EDUCATALYSTS

Class(12^{th})

Biology Sample Paper

Sample Question Paper

Class XII (2015-16)

Biology (044)

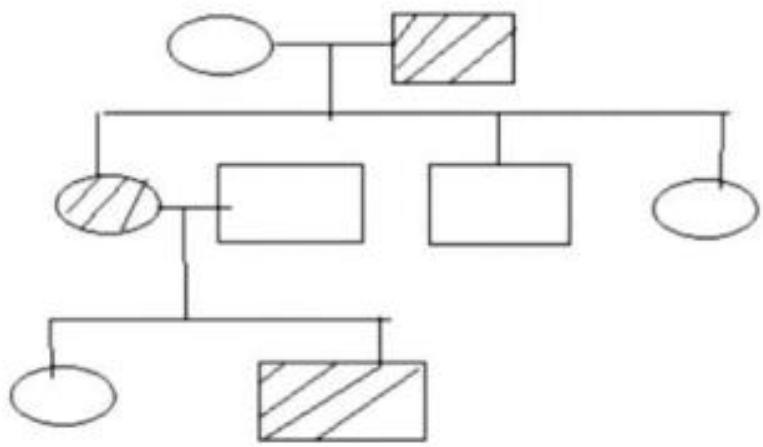
Time allowed: 3 Hrs **Maximum Marks: 70**

General Instructions:

1. **There are a total of 26 questions and five sections in the question paper. All questions are compulsory.**
2. **Section A contains question number 1 to 5, Very Short Answer type questions of one mark each.**
3. **Section B contains question number 6 to 10, Short Answer type I questions of two marks each.**
4. **Section C contains question number 11 to 22, Short Answer type II questions of three marks each.**
5. **Section D contains question number 23, Value Based Question of four marks.**
6. **Section E contains question number 24 to 26, Long Answer type questions of five marks each.**
7. **There is no overall choice in the question paper; however, an internal choice is provided in one question of two marks, one question of three marks and all three questions of five marks. An examinee is to attempt any of the questions out of the two given in the question paper with the same question number.**

SECTION -A

1. Observe the pedigree chart and answer the following questions:



(a) Identify whether the trait is sex-linked or autosomal.

(b) Give an example of a disease in human beings which shows such a pattern of inheritance.

[½ + ½=1]

2. Identify the reason for selection of DNA polymerase from *Thermus aquaticus* for Polymerase Chain Reaction.

[1]

3. Govt. of India has raised the marriageable age of female to 18 yrs and of males to 21 yrs. Suggest any two more measures adopted by Government for the purpose.

[½ + ½=1]

4. Thymus of a new born child was degenerating right from birth due to a genetic disorder. Predict its two impacts on the health of the child.

[½ + ½=1]

5. Give an example of a chromosomal disorder caused due to non-disjunction of autosomes.

[1]

SECTION -B

6. During an excavation assignment, scientists collected pollen grains of a plant preserved in deeper layers of soil. Analyse the properties of pollen grains which help in the fossilization.

[½+½ x3= 2]

7. Protein synthesis machinery revolves around RNA but in the course of evolution it was replaced by DNA. Justify.

[2]

8. Identify two ways in which *Spirulina is* helpful to mankind. [1+1=2]

OR

Keeping beehives in crop fields has several advantages. List any two.

[1+1=2]

9. Suryakant had banana plantation in his field. Quality of the fruit was excellent but the yield suffered due to infection of the plants by a virus. Suggest a fast and efficient method to get healthy and a large number of plants in the next generation without compromising on the existing quality. Justify the selection of your method.

[2]

10. Besides acting as 'conduits' for energy transfer across trophic levels, predators play other important roles. Justify.

