16/12/24

Printing Pages :1

Paper Code: PGDCG-101 A (SVSU:2024-25/R)

Enrollment No.													

Post Graduate Diploma in Clinical Genetics (PGDCG) Ist Semester

Subject: Basic Human Genetics

Time: 3:00 Hours **Max. Marks: 70**

Q.I: Write long notes on any three. **(10x3=30)**

a. What is the chemical composition of DNA? Describe the double helix model of DNA.
b. Discuss the principle of inheritance in details.
c. Describe the principles and application of non-Mendelian inheritance?
d. Describe the role of linkage in mapping of genes.
e. Describe the role of pedigree analysis in human genetics.

Q.II: Write short notes on any five. **(5x5=25)**

a. What is the importance of probability in genetics?
b. What is the purpose of a family pedigree?
c. What are the applications of gene mapping?
d. What are the most common uses of gene therapy?
e. How is the allele frequency of a population calculated?
f. What is the role of migration and mutation in changing allele frequencies?
g. How to flow the genetic information in human.

Q.III: Write Very short notes on any five. **(1x5=05)**

a. What is co-dominance?
b. How to calculate map distance between two genes?
c. What are the main types of population genetics?
d. Write the name of purine and pyrimidine
e. What are the two basic rules of probability in genetics?
f. What is the difference between inheritance and variation?
g. What is the purpose of a family pedigree?

Q.IV: Attempt any four multiple Choice Questions. Select the correct answer only. **(1x10=10)**

a. If a hybrid expresses a character, it is called:-
i. Epistasis ii. Dominant iii. Co-dominant iv. Recessive

b. Colour blindness is an _____ linked recessive trait
i. Z chromosome ii. X chromosome iii. Y Chromosome iv. None of these

c. An individual's collection of genes is called
i. Genetype iii. Phenotype iii. Trait iv. None of these

d. If there are 4 alleles for a gene, then what would be the number of genotypes?
i. 5 ii. 10 iii. 15 iv. 20

e. ABO blood group is not an example of:
i. Co dominance ii. Multiple allele iii. Epistasis iv. Mendalian relations.

f. Which of the following does not take part in gene expression?
i. Replication ii. Transcription iii. RNA processing iv. Translation

g. Which of the following regarding the basic mechanism of gene expression is correct?
i. DNA —> tRNA —> protein ii RNA —> cDNA —> mRNA —> protein
iii. RNA —> DNA —> mRNA —> protein iv. DNA —> protein

h. What kinds of traits were described by Mendel?
i. Contrasting traits ii. Alternative forms iii. Mixed forms iv. Opposite and recessive form

i. Which of the following is a classic example of polygenic inheritance?
i Skin colour in humans ii. Blood groups iii. Flower colour in pea iv. All of these

j. What is the unit of linkage map?
i. Morgan ii. Centi-morgan iii. Centimeter iv. Angstrom

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18/12/24

Printing Pages :1
Paper Code: PGDCG-102 **B (SVSU:2024-25/R)**

Enrollment No.													

PG Diploma in Clinical Genetics Ist Semester
Subject: Human Cytogenetics

Time: 3 Hours **M.M. 70**

Note: All questions are compulsory. Make diagrams wherever required.

Q1. Long answer type questions. Attempt any three. **(10x3=30)**

a. Write a note on the organization of a eukaryotic cell with appropriate illustration.
b. Explain the different type of chromosome preparation and staining with proper illustration.
c. Differentiate between mono, bi and triculture of human cells.
d. What are the essential components in human cell culture and maintenance? Elaborate.
e. What is Lyon's hypothesis? What is its significance?

Q2. Short answer type questions. Attempt any five. **(5x5=25)**

a. Describe what is karyotyping with proper illustration.
b. Explain the process of G-banding.
c. Explain the characteristics of suspension culture of human cells.
d. Explain chromosomal translocation with appropriate clinical example.
e. Explain the significance of interphase chromosome.
f. Differentiate between polyploidy and aneuploidy.
g. Explain the process through which inactivated X-chromosome may be identified.

