

CLASS: XII Model Examination – III - BIOLOGY

MARKS: 70

DATE: 21/12/19

CODE: 044

Time: 3Hrs

General instructions:

1. There are a total of 27 questions and five sections in the question paper. All questions are compulsory. 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.
2. Section C contains question numbers 13 to 21, short answer type II questions of three marks each. Section D contains question numbers 22 to 24; case- based short answer type questions of three marks each.
3. Section E contains question numbers 25 to 27, long answer type questions of five marks each.
4. 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 question paper with the same question number.

SECTION –A

1. A heterozygous violet –flowered pea plant is crossed to another homozygous violet flowered pea plant. What percent of the progeny plants will have the recessive trait, i.e. white flowers?

- a. 0% b.25% c.50% d.75%

2. The most accepted line of descent in human evolution is _____

- a. Australopithecus → Ramapithecus → Homo sapiens → Homo habilis
b. Homo erectus → Homo habilis → Homo sapiens
c. Ramapithecus → Homo habilis → Homo erectus → Homo sapiens
d. Australopithecus → Ramapithecus → Homo erectus → Homo sapiens

3. The formula for exponential population growth curve is _____

- a. $dN/dt = rN$ b. $dt /dN = rN$ c. $dN/ rN= dt$ d. $rN/ dN= dt$

Match the microbes listed under column – A with products mentioned in column – B.

Column I		Column II	
H	Penicillium notatum	i	Statin
I	Trichoderma polysporum	ii	Ethanol
J	Monascus purpureus	iii	Antibiotic
K	Saccharomyces cerevisiae	iv	Cyclosporin - A

- a. H-iii, I-iv, J-i, K-ii b. H-i, I-ii, J-iii, K-iv
c. H-iii, I-iv, J-ii, K-i d. H-iii, I-ii, J-iv, K-i

5. Significance of 'heat shock' method in bacterial transformation is to facilitate

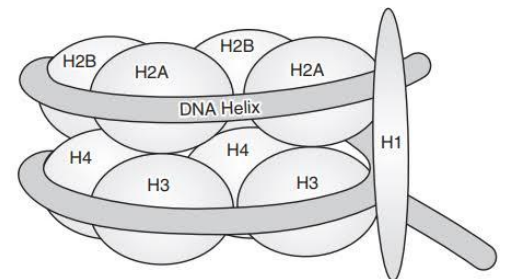
- a. binding of DNA to the cell wall
b. uptake of DNA through membrane transport proteins
c. uptake of DNA through transient pores in the bacterial cell wall.
d. expression of antibiotic resistant gene.

SECTION-B

6. You are conducting artificial hybridization on papaya and potato. Which one of them would require the step emasculation and why? However for both you will use the process of bagging. Justify giving answer.

OR

A mature embryo – sac in a flowering plant may possess 7 – cells but – 8 nuclei. Explain with the help of diagram only.



7. Identify the given diagram and describe its structure.

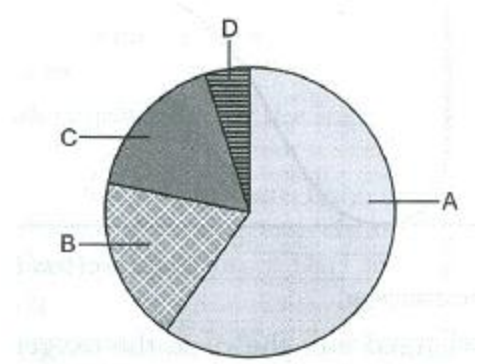
8. Name the causative organism of the amoebiasis. List three symptoms of the disease.

9. How are productivity, gross productivity, net productivity and secondary productivity Interrelated?

10. The figure given below shows the relative contribution of four green house gases to global warming.

i. Identify the gases A and G.

ii. Why are these four gases called green house gases?



11. How do automobiles fitted with catalytic converters reduce air pollution? Suggest the best fuel for such vehicles.

12. In Snapdragon, a cross between true-breeding red flowered (RR) plants and true-breeding white flowered (rr) plants showed a progeny of plants with all pink flowers.

