



# CHENNAI SAHODAYA SCHOOLS COMPLEX

## *(General Instructions)*

- ❖ Please check that this question paper contains 8 printed pages.
- ❖ Please check that this question paper contains 33 questions.
- ❖ Please write down the serial number of the question before attempting it.
- ❖ Reading time of 15 minutes is given to read the question paper alone. No writing during this time.
- ❖ All questions are compulsory.
- ❖ The question paper has five sections: Section A, Section B, Section C, Section D and Section E. There are 33 questions in the question paper.
- ❖ Section-A has 12 questions of MCQ and 04 Assertion & Reason questions each 1 mark. Section-B has 5 questions of 2 marks each. Section-C has 7 questions of 3 marks each and Section-D has 2 questions of 4 marks each, Section-E has 3 questions of 5 marks each.
- ❖ 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.
- ❖ Wherever necessary, neat and properly labelled diagrams should be drawn.

## COMMON EXAMINATION

### Class-12

### (BIOLOGY- 044/3)

**Roll No.:**

**Maximum Marks:70**

**Date:**

**Time allowed: 3 hours**

### SECTION – A

1. Arrange in decreasing order according to their gestation period (1)
  - (a) Cat, dog, cow, horse and Elephant
  - (b) Elephant, horse, cow, dog and cat
  - (c) Cow horse, cat, dog and Elephant
  - (d) Elephant, cow, horse, cat and dog
2. Which is the correct surgical procedure as a contraceptive method in male (1)
  - (a) Ovariectomy      (b) Hysterectomy      (c) Vasectomy      (d) Tubectomy.
3. In a flower, if the megaspore mother cell forms megaspores without undergoing meiosis and if one of the megaspores develops into an embryo sac, its nuclei would be (1)
  - (a) haploid
  - (b) diploid
  - (c) a few haploid and a few diploid
  - (d) with varying ploidy
4. Arrange the following events in the order of synthesis of a protein (1)
  - i) A peptide bond forms
  - ii) A tRNA matches its anticodon to the codon in the A- site
  - iii) The movement of second tRNA complex from A-site to P-site
  - iv) The large subunit attaches to the small subunit and the initiator tRNA fits in the P- site
  - v) A small subunit binds to the mRNA
  - vi) The activated amino acid tRNA complex attaches the initiation codon on mRNA

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- a) iv, v, iii, ii, i, vi  
b) iv, vi, v, ii, i, iii  
c) v, iv, iii, ii, vi, i  
d) v, vi, iv, ii, i, iii
5. How many meiotic divisions are necessary for the formation of 100 grains of wheat? (1)  
(a) 100 (b) 125 (c) 25 (d) 50
6. Chronic inflammation of the organs usually the lymphatic vessels of the lower limbs are caused by (1)  
a) Ascaris  
b) Wuchereria  
c) Salmonella  
d) Mycobacterium
7. Which among the following statements are true about DNA? (1)  
i) DNA is long polymer of deoxyribonucleotides  
ii) The length of DNA is defined as no. of nucleotides  
iii) DNA consist of 2 parallel strands opposite in direction  
iv) Haploid content of human DNA is  $0.33 \times 10^9$  bp.  
a) (i), ii, iii  
b) (i), ii, iv  
c) (i), ii,  
d) (i), iv, iii
8. While isolating DNA from plant which of the following enzyme is not required (1)  
a) Cellulase b) Ribonuclease c) Deoxyribonuclease d) Protease
9. Which of the following is most appropriately defined? (1)  
a) Commensalism is a relationship in which one species is benefitted and the other is neither benefitted nor harmed  
b) Parasite is an organism which always lives inside the body of another organism and may kill it  
c) Competition is defined as a process in which the fitness of one species is significantly higher in the presence of another species  
d) Mutualism is a relationship in which one species is benefitted whereas the other is unaffected
10. Which is the common nitrogen fixer in paddy fields: (1)  
a) Azospirillum b) Rhizobium c) Oscillatoria d) Frankia
11. Nematode specific genes were introduced into the tobacco host plant using a vector. (1)  
a) pBR322 b) plasmid c) bacteriophage d) Agrobacterium
12. Match the items in Column I with those in Column II. (1)