Q 3. Very short answer type questions. Attempt any five. **(1x5=5)**

a. What are autosomes?
b. In which disorder chromosomal deletion is observed to the maximum?
c. How FISH is helpful in diagnostics?
d. What is the significance of short-term lymphocyte culture?
e. Define chromosomal inversion.
f. What is chromosomal mosaicism?
g. What is band resolution?

Q 4. Multiple choice questions.Attempt all. **(1x10=10)**

a. Centromere is located exactly at the center of the chromosomes
   i. True ii.False
b. Name the unit of replication.
   i. DNA ii. Gene iii. Replicon iv. Chromosome
c. In which stage of the cell-cycle, Barr body can be identified?
   i. Interphase ii.Prophase iii. Metaphase iv. Anaphase
d. All genes on the inactivated X chromosome are transcriptionally silent
   i. True ii. False
e. What changes occur in the chromosome to make it inactive?
   i. Methylation ii. Glycosylation iii.Acetylation iv. Phosphorylation
f. Which of the following is less condensed, less stained portion of chromatin?
   i. Metaphase ii. Interphase iii. Heterochromatin iv. Euchromatin
g. Association of DNA and histone is mediated by --
   i. Covalent bonding ii. Hydrogen bonding
   iii. Hydrophobic bonding iv. Vander waals interaction
h. Which of the following is used by cells to interact with other cells?
   i. Cell tubules ii. Cell junctions iii. Cell adhesions iv. Cell detectors
i. Gene duplication occurs by unequal crossing over
   i. True ii. False
j. Which of the following is an intervening, non-coding sequences?
   i. Axon ii. Intron iii. Exon iv. Axiom

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Printing Pages :2
Paper Code: PGDCG -103 B (SVSU:2024-25/R)

Enrollment No.													

Program Name: Post Graduate Diploma in Clinical Genetics (PGDCG)
Ist Semester\ Ist Year
Subject Code: PGDCG -103
Subject: Biochemistry and Instrumentation

Time: 3:00 Hours **Max. Marks: 70**

Q.I: Write long notes on any three. **(10x3=30)**

a. Describe the principle, instrumentation and application of Spectrophotometer.
b. Describe the symptoms, diagnosis and treatment of G6PD deficiency syndrome (G6PD.
c. Describe the principle, instrumentation and application of HPLC.
d. What is the fertility? Describe the fertility profile test.
e. Describe the classification and functions of Lipids.

Q.II: Write short notes on any five. **(5x5=25)**

a. Write the biochemical function and deficiency symptoms of Vitamin D.
b. Describe the Essential fatty acid and their deficiency symptoms.
c. Write the biochemical function and deficiency symptoms of Vitamin B_{12}.
d. Write the Biochemical function and deficiency symptoms of Phosphorus.
e. Describe the principle and types of ELISA.
f. Describe the double helix model of DNA.
g. What is Radioactivity? Write the use of radioisotopes in medicine

Q.III: Write Very short notes on any five. **(1x5=05)**

a. Which test is used to detect protein in urine?
b. Write the deficiency symptoms of Vitamin D.
c. Write the deficiency symptoms of Iodine.
d. What is the use of carbon-14.
e. Write the name of aromatic amino acid.
f. Write the name of enzyme related to Phenylketonuria
g. Write the hormones secreted by thyroid.

