

## M.Sc Sem-3 Examination

504

## Human Genetics (EA)

Time : 2-30 Hours]

November-2024

[Max. Marks : 70

Q-I	1	Explain briefly: Thyroid hormone mechanisms of action	(14)
	2	Discuss "Receptor Protein-Tyrosine Kinases".	
	OR		
	1	Give a note on the role of second messenger molecules.	
	2	Write a short note on the Wnt signaling pathway.	
Q-II	1	Give an account on types of nanopore and its application.	(14)
	2	Discuss green synthesis of nanoparticles.	
	OR		
	1	Explain briefly: Applications of Liposome	
	2	Write any one tool or technique used in nanoparticle characterization.	
Q-III	1	What is Tissue engineering? Write down any two applications of stem cell therapy for heart diseases in detail.	(14)
	2	Write a note: Magnetic activated cell sorting (MACS) and Fluorescence-activated Cell Sorting (FACS).	
	OR		
	1	Explain in detail: Applications of stem cell therapy in reproductive diseases related to infertility	
	2	What is a stem cell and which are the characteristics of stem cells according to potency? Give any five differences between embryonic stem cells, iPSCs, adult stem cells.	
Q-IV	1	Enumerate the variants of PCR and explain its principle.	(14)
	2	Write a detailed note on flow cytometry with a labeled diagram.	
	OR		
	1	Describe the targeted inhibition of gene expression strategy for gene therapy.	
	2	Provide a thorough explanation of the mechanism of DNA vaccine with a labeled diagram.	
Q-V	Answer any SEVEN out of TWELVE.		(14)
	1	Give the full form of "AMPK" and mention its role.	02
	2	What is the role of Smads?	02
	3	Add a note on "Signal Amplification".	02
	4	What is "PromethION"?	02
	5	Define: controlled drug delivery systems.	02
	6	What nanoparticles are used in LFIA?	02
	7	Write down the advantages and limitations of filtration technique for stem cell isolation?	02
	8	Define: Neural Stem Cells	02
	9	Which density gradient medias are used for stem cell isolation?	02
	10	Draw a labeled diagram explaining the gene transfer strategy for gene therapy.	02
	11	SOLiD sequencing was developed by ____ company and the full name of SOLiD is ____.	02
	12	Give differences between conventional vaccines and DNA vaccines.	02

(P.T.O.)

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## Human Genetics (EB)

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Q-I	1	Describe the development of gonads and accessory organs in the male.	(14)
	2	Explain non-genetic factors affecting sex determination.	
	OR		
	1	Discuss indications and risks of pre-natal diagnosis. Explain 2 non-invasive methods.	
	2	Write a note on the genes controlling complete sex determination.	
Q-II	1	Explain external parts and mammary gland of female reproductive system in brief.	(14)
	2	Write a detailed note on any two diseases of egg cell.	
	OR		
	1	Write a detailed note on menstrual cycle.	
	2	Write a detailed note on barrier methods of birth control.	
Q-III	1	Describe the ultrastructure of sperm mid-piece and axoneme.	(14)
	2	What is the purpose of sperm function tests? List the various tests and describe tests for sperm viability.	
	OR		
	1	Elucidate the role and ultrastructure of the Sertoli cell.	
	2	What is the function of semen? Briefly describe the biochemical components.	
Q-IV	1	Discuss the Non-surgical techniques used for female fertility regulation.	(14)
	2	Describe: Mitochondrial Replacement Therapy. State 2 other advanced IVF methods.	
	OR		
	1	Explain the principles of Competitive and Sandwich ELISA. Mention advantages of ELISA.	
	2	Write an account on Hybridoma Technology.	
Q-V	Answer any SEVEN out of TWELVE.		(14)
	1	What is meant by an indifferent, bipotential gonad?	02
	2	Explain: Androgen Insensitivity syndrome.	02
	3	Describe briefly: CVS	02
	4	Enlist any two functions of egg cell.	02
	5	Define intrauterine devices.	02
	6	Define primordial follicle.	02
	7	State the role and enzymes of the Acrosome.	02
	8	Write the main steps for an IVF program.	02
	9	Mention the main events in Spermatogenesis.	02
	10	State the location and function of the Leydig cell.	02
	11	Distinguish between: PGD and PGS	02
	12	Explain 3 specific applications of molecular analysis in this field.	02

**2811E824-3**

Candidate's Seat No : \_\_\_\_\_

**M.Sc Sem-3 Examination****504****Human Genetics (EC)****Time : 2-30 Hours]****November-2024****[Max. Marks : 70**

Q-I	1	What is NIPT? Discuss in detail.	(14)
	2	Explain the importance of newborn screening.	
	OR		
	1	What is amniocentesis? Write in detail.	
	2	What are the goals and indications for invasive prenatal testing? Discuss in detail.	
Q-II	1	Discuss the significance and interpretation of genetic variation.	(14)
	2	What is gene tracking? Explain.	
	OR		
	1	What are Genetic Tests and Genomic Tests? Discuss.	
	2	Write a note on Pre-symptomatic testing.	
Q-III	1	Write a note on Identification of Individuals for Genetics Risk Assessment of cancer and their Counseling.	(14)
	2	What is preconception counseling? Discuss giving its clinical significance.	
	OR		
	1	Discuss the reasons for individuals and couples to seek out ART.	
	2	What are types of Rare Diseases in kids and diagnostic challenges for them? Discuss.	
Q-IV	1	Write a descriptive note on: Bioethics in research & experimentation.	(14)
	2	Write a note on EI SI in New Technologies	
	OR		
	1	What are the criteria & ELSI in Gene Therapy? Discuss.	
	2	Write a note on supervision and strategies for providing support & guidance to new counselors.	
Q-V	Answer any SEVEN out of TWELVE.		(14)
	1	What is PGD?	02
	2	Which non-invasive techniques can be used to identify Down syndrome prenatally?	02
	3	What is the importance of chordocentesis?	02
	4	What are limitations to genomic testing using NGS?	02
	5	What is a Gene panel?	02
	6	What are extragenetic probes?	02
	7	What are the Types of assisted reproductive technology used?	02
	8	What are the ethical issues in testing of minors?	02
	9	What are the Medicolegal Issues in surrogacy?	02
	10	What is therapeutic cloning?	02
	11	Define: transgenic mouse model.	02
	12	What is Epigenetic Therapy?	02