Chapter wise – Weightage Analysis and Most asked Topics

Chapter Name	Average Weightage (Marks)	Primary Focus of Questions / Most Asked Topics
Sexual Reproduction in Flowering Plants	5 – 6	Outbreeding devices, double fertilization, development of endosperm/embryo, and special modes like apomixis and polyembryony.
Human Reproduction	6 – 7	Spermatogenesis, oogenesis, the menstrual cycle (hormonal control), and the neuroendocrine mechanism of parturition.
Reproductive Health	4 – 5	Contraceptive methods (IUDs, pills), MTP regulations, amniocentesis, and Assisted Reproductive Technologies (IVF, GIFT, ZIFT).
Principles of Inheritance and Variation	7 – 8	Mendelian inheritance deviations (codominance, incomplete dominance), blood grouping, linkage/recombination, and chromosomal disorders like Down's and Turner's syndromes.
Molecular Basis of Inheritance	8 – 10	DNA structure/packaging, replication fork, transcription units, lac operon regulation, translation process, and DNA fingerprinting.
Evolution	5 – 6	Evidences for evolution (paleontology, comparative anatomy), industrial melanism, Hardy-Weinberg principle, and human evolution stages.
Human Health and Diseases	7 – 8	Life cycle of Plasmodium, pathogens (typhoid, pneumonia), immunity (active/passive, vaccines), AIDS/HIV mechanism, and drug abuse.
Microbes in Human Welfare	4 – 5	Microbes in industrial production (organic acids/enzymes), sewage treatment (STP stages), biogas production, and bio-fertilizers.
Biotechnology: Principles and Processes	6 – 7	Tools of recombinant DNA technology (restriction enzymes, vectors), PCR steps, and gel electrophoresis.

Biotechnology and its Applications	5 – 6	Bt crops (pest resistance), genetically engineered human insulin, transgenic animals, and biosafety/ethical issues.
Organisms and Populations	3 – 4	Population attributes, growth models (exponential and logistic growth curves), and population interactions (mutualism, predation, parasitism).
Ecosystem	3 – 4	Decomposition process/factors, energy flow (10% law), and ecological pyramids (number, biomass, energy).
Biodiversity and its Conservation	3 – 4	Patterns of biodiversity, species-area relationships, causes of biodiversity loss, and conservation strategies (hotspots, sacred groves).

Top 15 Most Asked Questions from Previous Year Papers

1. **The histone core in a nucleosome of chromatin thread is a/an :**

(A) pentamer

(B) hexamer

(C) heptomer

(D) octamer

2. **during the initial days of lactation is rich in antibody :**

(A) IgE

(B) IgD

(C) IgA

(D) IgG

3. **The process of splicing in eukaryotes represents the dominance of the :**

(A) DNA world

(B) RNA world

(C) Protein world

(D) Lipid world

4. **Regulation of lac operon by repressor is referred to as :**

(A) Inducible regulation

(B) Repressible regulation

(C) Negative regulation

(D) Positive regulation

5. **The pyramid of biomass in sea is generally inverted because in sea :**

(A) Biomass of fishes exceeds that of phytoplankton.

(B) Number of phytoplanktons is more.

(C) Number of phytoplanktons is less.

(D) Large fishes feed on small fishes.

6. **If a natural population with 50 individuals is in Hardy-Weinberg equilibrium for a gene with two alleles A and a, with the gene frequency of allele A of 0·6, the genotype frequency of Aa will be :**

(A) 0·16

(B) 0·36

(C) 0·24

(D) 0·48

7. **A DNA fragment has 2000 nucleotides, out of which 140 are Adenine. How many bases does this DNA segment possess that have triple hydrogen bonds between them ?**

(A) 280

(B) 860

(C) 1720

(D) 1860

8. **Match the items in Column I with those in Column II and select the correctly matched option :**

Column I (Cross)	**Column II (Phenotypic Ratio)**

1. Mendelian monohybrid	(i) 1 : 2 : 1 (F_2)
2. Mendelian dihybrid	(ii) 1 : 1
3. Incomplete dominance	(iii) 3 : 1 (F_2)
4. Test cross (monohybrid)	(iv) 9 : 3 : 3 : 1 (F_2)

Options :

(A) 1-(ii), 2-(iv), 3-(i), 4-(iii)

(B) 1-(iii), 2-(i), 3-(iv), 4-(ii)

(C) 1-(iii), 2-(iv), 3-(i), 4-(ii)

(D) 1-(ii), 2-(i), 3-(iv), 4-(iii)

9. **Select the option where the contraceptive method is correctly matched with its mode of action :**

Contraceptive Method	**Mode of Action**
A. The pill	I. Prevent sperm reaching cervix
B. Condom	II. Prevent implantation
C. Vasectomy	III. Inhibits ovulation
D. Copper-T	IV. Semen contains no sperm

Options :

(A) A – III, B – II, C – I, D – IV

(B) A – II, B – III, C – I, D – IV

(C) A – III, B – I, C – IV, D – II

(D) A – IV, B – III, C – II, D – I

Assertion-Reason based Questions

Note: For questions 10-15, use the following codes: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

10. **Assertion (A):** To generate only a part of the plant from a cell is totipotency.

Reason (R): Suitable special nutrient media and sterile conditions are required in 'in vitro' conditions for the division of cells in explants.

11. **Assertion (A):** Biogas plants are more often built in rural areas.

Reason (R): The excreta or gobar of cattle is rich in Methanobacterium.

12. **Assertion (A):** Linked genes do not show dihybrid F_2 ratio 9 : 3 : 3 : 1.

Reason (R): Linked genes do not undergo independent assortment.

13. **Assertion (A):** Cu-T, Cu-7 and LNG-20 are the most widely used copper-releasing IUDs.

Reason (R): Cu-ions in IUDs effectively suppress sperm motility and the fertilising capacity of sperms.

14. **Assertion (A):** Indian Government has set up an organisation known as GEAC to decide the validity of GM research.

Reason (R): Genetic modification of organisms has no effect when such organisms are introduced in the ecosystem.

15. **Assertion (A):** RNA is unstable and can mutate at a faster rate.

Reason (R): The presence of 2' – OH group in every nucleotide of RNA makes it labile and easily degradable.