

DIRECTORATE OF EDUCATION GNCT OF DELHI
PRACTICE QUESTION PAPER
BIOLOGY(044)
CLASS -XII

Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions:

- (1) This question paper contains 33 questions. All questions are compulsory.
- (2) The question paper is divided into five sections – Section A, B, C, D and E.
- (3) Section A: Questions 1 to 16 are multiple-choice questions. Each carries 1 mark.
- (4) Section B: Questions 17 to 21 are very short answer questions. Each carries 2 marks.
- (5) Section C: Questions 22 to 28 are short answer questions. Each carries 3 marks.
- (6) Section D: Questions 29 and 30 are case-based questions. Each carries 4 marks. Each has internal choice in one sub-question.
- (7) Section E: Questions 31 to 33 are long answer questions. Each carries 5 marks.
- (8) There is no overall choice. Internal choice is provided in Sections B, C and D; answer only one alternative where given.
- (9) Wherever necessary, draw neat and properly labelled diagrams.

SECTION A

Questions 1 to 16 are Multiple Choice Type Questions, carrying 1 mark each. $16 \times 1 = 16$

1. When a pollen tube emerges from the germinating pollen grain, it carries along with it:

- (A) cytoplasm, vegetative cell and generative cell
- (B) cytoplasm and generative cell
- (C) cytoplasm and vegetative cell
- (D) cytoplasm, vegetative cell and one male gamete

2. Scutellum in maize grain represents:

- (A) Cotyledon (B) Coleoptile (C) Embryo (D) Endosperm

3. Diameter of the pollen grain generally is

- (A) 5 to 10 micrometer
- (B) 10 to 15 micrometer
- (C) 25 to 50 micrometer
- (D) 50 to 100 micrometer

4. The type of sex determination in honeybee is referred to as:
(A) Haplodiploidy (B) Haploidy (C) Diplohaploidy (D) Diploidy
5. Overuse of antibiotics has increased resistance in bacteria in a very short span of time due to:
(A) selection of resistant varieties (B) chance mutations (C) divergent evolution (D) adaptive evolution
6. Which one of the following is NOT a characteristic of polygenic inheritance?
(A) Uninfluenced by environment (B) Distinct alternate forms (C) Additive effect of every allele (D) Dependence upon number of genes
7. When the F1 phenotypic ratio of a cross is 1 : 1, the parental phenotype and genotype are:
(A) homozygous recessive × homozygous dominant
(B) heterozygous × heterozygous dominant
(C) homozygous dominant × heterozygous dominant
(D) heterozygous dominant × homozygous recessive
8. Which one of the following is the causative agent of dengue fever?
(A) Adenovirus (B) Flavivirus (C) Alphavirus (D) Rhinovirus
9. In the lac operon, which one of the following is NOT a structural gene?
(A) y gene (B) z gene (C) i gene (D) a gene
10. Which one of the following statements is correct regarding agarose gel electrophoresis of DNA?
(A) Ethidium bromide-stained DNA can be seen under UV light.
(B) Ethidium bromide-stained DNA can be seen in visible light.
(C) DNA can be seen in visible light.
(D) DNA can be seen without staining in visible light.
- 11.Q: Which of the following microbes is used for the production of antibiotics?
A. *Penicillium notatum* B. *Lactobacillus*
C. *Saccharomyces cerevisiae* D. *Rhizobium*
12. The human chromosome having the highest number of genes and the one having the least number of genes are respectively:
(A) Chromosome 21 and Y (B) Chromosome 1 and X (C) Chromosome 1 and Y (D) Chromosome X and Y

For Question No.-13 to 16: A statement of Assertion is followed by a statement of Reason.

Mark the correct choice as:

- (a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c)Assertion is true but reason is false.

(d)Both assertion and reason are false

13. Assertion (A): In birds, the sex of the offspring is determined by the male.

Reason (R): Males are homogametic while females are heterogametic.

14. Assertion (A): DNA is a long polymer of deoxyribonucleotides.

Reason (R): A DNA polymer has a free phosphate at the 5' end and a free OH group at the 3' end.

15. Assertion (A): AIDS is a syndrome caused by HIV.

Reason (R): HIV is a virus that damages the immune system and contains RNA as its genetic material.

16. Assertion (A): In molecular diagnosis, a single-stranded DNA or RNA tagged with a radioactive molecule is called a probe.

Reason (R): A probe hybridises with its complementary nucleic acid sequence.