[2]

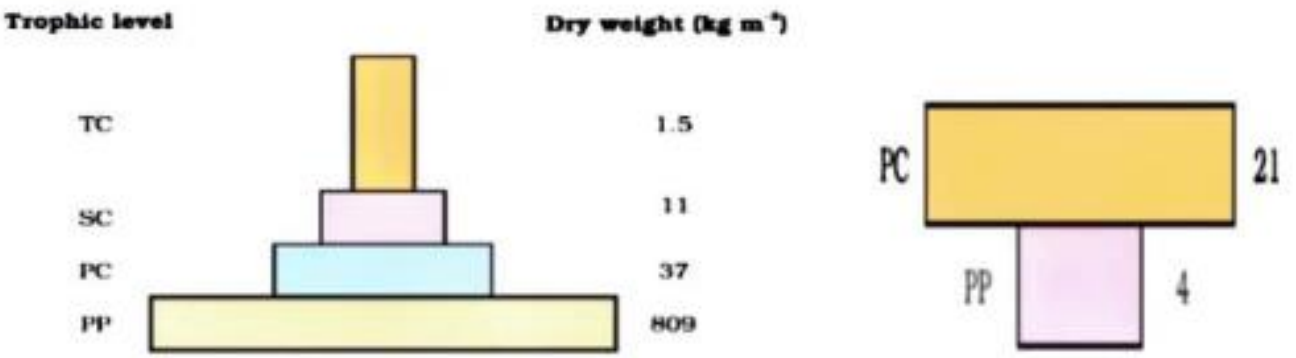
SECTION -C

11. Explain three outbreeding devices. [1+1+1=3]

12. After implantation interdigitation of maternal and foetal tissues takes place. Identify the tissues involved and justify their role.

[1+1+1=3]

13. Compare the two ecological pyramids of biomass given below and explain the situations in which this is possible. Also construct an ideal pyramid of energy if 200,000 joules of sunlight is available. [1+2=3]



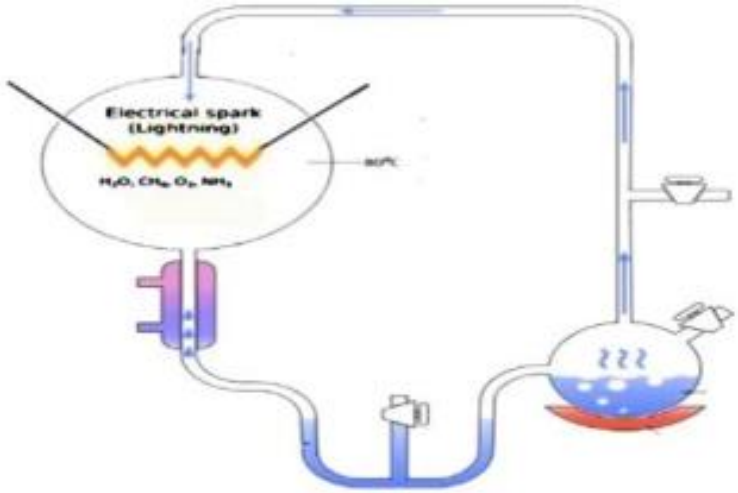
14. With respect to Messelson and Stahl's Experiment, answer the following questions:

(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.

[1+2=3]

15. A student was simulating Urey and Millers experiment to prove the origin of life. The set up used by the student is given –



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

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

(c) Compare the conclusion drawn with the theory of spontaneous generation.

[1+1+1=3]

16. Given below is a figure of a biogas plant.

(a) Identify A and justify its floating nature.

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

[1+2=3]