	Column I		Column II
A.	Rosie	1.	Polio vaccine safety
B.	Ti plasmid	2.	Human alphalactalbumin
C.	RNAi	3.	Agrobacterium tumefaciens
D.	Transgenic mice	4.	Meloidegyne incognitia

(a) A-3 B-2 C-1 D-4

(b) A-1 B-3 C-4 D-2

(c) A-2 B-3 C-4 D-1

(d) A-3 B-2 C-4 D-1

**In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.**

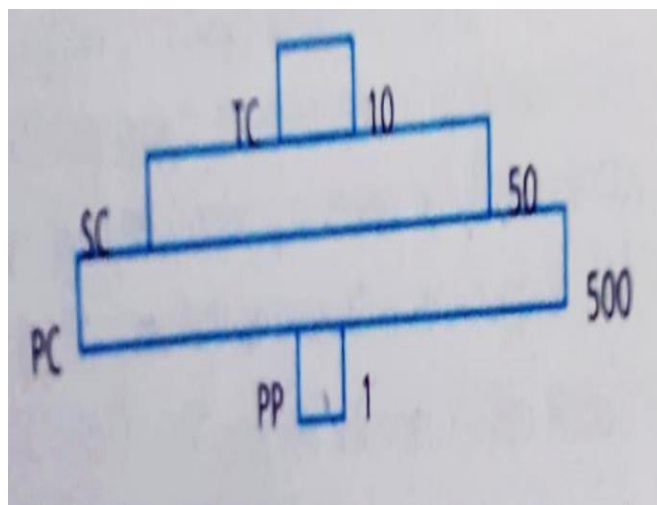
- (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- (c) Assertion is correct statement but reason is wrong statement.
- (d) Assertion is wrong statement but reason is correct statement.

13. **Assertion (A):** Pyramid of energy is always upright  
**Reason (R):** When energy flows from a particular trophic level to the next trophic level, some energy is always lost as heat at each step. (1)
14. **Assertion (A):** Insulin is said to be anabolic hormone. (1)  
**Reason (R):** Failure of Insulin secretion causes diabetes.
15. **Assertion (A):** Cu containing IUDs are very effective for emergency contraception. (1)  
**Reason (R):** Cu ions are Phagocytic to the sperms.
16. **Assertion (A):** An antibody is a protein molecule made by lymphocytes. (1)  
**Reason (R):** Antibody binds to a specific antigen and neutralizes its odd effects.

### SECTION – B

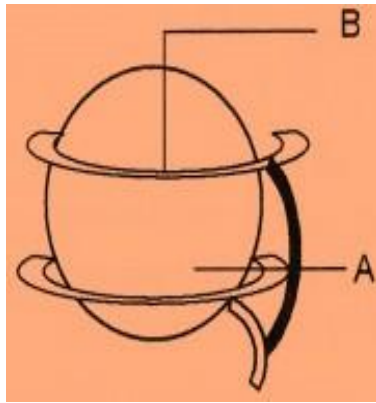
17. The Food Pyramid is a visual representation of how different foods and drinks contribute towards a healthy balanced diet. The Food Pyramid allows individuals the flexibility to choose foods and drinks from each shelf depending on their food preferences. (2)