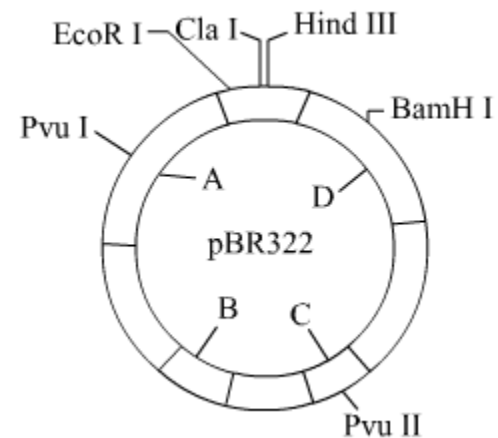
(a) The appearance of pink flowers is not known as blending. Why?

(b) What is the phenomenon known as?

SECTION-C

13. List six advantages of “ex-situ” approach to conservation of biodiversity.

14. Study the figure of vector pBR322 given below. Identify A, B, C and D and explain their roles in cloning a vector.



15. a. Identify A, B, C and D in the given table.

Crop	Variety	Resistance
A	Himgiri	Leaf rust
Cauliflower	Pusa shubhra	B
Brassica	Pusa Swarnium	C
Cow pea	D	Bacterial flight

b. Name the most common species of bees suitable for apiculture.

16. Plastid is boon to biotechnology. Justify this statement quoting the production of human insulin as an example.

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

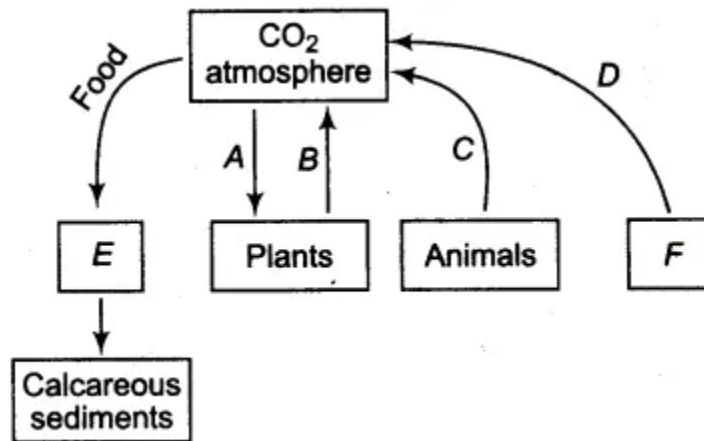


b. Write the RNA strand transcribed from the above transcription unit along with its polarity.

18. What do these pictures A and B illustrates with references to evolution? Explain



19. Draw and complete the following model of carbon cycle filling A, B, C, D, E and F.



20. Explain any two methods of assisted reproductive technology (ART) that has helped childless couples to bear children.

21. In humans, males are heterogametic and females are homogametic. Explain. Are there any examples where males are homogametic and females heterogametic?

SECTION-D

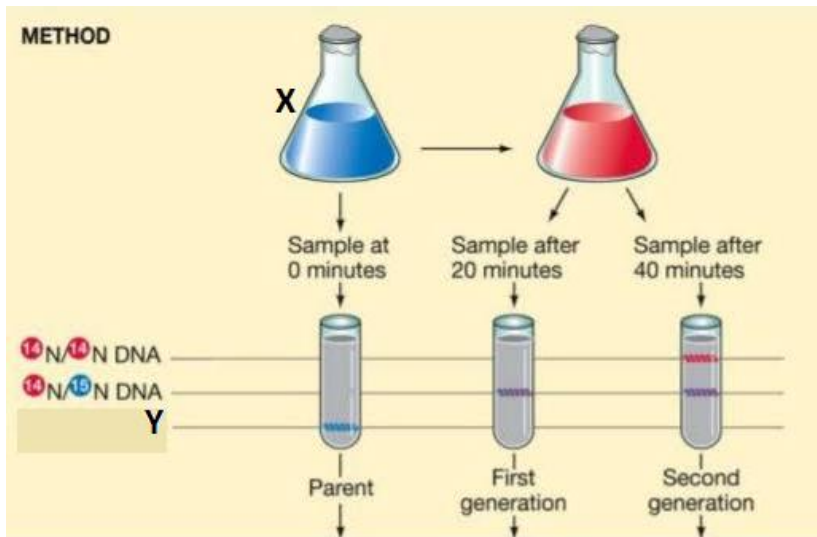
22. Two children A and B aged 4 and 5 years respectively visited to hospital with a similar genetic disorder. The girl A was provided enzyme-replacement therapy and was advised to revisit periodically for further treatment. The girl B was however given a therapy that did not require revisit for further treatment.

