Pre Board -1 Examination – December 2019

Series SSR / 1 Code No. 044/ 1 / 2

- Please check that this question paper contains 7 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 27 questions.
- Please write down the serial number of the question before attempting it.

Biology

Class : XII Time allowed : 3 hrs.
Date : 16-12-2019 Max marks : 70

General Instructions:

1. There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
2. Section A contains question numbers 1 to 5, multiple choice questions of one mark each.
   Section B contains question numbers 6 to 12, short answer type I questions of two marks each. Section C contains question numbers 13 to 21, short answer type II questions of three marks each. Section D contains question number 22 to 24, case-based short answer type questions of three marks each. Section E contains question numbers 25 to 27, long answer type questions of five marks each.
3. There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

SECTION-A

1. Mycorrhiza is an example of (1)

   (a) Commensalisms

   (b) Mutualism

   (c) Algal associated with fungi.

   (d) Fungi associated with Higher Plants

2. The conditions of the earth atmosphere conducive for the origin of life were: (1)

(a) Presence of high temperature, CH_4, NH_3, and O_3

(b) High temperature, CH_4, NH_3, volcanic eruption

(c) High temperature, volcanic eruption, O_2, NH_3

(d) Volcanic eruption, CH_3, NH_3 and O_2

OR

Non coding sequences present within a gene are called:

(a) Exon (b) Operon (c) Promoter (d) Intron

3. To analyze the genotype of an organism, it is made to (1)

(a) Self cross (b) Cross with recessive parent

(c) Cross with dominant parent (d) Cross with another species

4. An inverted Pyramid of biomass is represented by (1)

(a) Aquatic ecosystem (b) Ecosystem of a big tree

(c) Grassland ecosystem (d) Tropical fresh ecosystem.

5. Gene therapy can be used to correct one of the following (1)

(a) Defective ADA (b) Lack of B-Lymphocytes

(c) Defective Immunoglobulin (d) Lack of T-Lymphocytes

OR

Klinefelter's syndrome has the genetic makeup of

(a) 44 autosomes + xxy (b) 44 autosomes + xo

(c) 45 autosomes + xx (d) 45 autosomes + xy

SECTION-B

6. (a) You are given castor and bean seed. Which one of the two would you select to observe the endosperm? (2)

(b) The development of Endosperm precedes that of embryo in plants justify.

7. What are the major components of seminal plasma? (2)

8. In which parts of the body of the hosts do the following events in the life cycle of Plasmodium take place? Name both, the body part and the host. (2)

(a) Fertilization (b) Development of gametocytes

(c) Release of sporozoites (d) Asexual reproduction

9. A person injured in a road accident and requiring an urgent immune response was brought to a doctor. (2)

(a) What did the doctor immediately do?

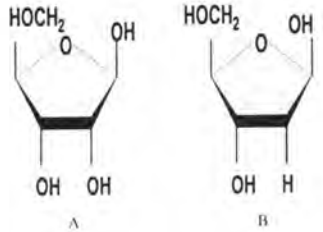
(b) What kind of immunity was he providing to the patient?

10. Why does a beekeeper keep beehives in crop fields during the flowering periods? State any two advantages. (2)

OR

List any four advantages of genetically modified crop plants over their wild/domesticated relatives.

11. Carefully examine structures A and B of pentose sugar given below. Which one of the two is more reactive? Give reasons. (2)



12. Differentiate between euchromatin and heterochromatin. (2)

SECTION-C

13. (a) In a pond there were 200 frogs. 40 more were born in the year. Calculate the birth rate of the population. (3)

b) Population in terms of number is not always a necessary parameter to measure population density. Justify with two examples.

14. Are humming birds and fish, regulators or conformers? Give reasons in support of your answer. (3)

15. Write the function of each one of the following: (3)

(a) Fimbriae (b) coleoptile (c) oxytocin

16. Draw a schematic sketch of pBR 322 plasmid and label the following in it. (3)

(a) any two restriction site (b) ori and rop genes (c) an antibiotic resistant gene

17. Enumerate in sequential order the 4 steps that a plant breeder should follow to obtain a disease resistant crop (3)

18. As a biologist explain the technique to a dairy farmer for increasing the yield of herd size of cattle in a short time (3)

19. a) Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below:

3

b) Write the RNA strand transcribed from the above transcription unit along with its polarity.

OR

a) Mention two events in which DNA is unzipped. b) Predict the consequences when both the template and the coding strands of a DNA segment participate in transcription process?

20. a What is meant by ecological succession? Explain how it occurs.

b. What properties distinguish a pioneer community from climax community?(3)

OR

Differentiate between primary and secondary succession. Provide one example of each.

21. With respect to Messelson and Stahl's Experiment, answer the following questions:

(a) Identify the method used to distinguish between heavy and light isotopes of nitrogen.

(b) With the help of diagrams, compare the results for the DNA isolated after 20 minutes of experiment with the DNA which was isolated after 40 minutes. (3)

SECTION-D

22. Given below is a figure of a biogas plant. (3)

(a) Identify A and justify its floating nature.

(b) Identify the products B and C and discuss their significance.