Q.IV: Attempt any four multiple Choice Questions. Select the correct answer only. **(1x10=10)**

a. Which test is used to detect glucose in urine?:-
i. Benedict's test ii. Biuret test iii. DAMO Test iv. All of these.

b. The sulpher containing amino acid is
i. Serine ii. Leucine iii. Methionine iv. Glycine

c. The deficiency of Vit B_{12} is
i. Beri beri ii. Rikets iii. Megaloblastic anemia iv. None of these

d. Example of Mucopolysaccharides are
i. Hyaluronic acid ii. Heparin iii. Both of these iv. None of these

e. FSH is secreted by
i. Pituitary ii. Testes iii. Ovary iv. Adrenal cortex.

f. Which of the following is act as the most essential nutrient for a woman during the initial stages of pregnancy to prevent birth defects?
i. Thiamine ii. Folic acid iii. Vitamin C iv. Vitamin E

g. What is the chemical name of Vitamin C?
i. Niacin ii. Ascorbic acid iii. Citric acid iv. Riboflavin

h. The fasting sugar level in serum is
i. 30-50mg/dl ii. 70-110mg/dl iii. 140-200mg/dl iv. 210-250mg/dl

i. The nitrogen base present in present in DNA not in RNA is
i Cytocine ii. Adenine iii. Thymine iv. None of these

j. The protein level in serum is
i. 5-7mg/dl ii. 9-10mg/dl iii. 14-15mg/dl iv. None of these

23/12/24

Paper Code: PGDCG-104 C (SVSU:2024-25/R)

Enrollment No.													

PG Diploma in Clinical Genetics

I Year/ Ist Semester

Subject: Genomics

Time: 3 Hours **M.M. 70**

Note: All questions are compulsory. Make diagrams wherever required.

Q1. Long answer type questions. Attempt any three. **(10x3=30)**

a. Differentiate between intron and exon in terms of both structure and function.
b. Out of the two processes, transcription and translation, which has more clinical significance? Explain with prope example.
c. Describe the gene splicing process in details.
d. Explain with proper example the significance of pharmacogenetics towards better clinical outcome.
e. Explain the structural characteristics of nuclear genome.

Q2. Short answer type questions. Attempt any five. **(5x5=25)**

a. What is the consequence of frame-shift mutation ? Explain with proper illustration.
b. Can a mutation be lethal? Provide justification.
c. Explain the significance of mitochondrial genome.
d. Explain with proper example the significance of pharmacogenetics towards better clinical outcome.
e. Explain the basis of classification of mutation with proper example.
f. What is the application of microsatellite marker ? Explain with proper example
g. Write a short note on the nomenclature of Wild-type and Mutant allele.

Q 3. Very short answer type questions. Attempt any five. **(1x5=5)**

a. DNA condensation
b. Mitochondrial genome mutation
c. Gain-of-function mutation
d. Teratogenetics
e. Significance of SNPs
f. Significance of Heterochromatin
g. Genomic database

Q 4. Multiple choice questions.Attempt all. **(1x10=10)**

a. What is a codon?
   i. A single base necessary to specify a single amino acid
   ii. A group of two bases necessary to specify a single amino acid
   iii. A group of three bases necessary to specify a single amino acid
   iv. A group of several bases necessary to specify a single amino acid.
b. The triplet code allows many amino acids to be specified by more than one codon. Such a code is said to be degenerate?
   i. False ii. True
c. What is Mitochondrial DNA?
   i. Simple, single stranded linear DNA molecule ii. Simple, single stranded circular DNA molecule
   iii. Simple, double stranded linear DNA molecule iv. Simple, double stranded circular DNA molecule
d. What is the approximate fraction of genetic variation in the nuclear genome that is expected to have a harmful effect on gene function:
   i. 50% ii. 25% iii. 10% iv. 1%
e. Phocomelia, a rare congenital anomaly, is associted to which particular field in the following:
   i. Developmental genetics ii. Familial trait iii. Teratogenetics iv. All of the above
f. Which of the following is associated with metabolomics?
   i. New born screening ii. Precision medicine iii. Drug development iv. All of the above
g. The unpacked stretches of DNA are the extra chromosomal load found in the eukaryotic genome
   i. True ii. False
h. Does nuclear DNA of eukaryote code for mitochondrial proteins?
   i. True ii. False
i. Which of the following does not take part in gene expression?
   i. Replication ii. Transcription iii. RNA processing iv. Translation
j. Which of the following is the start codon?
   i. CUC ii. ACC/CCA iii. GUA iv. AUG/GUG

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