

B. TECH
(SEM III) THEORY EXAMINATION 2020-21
MICROBIOLOGY & IMMUNOLOGY

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.

Q no.	Question	Marks.	CO
a.	Draw a bacterial cell and label all important structures.	2	CO1
b.	What kinds of inclusion bodies do prokaryotes have? What are their functions?	2	CO1
c.	Enlist the general characteristics of viruses.	2	CO2
d.	Differentiate between oxygenic and anoxygenic photosynthesis.	2	CO2
e.	Why are most fevers caused by either viruses or bacteria?	2	CO3
f.	What is the basis of immunologic memory?	2	CO3
g.	What are the functions of MHC molecules?	2	CO4
h.	All antibodies are proteins. What protein property has favored their use as antibodies in preference to some other type of biomolecule?	2	CO4
i.	What causes hypersensitivity? What are the signs and symptoms of hypersensitivity?	2	CO5
j.	A person with AIDS has a lower T-helper/T-cytotoxic cell ratio. What problem(s) does this create?	2	CO5

SECTION B

2. Attempt any three of the following:

Q no.	Question	Marks	CO
a.	Describe the following (with their uses and example): synthetic media, complex media, general purpose media, enriched media, selective media and differential media. What are peptones, yeast extract, beef extract and agar? Why are they used in media?	10	CO1
b.	Explain the processes by which bacteria transfer its DNA horizontally.	10	CO2
c.	Differentiate between- i. Adaptive and Innate immunity ii. Humoral and Cell-mediated immune responses	10	CO3
d.	Write short note on- i. Agglutination ii. ELISA	10	CO4
e.	What do you understand by bioremediation? What are the types of bioremediation? What bacteria are used in bioremediation? How safe is bioremediation?	10	CO5

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. https://www.aktuonline.com	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