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XII - A
Roll no. → 18

D.P.S R.K

S-4

Half-Yearly Examination 2016

Subject : Biology (Set 2)

Time : 3 hrs. Marks : 70

General Instructions :-

(i) There are total of 26 questions and five sections in the question paper.
All questions are compulsory.

(ii) Section A contains question number 1 to 5, Very Short Answer type questions of 1 mark each.

(iii) Section B contains question number 6 to 10, short answer type I questions of 2 marks each.

(iv) Section C contains question number 11 to 22, Short Answer type II questions of 3 marks each.

(v) Section D contains question number 23, Value Based question of 4 marks.

(vi) Section E contains question number 24 to 26, Long Answer type questions of 5 marks each.

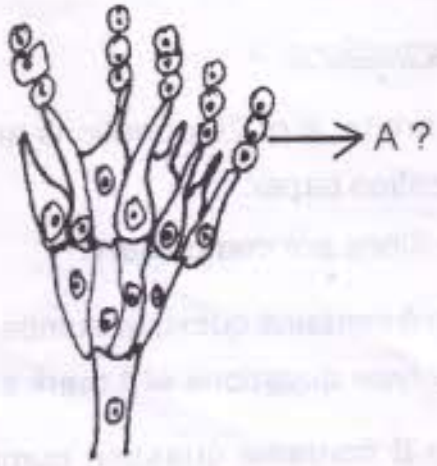
(vii) No overall choice, however an internal choice is provided in one question of two marks, one question of 3 marks and all questions of five marks.

P.T.O.

SECTION – A

1. (a) State a difference between gene and allele.

   (b) How does DNA polymorphism arise in a population ? (1)

2. 

   Identify A in the given diagram and mention its function. (1)

3. Which technique is employed for preservation of gametes of threatened species ? How is it helpful in conservation of biodiversity ? (1)

4. Why do internodal segments of sugarcane fail to propagate vegetatively even when they are in contact with damp soil ? (1)

5. (a) In case of an infertile couple, male partener can inseminate normally but the mobility of sperms is below 40%. Judge the kind of ART suited in this

situation to form an embryo in laboratory without involving a donor.

(b) Mention any two events that are inhibited by intake of oral contraceptive pills to prevent pregnancy in humans. (1)

SECTION – B

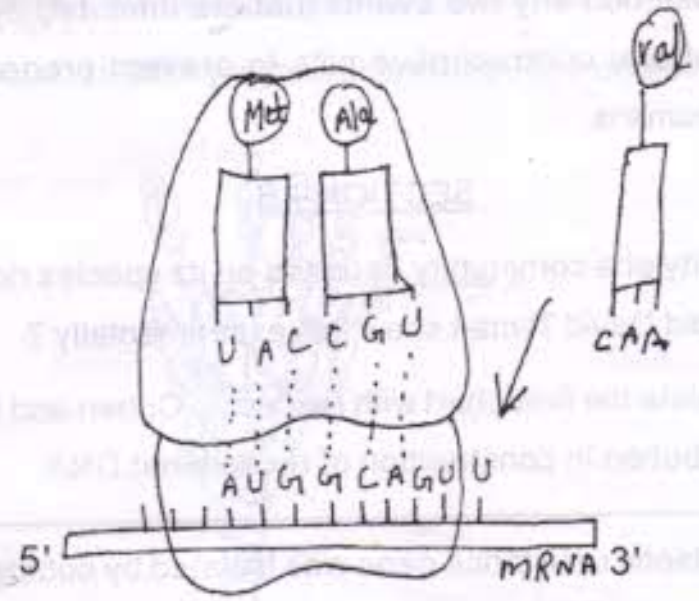
6. Stability of a community depends on its species richness. How did David Tilman show this experimentally ? (2)

7. Complete the flow chart with respect to Cohen and Boyer's contribution in construction of recombinat DNA. (2)

Antibiotic resistance gene was isolated by cutting out a piece of DNA from a plasmid
↓
The cut piece of DNA was linked with _____(A)_____ with the help of _____(B)_____ enzyme
↓
When this DNA is transferred to _____(C)_____ it could replicate using host's _____(D)_____ enzyme and make multiple copies

8. Why and how can bacterial cells be made 'competent' ? (2)

9.



(a) Illustrate this process when ribosome moves to next codon.