- Name the ailments the two girls were suffering from.
- Why did the treatment provided to girl 'A' required repeated visits?
- How was the girl B cured permanently?

23. Study the flow chart given below and answer the questions that follow:

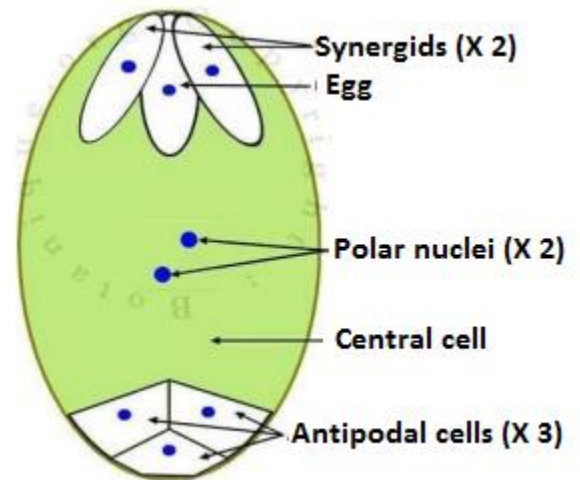
- Identify X and Y in this reaction. Why did they add X in this hypothesis?
- Name the scientist who did the experimental hypothesis.

c. Mention the interpretation of the given biochemical reaction.



24. Observe the diagram carefully and answer the following questions

- Is it a fertilized or unfertilized embryo sac?
- How many cells & nucleus are there in the embryo sac?
- Mention the fate of polar nuclei, synergids and antipodal cells.



SECTION-E

25. a. A tall plant with red flowers (dominant) is crossed with a dwarf plant with white flowers (recessive). Work out adihybrid cross states the dihybird ratio. What will be the effect on the dihybird ratio if the two genes are interacting with each other?

b. Why is Drosophila used extensively for genetic studies?

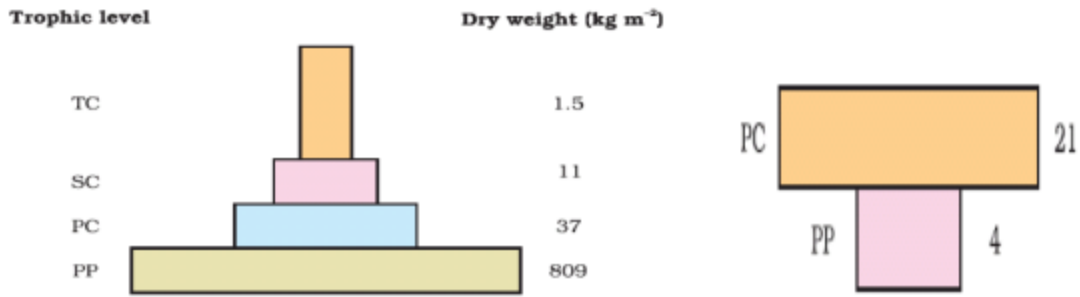
OR

26. Differentiate between spermatogenesis and oogenesis.

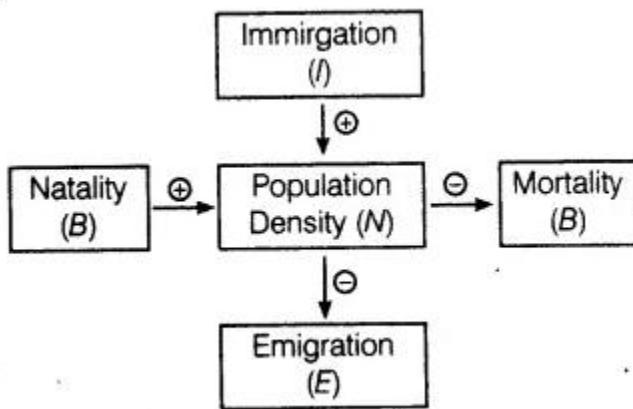
OR

‘Parturition is induced by a complex Neuro endocrine mechanism’. Justify

27. a. 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.



b. Explain the equation $N_{t+1} = N_t + [(B+I) - (D+E)]$ on the basis of the flow chart given below.



OR

a. Compare, giving reasons, the J-shaped and S-shaped models of population growth of a species.

b. Explain "fitness of a species" as mentioned by Darwin.