CLASS XII – BIOLOGY
SET – 1

Section – A (1×16 = 16 Marks)

Q1–12: MCQs (Select the correct option)

1. In angiosperms, triple fusion results in the formation of:
A. Zygote
B. Embryo
C. Primary endosperm nucleus
D. Suspensor

2. In humans, the hormone responsible for maintenance of corpus luteum during pregnancy is:
A. LH
B. FSH
C. hCG
D. Estrogen

3. The operon model proposed by Jacob and Monod explains regulation of:
A. Replication
B. Translation
C. Transcription
D. Mutation

4. Which of the following acts as a selectable marker in pBR322?
A. ori
B. ampR
C. rop
D. lacZ

5. The concept of "punctuated equilibrium" was proposed by:
A. Darwin
B. Hugo de Vries
C. Eldredge and Gould
D. Lamarck

6. In Hardy–Weinberg equilibrium, which of the following factors does NOT disturb genetic equilibrium?
A. Gene flow
B. Genetic drift

C. Random mating
D. Natural selection

7. A colour-blind man marries a carrier woman. What is the probability of having a colour-blind daughter?
A. 0%
B. 25%
C. 50%
D. 100%

8. Bt toxin becomes active in the insect gut due to:
A. Acidic pH
B. Neutral pH
C. Alkaline pH
D. High temperature

9. Which stage of Plasmodium infects the liver cells of humans?
A. Merozoite
B. Gametocyte
C. Sporozoite
D. Ookinete

10. The removal of introns and joining of exons is called:
A. Capping
B. Tailing
C. Splicing
D. Polyadenylation

11. BOD is a measure of:
A. Total dissolved oxygen
B. Oxygen used by microorganisms
C. Carbon dioxide released
D. Toxic metals in water

12. Mycorrhiza shows:
A. Parasitism
B. Mutualism
C. Commensalism
D. Amensalism

Q13–16: Assertion & Reason

A. Both A and R are true and R is correct explanation
B. Both A and R are true but R is not correct explanation

C. A is true but R is false
D. A is false but R is true

13.
Assertion: Incomplete dominance results in blending of traits.
Reason: Heterozygotes show intermediate phenotype.

14.
Assertion: Vaccination provides long-term immunity.
Reason: It induces formation of memory cells.

15.
Assertion: Genetic drift is more significant in small populations.
Reason: Sampling error is higher in small populations.

16.
Assertion: Secondary treatment of sewage reduces BOD drastically.
Reason: Aerobic microbes consume organic matter.

Section – B (2×5 = 10 Marks)

17. Attempt either A or B

A. Explain emasculation and bagging in artificial hybridization.
OR
B. Why are cleistogamous flowers always autogamous?

18. How is gene expression regulated in lac operon in absence and presence of lactose?

19. Differentiate between active and passive immunity (any two points).

20. Attempt either A or B

A. Why are restriction enzymes called molecular scissors?
OR
B. Explain insertional inactivation with example.

21. Attempt either A or B

A. Differentiate between pyramid of biomass in terrestrial and aquatic ecosystem.
OR
B. Why are tropical regions more species rich than temperate regions? (Any two reasons)

Section – C (3×7 = 21 Marks)

22. Explain the events of fertilisation in human female from ovulation to implantation.

23. A dihybrid cross is made between two heterozygous tall (Tt) and round seeded (Rr) pea plants.
Find phenotypic ratio with Punnett square.

24. Explain convergent evolution with suitable example.

25. Describe steps involved in PCR technique.

26. Explain primary and secondary treatment of sewage.

27. What is ELISA? Explain its principle and applications.

28. Explain logistic population growth with equation and graph.

Section – D (4×2 = 8 Marks)

29. Case Study – Reproductive Health

A couple is unable to conceive after 3 years of marriage. Medical reports show low sperm count in male.

A. Name the condition.
B. Suggest two assisted reproductive techniques suitable.
C. How does IVF help in such cases?
D. Mention one ethical issue related to ART.

30. Case Study – Immunity Graph Based

A child receives antibodies through mother's milk. Later vaccination is given.

A. Identify type of immunity in both cases.
B. Why is vaccination important?
C. Why does passive immunity decline over time?
D. What are memory cells?

Section – E (5×3 = 15 Marks)

31.

A. Explain transcription in prokaryotes.

B. Why is transcription more complex in eukaryotes?

OR

Explain translation process with diagram.

32.

A. Explain role of Agrobacterium tumefaciens in rDNA technology.

B. Name enzymes required in genetic engineering.

C. Explain Bt cotton mechanism of pest resistance.

OR

Explain formation of recombinant DNA using restriction enzyme and DNA ligase.

33.

Justify the following with examples:

A. Competitive exclusion principle

B. Resource partitioning

C. Competitive release

D. 10% law of energy transfer

E. First Law of Thermodynamics in ecosystem

OR

Explain latitudinal gradient of species diversity with reasons.