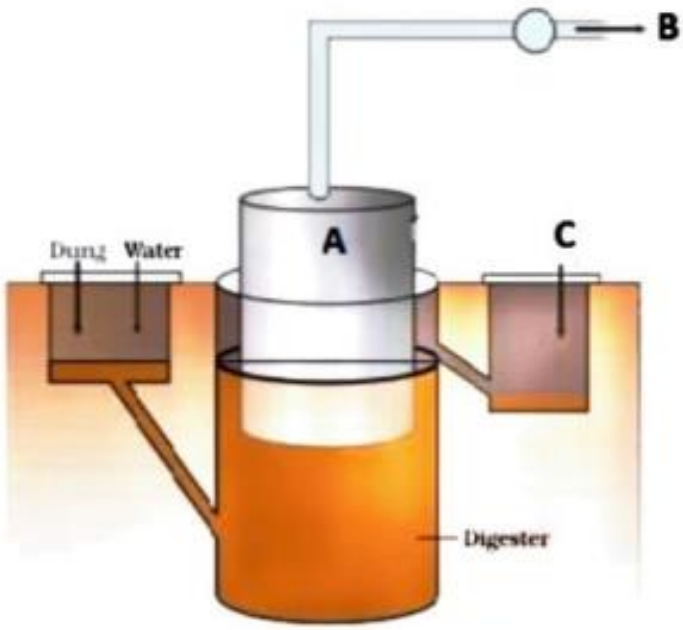


Figure A typical biogas plant

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

[½ +2+½=3]

18. DNA separated from one cell, when introduced into another cell is able to bestow some of the properties of former to the latter. What is this change called in technical terms? Describe the experimental evidences which led to the discovery of the above phenomenon.

[1+2=3]

19. When someone buys packets of cigarettes, cannot miss the statutory warning that is present on the packing which warns against smoking and says how it is injurious to health. Yet, smoking is very prevalent in our society, both among young and old. Advise the adolescents about the importance of avoiding smoking. (Mention any six points.)

[½x6= 3]

20. Biotechnology has helped farmers to get pest resistant cotton crops. Explain the technique adopted along with its mode of action. (Mention six points)

[½x6= 3]

OR

(a) Draw the figure of vector pBR322 and label the following:

Origin of replication

Ampicillin resistance site

Tetracycline resistance site

Bam H1 restriction site

(b) Identify the significance of Origin of replication

[½x4+1= 3]

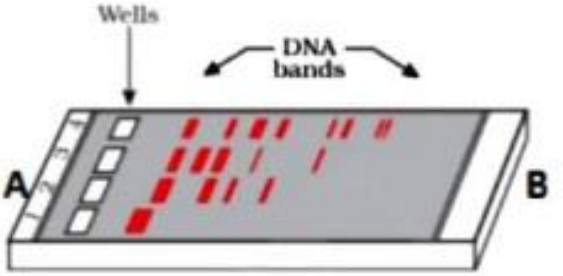
21. **(a)** Given below is a single stranded DNA molecule. Frame and label its sense and antisense RNA molecule.

5' ATGGGGCTC 3' sense

(b) How the RNA molecules made from above DNA strand help in silencing of the specific RNA molecules?

[2+1=3]

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



(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.

[1+1+1=3]

SECTION -D

23. Mohit and Sumit want to buy a new car for their company. Mohit insisted on buying a CNG car with a better mileage but Sumit insisted on buying a diesel version of a high end car with better music system and A.C but relatively low mileage.

(a) Being a responsible citizen of Delhi, how will Mohit convince Sumit about his decision in the wake of rising pollution levels.

(b) What qualities of personality are being exhibited by Mohit in doing so?

(c) Suggest two more measures which can help in reducing vehicular pollution.

[1+1+2=4]

SECTION -E

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

[5]

OR

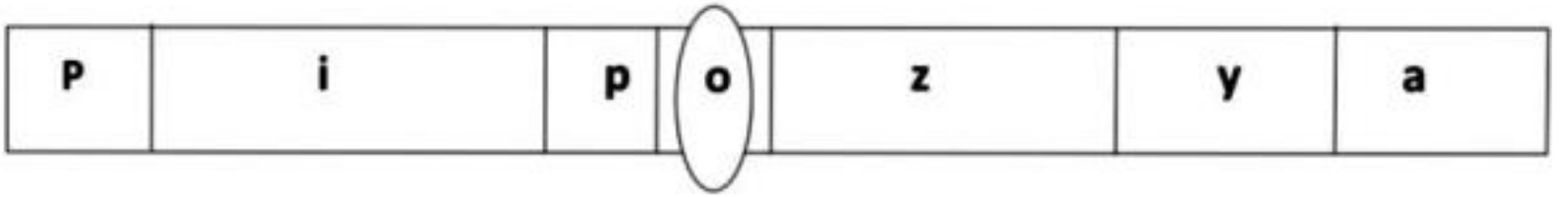
A village health worker was taking a session with women. She tells the women that one has to be very careful while using oral pills as method of birth control. Wrong usage can actually promote conception.

