



ANGEL'S PUBLIC SCHOOL

SAMPLE PAPER

HALF YEARLY EXAMS SESSION 2025 – 26

CLASS – XII

TIME : 3 HRS.

SUBJECT – BIOLOGY

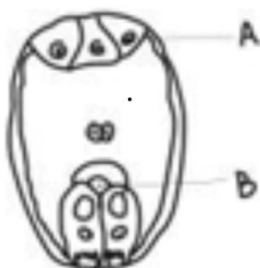
M.M:70

General Instructions:

- (a) All questions are compulsory.
- (b) The question paper has five sections and 33 questions. All questions are compulsory.
- (c) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
- (d) 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.
- (e) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION - A

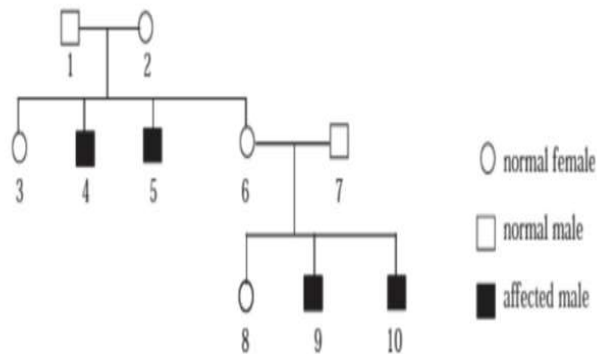
- 1. The fimbriae help in:
 - (a) Collection of ovum
 - (b) Collection of sperm
 - (c) Fertilization of sperm and ovum
 - (d) Maturation of sperm
- 2. Study the given diagram and choose the correct option against 'A' and 'B':



- (a) A-Egg apparatus; B-Polar body
 - (b) A-Antipodals; B-Egg apparatus
 - (c) A-Synergids; B- Egg apparatus
 - (d) A-Central cell; B-Antipodals
- 3. Which process is responsible for increasing the percentage of alcohol in whisky after fermentation?
 - (a) malting
 - (b) dilution
 - (c) distillation
 - (d) maturation
- 4. Meselson and Stahl carried out centrifugation in CsCl₂ density gradient to separate :
 - (a) DNA from RNA
 - (b) DNA from protein
 - (c) The normal DNA from ¹⁵N-DNA
 - (d) DNA from tRNA
- 5. What is the smallest part of a DNA molecule that can be changed by a point mutation?
 - (a) Oligonucleotide
 - (b) Codon
 - (c) Gene
 - (d) Nucleotide
- 6. Which of the following statements about Untranslated regions is/are true?
 - (I) present on rRNA
 - (II) present on mRNA at 3' position only
 - (III) present on mRNA at 5' position only
 - (IV) present on mRNA at both 3' and 5'position
 - (V) not required in translation process.
 - (VI) required for efficient translation process.
 - (a) I only
 - (b) II and V
 - (c) III and VI
 - (d) IV and VI
- 7. Carbon dioxide is not released in which of the following processes?
 - (a) Lactate fermentation
 - (b) Alcoholic fermentation
 - (c) Aerobic respiration in animals
 - (d) Aerobic respiration in plants

8. This is a good producer of citric acid
 (a) *Aspergillus* (b) *Clostridium* (c) *Saccharomyces* (d) *Pseudomonas*
9. A nitrogen fixing microbe associated with the fern *Azolla* in rice fields is:
 (a) *Frankia* (b) *Rhizobium* (c) *Spirulina* (d) *Anabaena*
10. The nucleic acid synthesis takes place in:
 (a) 3'-5' direction (b) 5'-3' direction (c) Both ways (d) Any direction
11. The process of evolution of different species in a geographical area starting from a point and radiating to other areas of geography is called _____.
 (a) Founder effect (b) Adaptive radiation
 (c) Convergent evolution (d) Saltation

12. The family tree below shows the inheritance of Duchenne Muscular Dystrophy (DMD) in a family.



The pattern of inheritance in DMD is:

- (a) Autosomal Dominant (b) Autosomal Recessive
 (c) X linked Dominant (d) X linked Recessive

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

13. Assertion (A): DNA ligase is not used in PCR.

Reason (R): Discontinuous fragments are not formed in the amplification of DNA by PCR.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true and R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.

14. Assertion: In the process of transcription, template strand with polarity 3' → 5' plays a major role.

Reason: DNA dependent RNA polymerase catalyses the polymerization in only one direction, that is 5' → 3'.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true and R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.

15. Assertion : Genetic code is universal. Reason : Genetic code is same for all organisms.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true and R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.

16. Assertion: PCR is a powerful technique to identify genetic disorders.
Reason: PCR can detect mutations in low amounts of DNA.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

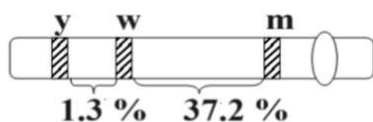
SECTION - B

17. Given below is one of the strands of a DNA segment :
3'TACGTACGTACGTACG 5'
(a) Write its complementary strand.
(b) Write a possible RNA strand that can be transcribed from the above DNA molecule formed.
18. Wings of birds and wings of butterflies contribute to locomotion. Explain the type of evolution such organs are a result of.
19. Consuming mother's milk for the first few days is important for the baby not just for energy, but also for other reasons. Elaborate.
20. Explain the process of hormonal regulation of spermatogenesis.
21. Micro-organisms play an important role for the biological treatment of sewage." Justify.

