

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
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.

(14)

Q-II

1	Give an account on types of nanopore and its application.
2	Discuss green synthesis of nanoparticles.

OR

1	Explain briefly: Applications of Liposome
2	Write any one tool or technique used in nanoparticle characterization.

(14)

Q-III

1	What is Tissue engineering? Write down any two applications of stem cell therapy for heart diseases in detail.
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.

(14)

Q-IV

1	Enumerate the variants of PCR and explain its principle.
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.

(14)

Q-V **Answer any SEVEN out of TWELVE.**

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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Q-I	1	Describe the development of gonads and accessory organs in the male.	(14)	
	2	Explain non-genetic factors affecting sex determination.		
	OR			
<p>1 Discuss indications and risks of pre-natal diagnosis. Explain 2 non-invasive methods.</p> <p>2 Write a note on the genes controlling complete sex determination.</p>				
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			
<p>1 Write a detailed note on menstrual cycle.</p> <p>2 Write a detailed note on barrier methods of birth control.</p>				
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			
<p>1 Elucidate the role and ultrastructure of the Sertoli cell.</p> <p>2 What is the function of semen? Briefly describe the biochemical components.</p>				
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			
<p>1 Explain the principles of Competitive and Sandwich ELISA. Mention advantages of ELISA.</p> <p>2 Write an account on Hybridoma Technology.</p>				
Q-V	Answer any SEVEN out of TWELVE.			
	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	

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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.		
Q-II	2	What are the goals and indications for invasive prenatal testing? Discuss in detail.		
	1	Discuss the significance and interpretation of genetic variation.		
	2	What is gene tracking? Explain.		
	OR			
Q-III	1	What are GeneticTests and GenomicTests? Discuss.	(14)	
	2	Write a note on Pre-symptomatic testing.		
	1	Write a note on Identification of Individuals for Genetics Risk Assessment of cancer and their Counseling.		
	2	What is preconception counseling? Discuss giving its clinical significance.		
Q-IV	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.		
	1	Write a descriptive note on: Bioethics in research & experimentation.		
Q-V	2	Write a note on ELSI in New Technologies	(14)	
	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.		
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 chardocentesis?			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	