(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.

[3 +2 =5]

25. Observe the representation of genes involved in the lac operon given below -



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

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

(c) If repressor fails to attach to the said site what products will be formed by z, y and a?

(d) Analyze why this kind of regulation is called negative regulation.

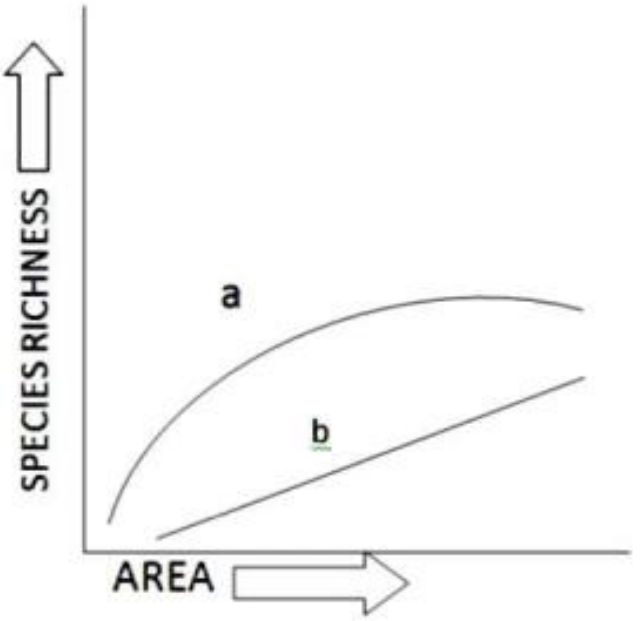
[½ +1+1½+2=5]

OR

Transcription in eukaryotes is more complex process than in prokaryotes. Justify and compare the initiation, elongation and termination in bacterial cells with eukaryotes.

[1+1+1+2=5]

26. The graph below shows species –area relationship:



(A) If b denotes the relationship on log scale-

i) Describe a and b.

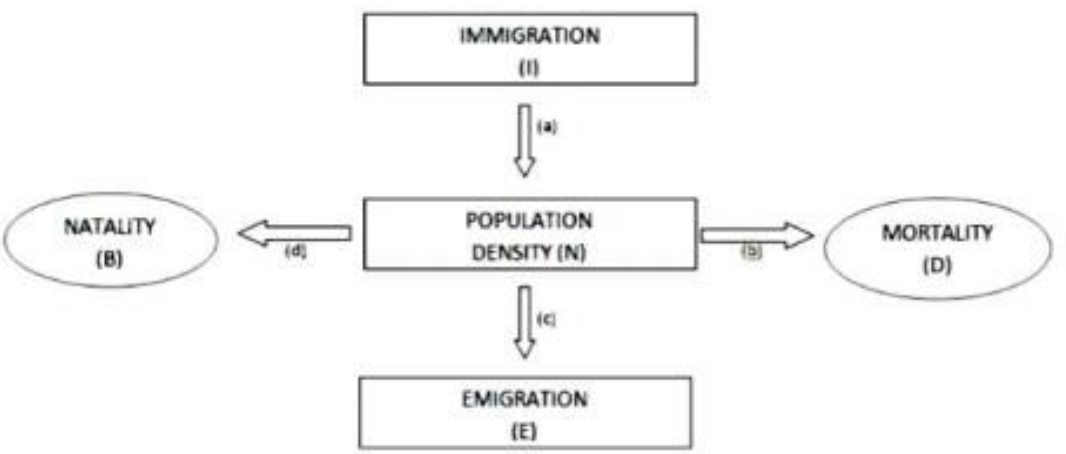
ii) How is slope represented? Give the normal range of slope.

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.

[3+2=5]

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?

[1+1+2+1=5]