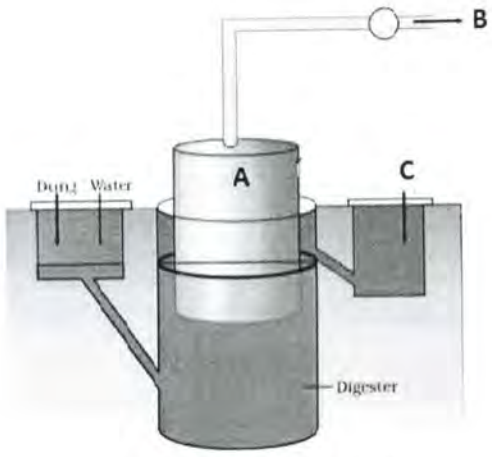
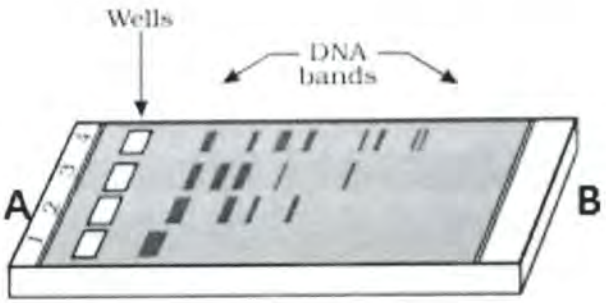


Figure A typical biogas plant

23. Rajesh was doing gel electrophoresis to purify DNA fragments. Given below is the sketch of the observations of the experiment performed by him. (3)



(a) At which end he would have loaded the samples and where?

(b) Analyse the reason for different positions taken up by the DNA bands.

(c) Elaborate the step he would have followed to visualize DNA bands.

24. According to Global Hunger Index 2014 two billion people suffer from hidden hunger. Apply your knowledge of plant breeding techniques to suggest a program to improve public health. Specify four objectives of the program. Also mention one example of such a produce. (3)

SECTION-E

25. Human female is not fertile after menopause whereas males can produce gametes at any age after puberty. Analyze the statement and schematically represent a comparison between gametogenesis in males and females.

[2+3=5]

OR

A village health worker was taking a session with women. She tells the women that one has to be very careful while using oral pills as method of birth control. Wrong usage can actually promote conception.

(a) Analyze the statement and compare the merits and demerits of using oral pills and surgical methods of birth control.

(b) Village women were confused as to how a thin metallic Copper loop can provide protection against pregnancy. Justify the use explaining the mode of action of IUDs.

26. In a dihybrid cross, white eyed, yellow bodied female Drosophila was crossed with red eyed, brown bodied male Drosophila. The cross produced 1.3 percent recombinants and 98.7 progeny with parental type combinations in the F2 generation.

Analyze the above observation and compare with the Mendelian dihybrid cross.

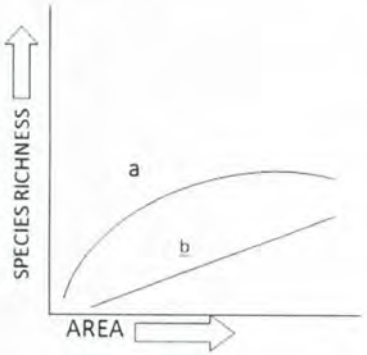
(5)

OR

(a) Summarize the process by which the sequence of DNA bases in Human Genome Project was determined using the method developed by Frederick Sanger.

(b)Name a free living non-pathogenic nematode who's DNA has been completely sequenced.

27. The graph below shows species –area relationship: (5)



A. If b denotes the relationship on log scale

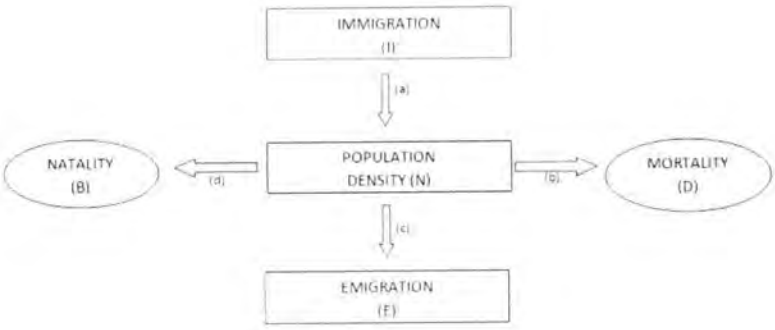
i) Describe a and b.

ii) How is slope represented? Give the normal range of slope.

iii) What kind of slope will be observed for frugivorous birds and mammals in a tropical forest?

B. Species diversity of plants (22%) is much less than that of animals (72%). Analyze the reasons For greater diversity of animals as compared to plants.

OR



(a) Which of the above represents the increase or decrease of population?

(b) If N is the population density at time t, then what would be its density at time (t+1)? Give the formula.

(c) In a barn there were 30 rats. 5 more rats enter the barn and 6 out of the total rats were eaten by the cats. If 8 rats were born during the time period under consideration and 7 rats left the barn, find out the resultant population at time (t+1).

(d) If a new habitat is just being colonized, out of the four factors affecting the population growth which factor contributes the most?

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