Consider the above diagram and write the answers

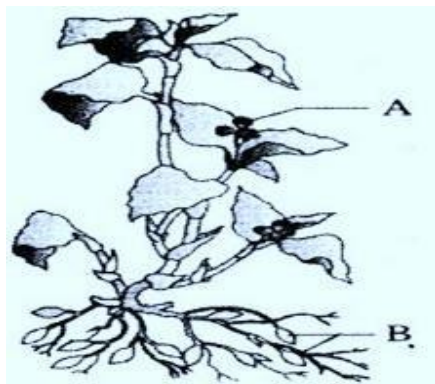


- i) What do you understand by TC 10?
  - ii) Give one example of PP and SC in this food pyramid.
18. Exonuclease cannot be used while producing recombinant DNA – Give reason. (2)
19. Allergies occur when your immune system reacts to a foreign substance like pollen grains of the seasonal crop, dust, etc. The chemical responsible for allergic reactions is called allergens. (2)
- i) Name one chemical that induces an allergic response in our body.
  - ii) Mention any two drugs that quickly reduce the symptoms of allergy.

20. Answer the questions based on the diagram given below (2)



- What does the diagram represent?
  - Mention its significance.
  - Label A.
21. Observe the diagram and label “A” and “B” as well as write two specific features of “B”. (2)

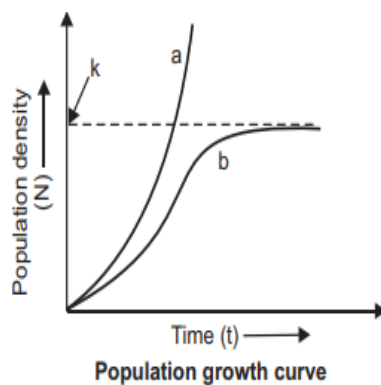


(OR)

What are apomictic seeds? Why do farmers prefer apomictic seeds?

### SECTION – C

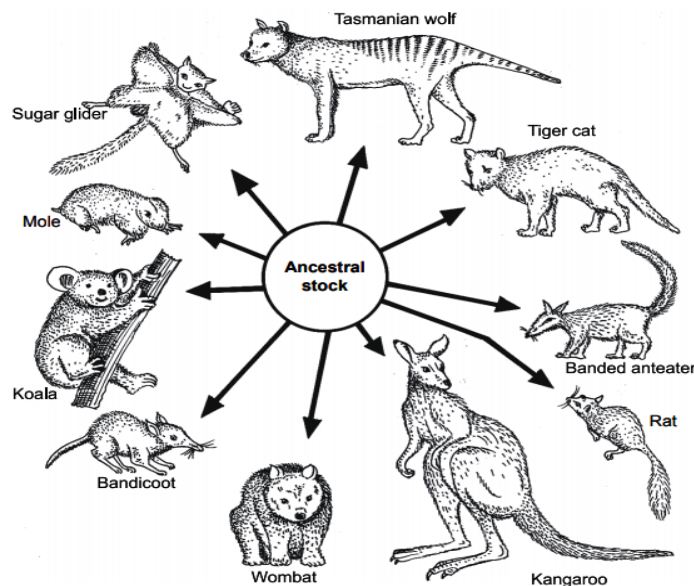
22. (a) ‘The Evil Quartet’ describes the rates of species extinction due to human activities. (3)  
Explain how the population of organisms is affected by fragmentation of the habitats.
- (b) Introduction of alien species had led to environmental damage and decline of indigenous species. Give any one example of how it has affected the indigenous species?
- (c) Could the extinction of Steller’s sea cow and passenger pigeon be saved by man? Give reasons to support your answer.
23. a) Identify the curves ‘a’ and ‘b’ shown in the graph given below. List the conditions responsible for growth patterns ‘a’ and ‘b’. (3)



b) What is  $r$  in the given equation and what does  $K$  denotes?

$$\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$$

24. Why do lepidopterans die when they feed on Bt cotton plant? Explain how does it happen. (3)
25. State the medicinal value and the bioactive molecules produced by streptococcus, Monascus and Trichoderma. (3)
26. What are different types of stem cells? Mention any three applications of it. (3)
27. (a) Name and explain the evolutionary concept represented in the illustration given below: (3)



(b) Name the type of evolution if more than one adaptive radiation occurred in an isolated geographical area?

(or)

(a) How does the Hardy- Weinberg's expression ( $P^2 + 2pq + q^2 = 1$ ) explain that genetic equilibrium is maintained in a population?