(b) What will happen when ribosome reaches UGA codon of mRNA ? (2)

10. What are the consequences of cultural eutrophication ? (2)

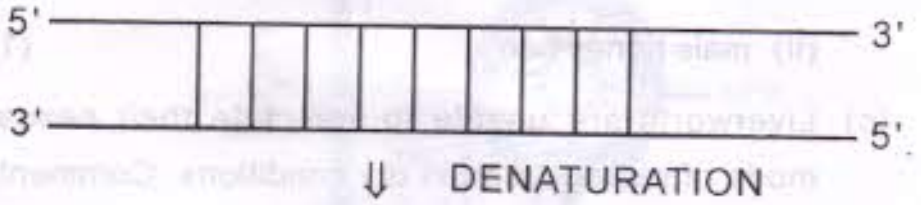
OR

Name any two sources of e-wastes and write two different ways for their disposal.

Contd.....

SECTION – C

11. (a) Complete the following diagram for the technique involved in the amplification of gene of interest.



(b) Why are two sets of primers required in this technique ? (2+1)

12. (a) What is the difference between mode of action of CuT and LNG 20 as contraceptive device.

(b) Removal of gonads cannot be considered as contraceptive option why ? (2+1)

13. (a) Name :-

(i) The type of cell division that takes place in zygote of an organism exhibiting haplontic life cycle.

(ii) Units of vegetative propagation in water hyacinth. (1)

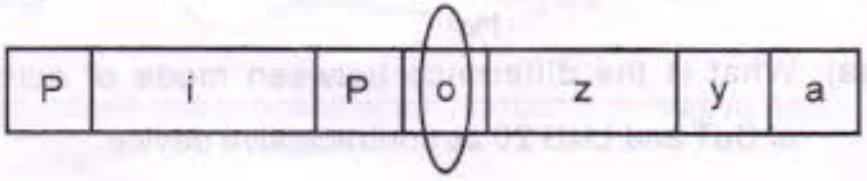
(b) Mention the ploidy of :

(i) meiocytes

(ii) male honey bee (1)

(c) Liverworts are unable to complete their sexual mode of reproduction in dry conditions. Comment. (1)

14. Observe the representation of genes involved in lac operon.



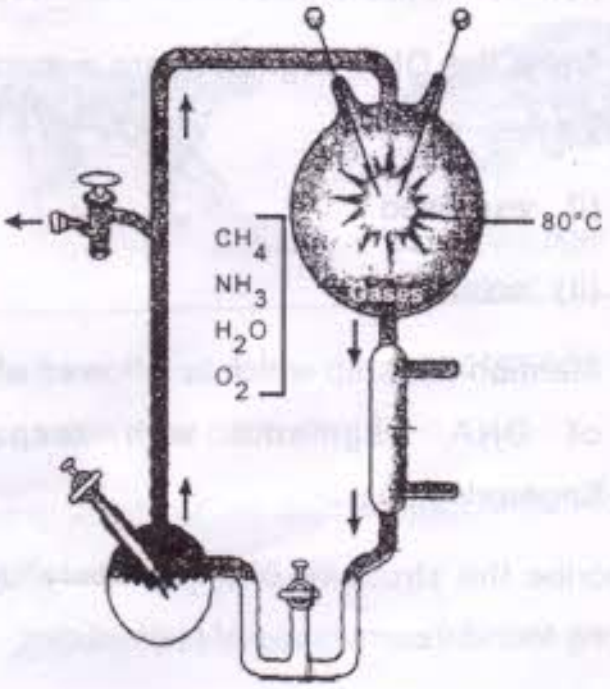
(a) Identify the region where the represser protein will attach normally.

(b) Under certain conditions represser is unable to attach at this site. Explain.

(c) Why this kind of regulation is called negative regulation ?

(d) Why a very low level of expression of this operon has to be present in the cell all the time ? (½+½+1+1=3)

15. A student was simulating Urey and Miller's experiment to prove the origin of life.



(a) Find out the reasons why he could not get desired results.

(b) What conclusion can be drawn by Urey and Miller through this experiment ?

(c) Compare the conclusion drawn with the theory of spontaneous generation. (1+1+1=3)

16. (a) Suggest a technique to a researcher who needs to

separate fragments of DNA. What is the principle behind this technique ? (1)

(b) Once the DNA segments are separated, how are they :

(i) visualised

(ii) isolated (1)

(c) Mention the step which is followed after separation of DNA fragments with respect to DNA fingerprinting. (1)

17. Describe the structure of a RNA polynucleotide chain having four different types of nucleotides. (3)

18 (a) What is El Nino effect ? How does it account for biodiversity loss ? (3)

(b) List 2 criteria used for determining a "hot spot."

