JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION-2025
B. Tech.-V Semester (BT)

COURSE CODE (CREDITS): 18B1WBT532 (3) MAX. MARKS: 35

COURSE NAME: COMPARATIVE AND FUNCTIONAL GENOMICS

COURSE INSTRUCTORS: DR. JATA SHANKAR MAX. TIME: 2 Hour

Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q. No	Questions	CO	Marks
Q1	What are the salient characteristics of DNA Microarray? What are the basic types of DNA microarrays, and describe the major differences? Analyse the role of DNA microarray methodology to identify genome expression profiles of cancer versus non-cancerous lung cells.	CO III	5
Q2	If the *p-value* of differently expressed data from the Microarray is 0.01. The analysis enables a total of 2000 genes to be differentially expressed. What could be the estimated number of differentially expressed genes that are false positives or not true biological data?	CO III	5
Q3	Explain the working principle of Illumina sequencing technology, detailing the major steps involved in sequencing-by-synthesis. Additionally, describe how this technology is applied in genome-wide gene expression analysis through RNA sequencing (RNA-seq).	CO II	5
Q4	Evaluate and contrast the genomic architecture of eukaryotic organisms such as humans and *Saccharomyces cerevisiae*. Explain the principle of gene density and calculate the gene density and its relationship to the biological complexity of these species (Give the genomic data precisely).	CO I	5
Q5	Explain how genetic differences among individuals affect drug response. Give examples of diseases and drugs where genotype-guided selection or dosing is essential. Describe how pharmacogenomics supports personalised medicine in these contexts.	CO II	5
Q6	What is a Biomarker, and describe the primary criteria for considering any biomolecule to be considered as a biomarker? List a few examples of cancer biomarkers?	CO III	5
Q7	TP53 is known as the "guardian of the genome. Describe the TP53 mutations commonly observed in different types of human cancers. Discuss the concepts of loss of function, dominant-negative effects, and gain-of-function mutations. With example, how do these mutations contribute to cancer progression and therapy resistance?	CO II	5

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