(b) List any two factors that can disturb the genetic equilibrium

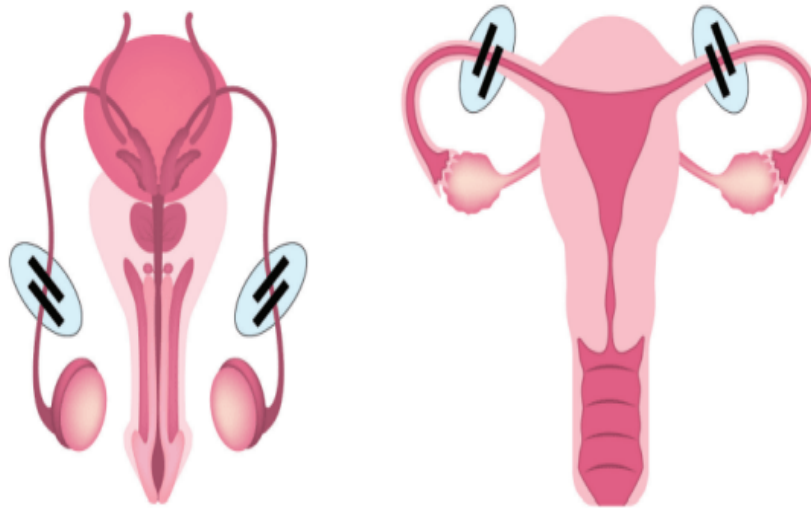
28. Identify 'a', 'b', 'c', 'd', 'e' and 'f' in the table given below. (3)

S.No	Syndrome	Cause	Characteristics of affected individuals	Sex Male/ Female/Both
1.	Down's	Trisomy of 21	(i) short stature (ii) 'a'	'b'
2.	'c'	XXY	Overall masculine development	'd'
3.	Turner's	45 with XO	(i) Sterile ovaries (ii) 'e'	'f'

## SECTION – D

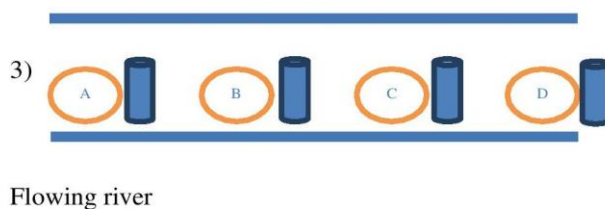
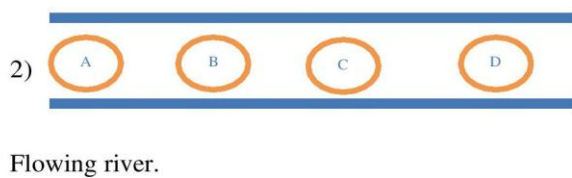
Read the following questions 29 & 30 – Paragraph / Data and answer any four of the following questions given below:

29. Study the diagram of the female reproductive system given below. Answer the questions based on the diagram. (4)




- (i) What does the diagram depict?
- (ii) At what stage zygote can be introduced in the Fallopian Transfer (ZIFT)?
- (iii) At what stage of embryo can be introduced into the uterus in Intra Uterine Transfer (IUT)?
- (iv) Mention any two events that are inhibited by the intake of oral contraceptive pills to prevent pregnancy in humans.
- (v) How is ICSI differ from AI?

30. Study the data given below and answer any four of the following questions: (4)



 = Sewage Treatment Plant

 = Human settlements on the banks of flowing river.

Given here are three cases of how human are settled on the banks of river. Give answers to the following questions based on it.

- (i) In which of the case, humans will be suffering from most water borne diseases by using most polluted water?

