0305E335

Candidate's Seat No :_____

M.Sc. (Sem.-II) Examination

407

Human Genetics

May-2017

Time : 3 Hours] [Max. Marks : 70

NB: All questions are compulsory.
Illustrate your answers with neat diagrams wherever necessary

Q-1 (A)	What are the factors affecting electrophoresis? Discuss in detail.	(07)
OR (A)	Briefly explain the isolation of DNA and its importance.	
(B)	What are the different types of enzymes required for DNA technology? Give an account on its role in DNA manipulation with suitable example.	(07)
OR (B)	Give an account on PAGE.	
Q-2 (A)	Write about protein blotting technique.	(07)
OR (A)	What is ELISA? Give an account on different types of ELISA.	
(B)	Discuss in detail about oligonucleotide synthesis.	(07)
OR (B)	Briefly explain PCR and give its applications.	
Q-3 (A)	Briefly discuss the various types of rotors used in centrifuges. Add a note on sedimentation coefficient.	(07)
OR (A)	Discuss the main features of various types of centrifugation.	
(B)	Explain recombinant DNA technology and discuss its significance.	(07)
OR (B)	Describe the types of cloning vectors with emphasis on Plasmid.	
Q-4 (A)	Explain Beer-Lambert's law and describe UV/VIS spectroscopy.	(07)
OR (A)	Describe briefly various separation techniques by chromatography.	
(B)	Give an account of principle and applications of HPLC. Add a note on various detectors used in HPLC.	(07)
OR (B)	Explain the principle and instrumentation for infrared spectroscopy.	
Q-5	Answer the following: (One Mark Each)	(14)
(1)	If A_{260}/A_{280} ratio is less than 1.7 for isolated RNA, it indicates contamination of _____.	
(2)	Molecular charge and strength of electric field decide _____ in electrophoresis.	
(3)	What are the two basic agarobiose repeating units present in agarose gel?	
(4)	What is the name of modified nucleotides used in oligonucleotide synthesis?	
(5)	To Immobilize DNA onto a permanent substrate and to identify DNA sequence (gene) of interest, are two important goals of which technique?	
(6)	Give name of RNA blotting technique?	
(7)	Which DNA sequencing method requires M13 vector and ddNTPs.	
(8)	Write down the formula to determine sedimentation coefficient.	
(9)	Write the applications of TLC in Human Genetics.	
(10)	What is nomogram?	
(11)	What is interferogram?	
(12)	What is tandem Mass spectrometer?	
(13)	Mention differences between rDNA and cDNA.	
(14)	List attributes of Phage λ vector.	

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Q-1 (A) Bioinformatics is interdisciplinary. Explain. (07)

OR (A) Write a note on applications of Bioinformatics in Genetics.

(B) Explain protein Data Bank in detail. (07)

OR (B) Write a note on EMBL and DDBJ databases.

Q-2 (A) What is sequence alignment? Give its types. (07)

OR (A) Explain Protein's super secondary structure.

(B) Discuss metabolic pathway database . (07)

OR (B) Elaborate:
(i) Pubchem (ii) Pubmed

Q-3 (A) Define and explain advantages of the measures of central tendency. Calculate these measures from the given data. (07)

12.1	12.6	13.8	16.2	14.5	15.7	12.6	13.2	14.6	12.6

OR (A) What is Sampling? Explain Sampling methods and sources of errors.

(B) Write a note on Range and Mean Deviation. Determine Standard deviation and Standard error for the following data obtained while estimating an enzyme activity from a sample. (07)

Enzyme 1 (u/mg prot)	7.1	7.9	10.4	9.8	7.8	8.5	9.4	8.9

OR (B) Give a complete account of the types, organization and tabulation of data.

Q-4 (A) Test the following data, using a suitable Test of Hypothesis to determine if there is a statistically significant difference (at 5% level of significance) between the two Groups. (07)

GROUP	DATA
CONTROL(GR I) (n=10)	60.2 ± 14.6
EXPERIMENT(GRII) (n=10)	38.5 ± 10.9

OR (A) Discuss Probability and give its practical applications.

(B) Write a note on Correlation, its types and application. Calculate Pearson's correlation co.efficient 'r' for the values obtained for Age (yrs-X) and systolic BP(Y). (07)

Age (X)	49	54	58	59	62	45	68	52
SBP (Y)	130	160	155	150	160	140	170	150

OR (B) What are Tests of Hypothesis? Give an example and explain ANOVA and its significance.

P. T. O.

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Q-5	Answer the following: (One Mark Each)	(14)
(1)	Define Human Genome Project.	
(2)	How Bioinformatics can help in identification of genetic disorders?	
(3)	Give examples of Protein classification databases.	
(4)	State the Sum Law in Probability.	
(5)	What are Parametric Tests?	
(6)	What is the contribution of Fisher in Statistics?	
(7)	Define: Accuracy of an Assay.	
(8)	What are the main points to be noted in a data Table?	
(9)	Calculate %CV if SD=4.8, $\bar{x}$ =24 and n=9.	
(10)	Mention the applications of Biostatistics in genetics.	
(11)	Distinguish between 'one way' and 'two way' ANOVA.	
(12)	Give any tool of Primer designing.	
(13)	Define 'phylogenetic tree'.	
(14)	What is tr EMBL?	

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Q-1 (A)	Mention the method for enrichment of haemopoetic stem cells and mention their applications.	(07)
OR (A)	Describe clonal selection theory in detail.	
(B)	Mention in detail the function of macrophages.	(07)
OR (B)	What are antigens? Describe antigenicity in detail.	
Q-2 (A)	Describe the structural characteristic of an antibody. Where are the CDR regions located on an antibody molecule and what are their functions?	(07)
OR (A)	What mechanisms generate the three hypervariable regions (complementarity-determining regions) of immunoglobulin heavy and light chains? Discuss.	
(B)	List the primary and secondary lymphoid organs and briefly mention their functions in the immune response.	(07)
OR (B)	Write a detailed account on Fc receptors. Also mention its distinct role.	
Q-3 (A)	Write an essay on "cytotoxic hypersensitivity".	(07)
OR (A)	What is GOWT? Explain treatment in detail.	
(B)	Give a brief note on treatment of immune pathology.	(07)
OR (B)	Define pathogenesis of autoimmunity by an example.	
Q-4 (A)	What is cytokine? Explain in detail.	(07)
OR (A)	Describe immune response to infectious diseases.	
(B)	Discuss trastuzumab in detail.	(07)
OR (B)	Write an essay on "immunotherapy".	
Q-5	Answer the following: (One Mark Each)	(14)
(1)	What are beige mice?	
(2)	What is contribution of Galen?	
(3)	Give the function of spleen.	
(4)	Eosinophils do not stain with _____.	
(5)	Accute inflammation can be initiated by _____.	
(6)	Define complement component C3.	
(7)	Define interferons.	
(8)	Define naked mAb.	
(9)	Mention opsonization.	
(10)	What is paratope?	
(11)	Explain arthritis.	
(12)	How does azathioprine work?	
(13)	What is scFv?	
(14)	What is pannus?	