoid	a	Small intestine
ii.	Common cold	b	c
iii.	Pneumonia	d	Alveoli of lungs

18. State the role of oxytocin in parturition. What triggers its release from the pituitary?

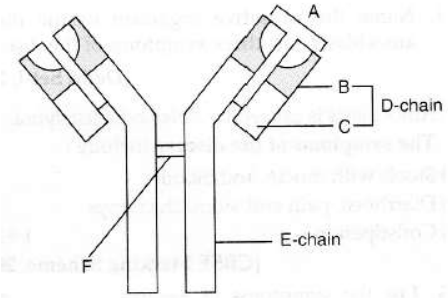
19. A colour-blind man marries a woman with normal vision whose father was colour-blind. Work out a cross to show the genotype of the couple and their respective sons.

20. Construct an age pyramid which reflects an expanding growth status of human population.

OR

What is mutualism? Mention any two examples where the organisms involved are commercially exploited in agriculture.

21. Construct a pyramid of biomass starting with phytoplankton. Label three tropic levels. Is the pyramid upright or inverted? Why?
22. What is cryopreservation? Give its one use.
23. A student on a field trip suddenly felt breathlessness and started to sneeze very badly. Name this response and explain what it is due to?
24. Identify A, D, E and F in the diagram of an antibody molecule given below:



25. Describe how biogas is generated from activated sludge. List the components of biogas.

Section- C

26**.** How would you find genotype of a tall pea plant bearing white flowers? Explain with the help of a cross. Name the type of cross you would use.
27. Explain the process of transcription in bacterium.
28. Name the host plant and the part that Meloidogyne incognita infects. Explain the role of Agrobacterium in production of dsRNA in host plant.
29. Construct a flow chart exhibiting sequential events of oogenesis.
30. Explain any three advantages the seeds offer to angiosperms.

OR

Suggest and explain any three Assisted Reproductive Technologies (ART) to an infertile couple.

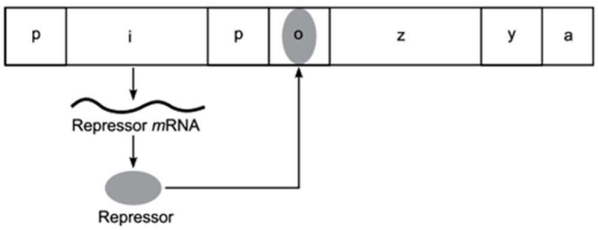
Section- D

31. a. Draw a vertical section of a maize grain and label pericarp, scutellum, coleoptiles and endosperm.
    b. Can pollen grains be stored? How?
    c. Which are the three cells found in pollen grain when it is shed at 3 – celled stage?

OR

    a. Explain the events taking place at the time of fertilisation of an ovum in a human female.
    b. Trace the development of the zygote up to its implantation in the uterus.

32. Given above is the schematic representation of lac operon of E. coli.
    (i). Identify i and p.
    (ii). Name the 'inducer' for this operon
    (iii.) Explain the functioning of this operon when lactose is provided in the growth medium of the bacteria.



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