OR

Give graphical representation of species area relationship as studied by Alexander Humboldt. What is the significance of slope of regression in such a relationship ?

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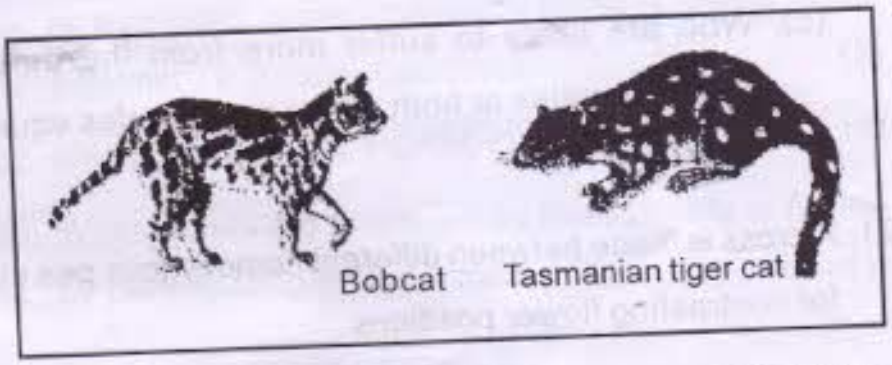
19. Refer to the figure given below and answer the questions that follow :-



(a) Recognize and explain the process by which Tasmanian tiger cat evolved.

(b) Give example of two animals that have evolved along with Tasmanian tiger cat.

(c) Compare and contrast the two animals shown. (3)

20. (a) Complete the following blanks in mutant Hb gene for sickle cell anaemia. (3)

Hb(s) gene 3' _____ [A] ?_____5'

5' _____ GTG _____3'

↓

mRNA _____ [B] ?_____3'

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(b) What difference would be noted in phenotype of normal and sufferer related to this gene ?

(c) Who are likely to suffer more from the defect ? Males, females or both males and females equally ? Why ?

21. A cross is made between different homozygous pea plants for contrasting flower positions.

(a) Find out the position of flowers in F_1 generation on the basis of genotypes. (1)

(b) Work out the cross upto F_2 generation. (1)

(c) Compute the relative fraction of genotypes in the F_2 generation. (1)

22. (a) Refrigerants are said to be responsible for ozone holes detected in Antartica. Justify.

(b) Inspite of being non-polluting, why are there great apprehensions in using nuclear energy for generating electricity ?

(c) Mention the effect of UV rays on DNA and proteins in living organisms. (1x3=3)

SECTION – D

23. (a) Explain the innovative approach taken by biologists of Humboldt State University towards waste water treatment in Arcata, California. (2)

(b) Mention the role of 'FOAM' in this project. (1)

(c) What values are projected by town people of Arcata by participating in this project ? (1)

SECTION – E

24. (a) A foreign DNA was ligated to PstI site in PBR 322 vector. Explain how would Ampicillin act as a selectable marker in such a situation ? (2)

(b) Mention the role of :

(i) ori

(ii) rop in PBR 322 (1)

(c) How is coding sequence of â galactosidase considered a better marker than antibiotic resistance genes. (2)

OR

(a) Draw a labelled sketch of simple stirred tank bioreactor. Mention its application. Why does this bioreactor have a curved base ? (3)

P.T.O.

(b) After completion of biosynthetic stage, how is product made ready for marketing as a finished product. (2)

25. (a) Illustrate operation of Natural Selection as observed due to Industrial melanism. How will you explain occurence of such operation by Natural Selection ? Give an example of evolution by anthropogenic action which occurs in time scale of months or years. (5)

(b) Rate of appearance of new forms is linked to life span of an organism. Explain with help of suitable example.

OR

Fitness is end result of ability to adapt and get selected by Nature. Explain with suitable examples.

26. (a) How are the following formed and involved in DNA packaging in nucleus of a cell ?

(i) Histone octamer

(ii) Nucleosome

(iii) Chromatin

(b) Differentiate between euchromatin and heterochromatin. (5)

OR

(a) Name the methodology of sequencing total DNA from a cell. How were the DNA fragments arranged ? How were genetic and physical maps assigned on the genome. (3)

(b) How did Hershey and Chase differentiate between DNA and protein in their experiment while proving that DNA is genetic material. (2)