1511E1257

Candidate's Seat No :_____

M.Sc. Sem.-3 Examination

503

C. E. & A. R. T.

November-2025

Time : 2-30 Hours] **[Max. Marks : 70**

Q1A	Discuss the use of FISH and emerging technologies in PGD for sex determination and chromosomal rearrangements.	7 Mark
Q1B	Discuss the application of preimplantation diagnosis in HLA typing and its role in treating genetic and hematological disorders.	7 Mark
	OR	
Q1A	Outline the management of a PGD cycle, including patient selection, counselling, and laboratory procedures.	7 Mark
Q1B	Elaborate on the importance of training and accreditation in PGD laboratories and clinical settings.	7 Mark
Q2A	Evaluate the ethical and social aspects associated with PGD and preimplantation genetic screening (PGS).	7 Mark
Q2B	Write an essay on the regulation of PGD worldwide, comparing the legal and ethical frameworks of different countries.	7 Mark
	OR	
Q2A	Outline the management of a PGD cycle, including patient selection, counseling, and laboratory procedures.	7 Mark
Q2B	Explain the comparative advantages and disadvantages of PGD versus prenatal diagnosis in genetic disease management.	7 Mark
Q3A	Explain the principles and steps of intracytoplasmic sperm injection (ICSI) and its role in PGD.	7 Mark
Q3B	Describe the procedure and significance of first polar body removal in preimplantation genetic testing.	7 Mark
	OR	
Q3A	Write detailed notes on laser-assisted hatching — its mechanism, procedure, and importance in embryo biopsy.	7 Mark
Q3B	Explain the trophectoderm biopsy technique, including its application in genetic screening and impact on implantation rates.	7 Mark
Q4A	Elaborate on the methods used for preimplantation diagnosis of aneuploidies, including molecular and cytogenetic approaches.	7 Mark
Q4B	Discuss the strategies for detecting chromosomal translocations through	7 Mark

P.T.O

E1257-2

	preimplantation genetic diagnosis.	
	OR	
Q4A	Discuss the visualization of polar body and blastomere chromosomes and its application in detecting chromosomal abnormalities.	7 Mark
Q4B	Explain the molecular and cytogenetic approaches for single-gene disorder diagnosis during the preimplantation stage.	7 Mark

Q5	**Answer the following questions (Any Seven)**	**14 Marks**
1.	What is the use of chromosome visualization in preimplantation diagnosis?	
2.	Define aneuploidy.	
3.	What is the function of trophectoderm cells in the blastocyst?	
4.	Define laser-assisted hatching.	
5.	Name any two chromosomal disorder detectable through PGD.	
6.	Mention one key difference between PGD and prenatal diagnosis.	
7.	What is the role of HLA typing in PGD?	
8.	Explain why blastocyst-stage biopsy is often preferred over cleavage-stage biopsy in PGD.	
9.	Differentiate between FISH and array CGH in terms of their application in detecting chromosomal abnormalities.	
10.	What are the ethical implications of sex selection through PGD for non-medical reasons?	
11.	How can nuclear transfer techniques be used to prevent the transmission of maternal mitochondrial diseases?	
12.	Describe the principle behind whole genome amplification (WGA) and its importance in single-cell genetic analysis.	
13.	Compare the clinical success rate and genetic accuracy between polar body analysis and blastomere biopsy.	
14.	How does allele dropout (ADO) affect the accuracy of PGD results, and how can it be minimized?	