SECTION B

Questions 17 to 21 are Short Answer Type Questions, carrying 3 marks each. $5 \times 2 = 10$

17. Provide the correct sequential order of the male accessory ducts in the human reproductive system. **[2]**

18. Explain the two distinct roles played by the start codon AUG. **[2]**

19. Provide a justification why antibiotics must strictly be taken under medical supervision. **[2]**

20. Outline the key biological properties that define stem cells. **[2]**

21. Answer any ONE of the following options:

(a) i) Draw a diagram of an enlarged view of transverse section (T.S.) of one microsporangium of an angiosperm and label the following parts:

Tapetum, Middle layers, Endothecium, Microspore mother cell **[2]**

OR

(b) State one benefit and one drawback associated with performing amniocentesis. **[2]**

SECTION C

Questions 22 to 28 are Short Answer Type Questions, carrying 3 marks each. $7 \times 3 = 21$

22. Explain the reason for following:

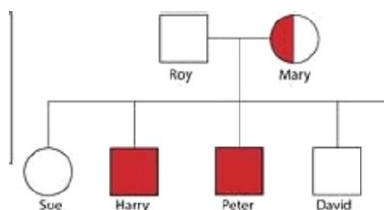
a) Nita is a new mother and she wants to maintain a gap of 4 years between her first and second child. Doctor suggested her to use IUDs.

b) Aman got married to Riti. They were using a natural contraceptive method for avoiding pregnancy but still Riti got pregnant.

c) Condoms are called better contraceptive devices over chemical methods. **[3]**

23. Where does fertilisation occur in a human female? Explain the process of fertilisation. **[3]**

24. Study the given pedigree Chart:



I) How many males are there in this chart and how many males are affected?

II) David is a normal son while his brothers are affected, illustrate this with the help of a punnett square ? [3]

25. What are fossils? How do fossils help in understanding the process of evolution? [3]

26. Name any three enzymes obtained from microbes and mention the role played by each in human welfare. [3]

27. (a) i) How is aneuploidy different from polyploidy?

li) Name the chromosomal disorder in which affected females develop rudimentary ovaries?
OR

(b) Explain how RNA interference (RNAi) is helpful in protecting tobacco plants from nematode infection. [3]

28. (a) Why does DNA replication occur within a replication fork and not along its entire length simultaneously? Explain why replication is continuous on one strand and discontinuous on the other.

OR

(b) Explain the processing of heterogeneous nuclear RNA (hnRNA) into fully functional mRNA in eukaryotes. Where does this processing occur? [3]

SECTION D

Questions 29 and 30 are Case-Based Questions, carrying 4 marks each. Each has internal choice in one sub-question.

29. Read the passage given below and answer the questions that follow:

Biotechnology is based on the manipulation of genes by addition of a desirable gene or deletion of an undesirable gene from the genome of an organism. Genetic engineering involves the use of specific molecular tools and suitable vectors to introduce and express a desired DNA fragment in a host organism.

(a) Write the specific sequence of nucleotides recognised by EcoRI on a DNA segment. (1)

(b) List the five tools generally used in genetic engineering. OR Name any two essential tools used in recombinant DNA technology and state their functions. (2)

(c) Name a synthetic/engineered vector. Why does it have multiple restriction sites? (1) [4]

30. Read the passage given below and answer the questions that follow:

In angiosperm, the seed is the final product of sexual reproduction. It is described as a fertilized ovule. The seeds are formed inside the fruit. The seed consists of a seed coat, cotyledon, and the embryo axis. A mature seed is usually non - albuminous or albuminous. integument of ovules harder as tough protective seed coat. Sometimes due to reduced water content, the general metabolic activity of the seed slows down and the seed enters a state of inactivity. In the mature plant, the fruit develops from the ovary they are called true fruit. The fruit is the result of fertilization. There are a few species in which fruit develops without fertilization. Bananas are such an example.

i. Which of the following have non-albuminous seed? [1]

- a. Sunflower
- b. Groundnut
- c. Maize
- d. Barley

ii. The entry of oxygen and water in the seed during germination: [1]

- a. micropyle
- b. chalazal
- c. epicotyl
- d. hypocotyl

iii. The embryo enters the state of inactivity called: [1]

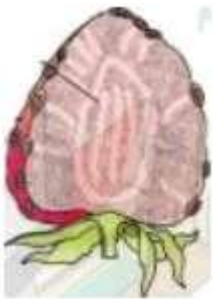
- a. pericarp
- b. dormancy
- c. apomixis
- d. none of these

iv. The wall of the ovary develops into the wall of fruit called: [1]

- a. scutellum
- b. pericarp
- c. plumule
- D. radicle

or

v. The figure given below represent [1]



- a. true fruit
- b. parthenocarpic fruit
- c. false Fruit of apple
- d. false fruit of strawberry

SECTION E

Questions 31 to 33 are Long Answer Type Questions, carrying 5 marks each. $3 \times 5 = 15$

- 31.** (a) (i) Explain the process of double fertilization in angiosperms.
(ii) Describe the development of endosperm in coconut.

OR

- (b) (i) Describe the stages of human spermatogenesis.
(ii) Name the hormones regulating spermatogenesis and explain their specific roles. **[5]**

- 32.** (a) (i) Define mutation.
(ii) Using a suitable human example, explain point mutation and describe its clinical manifestations.
(iii) State another type of mutation with an example.

OR

- (b) Summarize the experimental procedure followed by Meselson and Stahl and state the conclusion drawn from their results. **[5]**

- 33.** (a) Draw a well-labeled diagram of the cloning vector pBR322 showing: (1) ampicillin resistance gene, (2) BamHI recognition site, (3) rop gene, and (4) ori region. Explain the significance of selectable markers and describe the function of the rop gene.

OR

- (b) Explain the mechanism of transcription in prokaryotes and highlight how it differs from eukaryotic transcription. **[5]**