



Department of Genetic Engineering and Biotechnology
Faculty of Health and Life Sciences
B. Sc. (Hons.) in Genetic Engineering and Biotechnology
Final Examination Spring 2026

Course Code: 0512-2103
Level and Term: L-2, T-1
Time: 02 Hours

Section: 251 (A+B)

Course Title: Cytology
Course Teacher Initials: DSR
Total Marks: 40

	Marks
1 (a) Explain the concept of protoplast fusion and discuss its application in plant cytology and genetic improvement. [CLO1, PLO2, C2]	4.0
(b) Discuss numerical chromosomal abnormalities, including polyploidy, trisomy, monosomy, and the diploid state. [CLO2, PLO1, C6]	4.0
2 (a) Analyze structural chromosomal alterations such as deletion, inversion, and duplication, and their effects on genetic balance. [CLO2, PLO1, C4]	4.0
(b) Evaluate the significance of chromosomal rearrangements in altering gene order and expression, and their implications in biology. [CLO3, PLO1, C5]	4.0
3 (a) Describe how ISH and H&E staining are used to study cells and tissues, highlighting their distinct approaches. [CLO3, PLO4, C6]	4.0
(b) Compare ICC and IHC in terms of their principles and applications in protein detection. [CLO3, PLO3, C4]	4.0
4 (a) Explain the composition and function of PBS, emphasizing how its components maintain physiological conditions in cytological experiments. [CLO3, PLO2, C2]	4.0
(b) Design a comparative framework illustrating the processes of spermatogenesis and oogenesis, highlighting their key stages, outcomes, and biological significance. [CLO2, PLO2, C6]	4.0
5 (a) Explain the terms mitosis and meiosis and state why are they important in multicellular organisms? [CLO1, PLO1, C2]	4.0
(b) Describe the stages of Mitosis and Meiosis, and differentiate between the two processes. [CLO2, PLO2, C6]	4.0