JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

MTech-I Semester (BT)

Course Code (Credits): 13M11BT114 (3) Max. Marks: 15

Course Name: High Throughput Technologies (13M11BT114)

Course Instructors: Dr. Abhishek Chaudhary Max. Time: 1 Hour

Note: (a)*All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q-1	**a.** A fluorescent molecule absorbs radiation at **280 nm** but emits fluorescence at **400 nm**. Explain why the emission occurs at a longer wavelength and calculate the Stokes shift. **b.** Explain the roles of **internal conversion (IC)** and **intersystem crossing (ISC)** in determining the fluorescence intensity and lifetime of the molecule. How would an increase in ISC affect fluorescence emission?	**2.5+2.5**
Q-2a	A molecule in its ground state has all electrons paired. After absorption of light, it is promoted to an excited electronic state without a change in the overall electron spin. Determine the **spin multiplicity** of the **ground and excited states** and **explain why the resulting emission is classified as fluorescence.**	**5**
Q-3	**a.** Differentiate between primary and secondary data. Explain the major differences between them. What are the major databases, and what are they? **b.** Explain the major scientific outcomes of the Human Genome Project and describe the timeline of the Human Genome Project. Explain alternate splicing in a human gene with an example associated with disease or a normal condition.	**2.5+2.5**