B. TECH
(SEM III) THEORY EXAMINATION 2020-21
TECHNIQUES IN BIOTECHNOLOGY

Time: 3 Hours | *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Why must TEM use a high vacuum and very thin sections?	2	CO1
b.	If a specimen is viewed using a 45X objective in a microscope with a 15X eyepiece, how many times have the image being magnified?	2	CO1
c.	Describe the terms: elution development, gradient elution, development, displacement development and frontal analysis.	2	CO2
d.	How Kd is exploited in column chromatography?	2	CO2
e.	How are electromagnetic waves classified in the electromagnetic spectrum?	2	CO3
f.	What are the applications of X ray diffraction in biotechnology?	2	CO3
g.	What are types of rotors used in Centrifuge?	2	CO4
h.	What do you understand by sedimentation?	2	CO4
i.	What are the characteristics of an ideal biosensor?	2	CO5
j.	Define 'bioink' with examples.	2	CO5

SECTION B

2. Attempt any *three* of the following:

Q no	Question	Marks	CO
a.	Describe briefly how the scanning probe microscope operates? For what it is used? Distinguish between the two types of scanning probe microscopes with respect to their mechanism of operation.	10	CO1
b.	Explain the different components of chromatography system.	10	CO2
c.	Differentiate between adsorption, emission, and scattering spectroscopy. What are the applications of spectroscopy?	10	CO3
d.	What is the principle of centrifugation? Differentiate between low, high and ultra-centrifuges.	10	CO4
e.	How does fluorescence activate cell sorting work? Explain the process of cell sorting in flow cytometry.	10	CO5

SECTION C

3. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Briefly describe how dark-field, phase-contrast. Differential interference contrast and fluorescence microscopes work, and the kind of image provided by each. Give a specific use for each type.	10	CO1
b.	10. How would you visualize capsules, endospores, and flagella? Define resolution, numerical aperture, working distance and fluorochrome. How does resolution depend upon the wavelength of light, refractive index, and the numerical aperture? What are the functions of immersion oil and substage condenser?	10	CO1