- (a) Case -1
  - (b) Case-2
  - (c) Case-3
  - (d) Case-1 and Case -2 Both
- (ii) The primary treatment of sewage involves removal of
- (a) Dissolved waste
  - (b) Stable particles
  - (c) Toxic substances
  - (d) Harmful pathogens
- (iii) Which of the following gases are produced during digestion of sludge in secondary treatment of sewage?
- (a) Methane, hydrogen sulphide and nitrogen
  - (b) Methane, carbon dioxide and hydrogen
  - (c) Carbon monoxide, hydrogen sulphide and hydrogen
  - (d) Methane, hydrogen sulphide and carbon dioxide
- (iv) In Case 1 and Case 3 which is better for the ecology of the river?
- (a) Case-1, as the distance is more. River will decompose all the biodegradable waste.
  - (b) Case-3, as sewage treatment plants are used and negligible polluted water is added to river.
  - (c) Both Case 1 and Case 3 will make the same impact on the ecology of river system as per the given data.
  - (d) Cannot say, data is not appropriate.
- (v) Treated waste water has
- (a) Low BOD
  - (b) maximum BOD
  - (c) Least BOD
  - (d) Moderate BOD

### SECTION – E

31. A large number of married couples the world over are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless. (5)
- (a) Why in your opinion the female partner is often blamed for such situations in India?
  - (b) State any two reasons responsible for the cause of infertility.
  - (c) Suggest a technique that can help the couple to have a child where the problem is with the male partner.

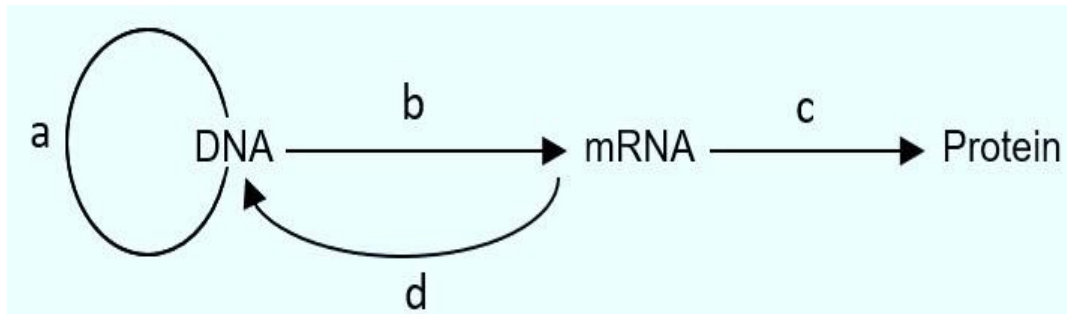
(OR)

- (a) List any four characteristics of an ideal contraceptive.
  - (b) Name two intrauterine contraceptive devices that affect the motility of sperms.
  - (c) How is multiload 375 different from LNG 20?
32. When snapdragon plant bearing pink colour flower was selfed, it was found that: 69 plants were having red coloured flowers. What would be the number of plants bearing pink flower and white flower? Show with the help of Punnett square and give the phenotypic & genotypic ratio of the same. Identify the principle of inheritance involved in this experiment. (5)

(OR)

A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds:

- (a) What would be the phenotype and genotype of  $F_1$ ?
  - (b) Work out the phenotypic ratio of  $F_2$  generation with the help of a Punnett square
33. i) Who proposed the idea of Central Dogma? (5)
- ii) Identify processes **a, b, c** and **d** in the following diagram.



iii) Write the name of enzymes in processes **a**, **b**, **c** and **d**.

iv) Give one example where the process '**d**' is essential for the completion of the life cycle.

**(OR)**

The lac operon is an operon or group of genes with a single promoter (transcribed as a single mRNA). The genes in the operon encode proteins that allow the bacteria to use lactose as an energy source. Study the following schematic representation of the genes, involved in the lac operon of *E. coli* and give answers to the following questions

i	P	O	z	Y	a
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- Which one is responsible for the synthesis of repressor? Write the name along with the symbol.
- What is the binding site for the repressor?
- Which one is responsible for the entry of lactose into the bacteria?
- Complete the drawing to show the process in the presence of an inducer

**End of paper**