SECTION - C

22. Draw a schematic transverse section of a mature anther of an angiosperm. Label its epidermis, middle layers, tapetum, endothecium, sporogenous tissue and the connective.
23. The aeration tank of a sewage treatment plant is not functioning properly. Explain in detail the impact of this on the treatment of sewage and BOD of the effluent.

24.



y - yellow body

w - white eye

m - miniature wing

Above figure indicates the percentage of recombination between 2 pairs of genes – y and w; w and m. On the basis of this data what conclusion can you draw -

- (a) Which two of these genes are tightly linked? Justify your answer.
(b) Which scientist used such data of the frequency of recombination between gene pairs on the same chromosome to prepare genetic maps and how?
(c) How are genetic maps useful?
25. Why is RNA more reactive in comparison to DNA?
26. Write the scientific name of the fruitfly. Why did Morgan prefer to work with fruit flies for his experiments? State any three reasons

OR

- (a) Why is it important to measure biochemical oxygen demand (BOD) of the effluent? At what stage of sewage treatment is this testing done?
(b) BOD level of three samples of water labelled as A, B and C are 60 mg/L, 20 mg/L and 500 mg/L respectively. Which sample of water is most polluted?

27. The figure given below shows white winged and dark winged moth present on a tree trunk with variable lichen growth (a) in unpolluted area and (b) in polluted area. Which variety of moth is likely to survive in these two conditions? Justify your answer.



28. Mention one application for each of the following _____
(a) Passive immunisation (b) Antihistamine (c) Colostrum

SECTION – D

Q. No.29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.

29. Two blood samples of suspects 'A' and 'B' were sent to the Forensic Department along with sample 'C' from the crime scene. The Forensic Department was assigned the responsibility of running the samples and matching the samples of the suspects with that of the sample from the scene of the crime and thereby identifying the culprit.

- (i) In genetic fingerprinting, the 'probe' refers to _____
(ii) What does 'minisatellite' and 'microsatellite' mean in relation to DNA Fingerprinting?

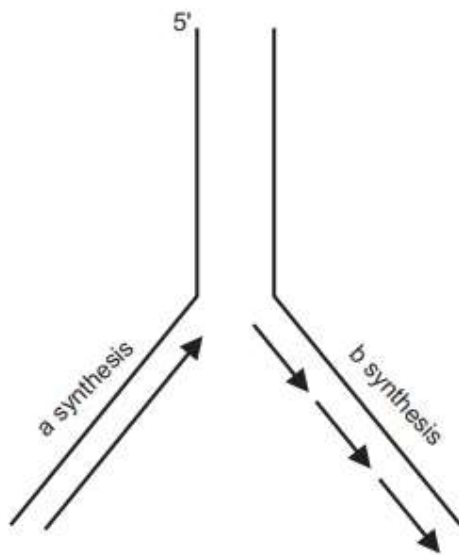
OR

How does polymorphism arise in a population?

State the steps involved in DNA Fingerprinting in a sequential manner.

30. Darwin found the varieties of finches that in travelled to Galapagos Islands and observed variations in them.
(a) What role does an individual organism play as per Darwin's theory of natural selection?
(b) How did Darwin explain the existence of different varieties of finches on Galapagos Islands?
(c) What is "fitness of an individual" according to Darwin?

OR



A DNA replication fork is shown above. Answer the following questions based on that.

- (a) Why does DNA replication occur in such small forks?
(b) What is 'a' synthesis and 'b' synthesis?
(c) Mention the polarity at A and B.

SECTION - E

- 31.** (a) Draw a sectional view of a human ovary and label primary follicle, tertiary follicle, Graafian follicle and corpus luteum in it.
(b) Name the gonadotropins and explain their role in oogenesis and the release of ova.

OR

In shorthorn cattle, the coat colours red or white are controlled by a single pair of alleles. A calf which receives the allele for red coat from its mother and the allele for white coat from its father is called a 'roan'. It has an equal number of red and white hairs in its coat.

- (a) Is this an example of codominance or of incomplete dominance?
(b) Give a reason for your answer.
(c) With the help of genetic cross explain what will be the consequent phenotype of the calf when:
(i) red is dominant over white (ii) red is incompletely dominant.
- 32.** A couple had unprotected intercourse.

- (a) Which are the two possible emergency contraceptives that can be used to avoid pregnancy in such a case?
(b) What is the basic principle of each of these?
(c) Will these contraceptive devices provide protection to the couple from STDs as well? Justify your answer.
(d) Removal of gonads cannot be considered as a contraceptive option. Justify.

OR

Consider the following three possible diagnoses for infertility and answer the trailing questions.

- (a) Inability to produce a normal egg. (b) Low Count of Sperm.
(c) Blocked Fallopian tube
(i) Suggest and explain different method so FART based on clinical examination for the above cases.
(ii) What are the legally acceptable reasons that allow MTPs to be carried out?
- 33. (a)** Innate immunity is a non-specific type of defense and consists of four types of barriers. Categorize these barriers and give one example for each.
(b) Differentiate between benign and malignant tumors? Which one is lethal and why?

OR

- (a)** State three characteristics of acquired immunity.
(b) List the different ways by which it can be attained by humans.