

Total No. of printed pages = 5

63/2 (SEM-1) BOT 104

2021

(held in 2022)

BOTANY

(Theory Paper)

Paper Code : BOT-104

(Instrumentation And Laboratory Technique)

Full Marks – 80

Time – Three hours

**The figures in the margin indicate full marks
for the questions.**

1. Choose the correct answer from the following questions : $1 \times 7 = 7$

(a) The resolution power of a microscope means the capacity to

- (i) Magnify the image
- (ii) Distinguish between two organelles
- (iii) Focus objects
- (iv) Distinguish between two points

[Turn over

(b) How does an oil immersion lens enhance the power of resolution of a microscope?

- (i) Increasing the numerical aperture of the objective lens
- (ii) Reducing the spherical aberrations of lens systems
- (iii) Decreasing the chromatic aberrations of lens systems
- (iv) Increasing the angle ($\sin \alpha$) of objective lens

(c) The regional ASSAM herbaria located at _____.

- (i) Shillong
- (ii) Guwahati
- (iii) Itanagar
- (iv) Calcutta

(d) The spectrum for UV visible is a plot of

- (i) Concentration versus absorbance
- (ii) Concentration versus time
- (iii) Transmittance versus wave number
- (iv) Transmittance versus absorbance

(e) What is ELISA intended to do?

- (i) Detect antibody to HIV
- (ii) Detect antigen to HIV
- (iii) Detect free circulating virus
- (iv) None of the above

(f) The thin layer chromatography, the stationary phase is composed of

- (i) Silica gel
- (ii) CaCO_3
- (iii) Agarose gel
- (iv) None of these

(g) Ethidium bromide is used in separating

- (i) DNA
- (ii) RNA
- (iii) Protein
- (iv) Both (ii) and (iii)

2. Answer the following questions : $2 \times 6 = 12$

- (a) Differentiate between histochemistry and cytochemistry.
- (b) Write any two applications of haematoxylin.
- (c) What is numerical aperture? How to calculate numerical aperture?

- (d) Define chromatography. What is RF ?
1+1=2
- (e) State the function of loading dye used in gel electrophoresis. Give an example. 1+1=2
- (f) Differentiate between native and denatured gel electrophoresis.
- (g) 'Proteins are amphoteric molecules.' Justify the given statement.
- (h) State Beer's Lamberts law.

3. Write short notes on any *four* : 5×4=20

- (a) Plant maceration technique
- (b) Double staining procedure
- (c) Application of radioisotope in biology
- (d) FISH
- (e) HPLC
- (f) Working principle of UV-spectrophotometer.

4. Answer any *three* of the following broad questions : 9×3=27

- (a) What is digital herbarium ? Discuss the role of herbarium in botanical research. Mention two major herbaria in the world.

2+5+2=9

- (b) Write the principle, procedure, types and uses of ELISA. Distinguish between ELISA and RIA.
6+3=9

- (c) State the properties of compounds based on which these are separated by Gas Chromatography. Give an account of the working principle of Gas Chromatography. Write its applications.
2+5+2=9

- (d) What does isoelectric point mean ? Describe the working principle of two-dimensional gel electrophoresis. Write its applications.
2+5+2=9

5. Answer any *one* of the following : 14×1=14

- (a) Differentiate between bright field and dark field microscopy. Explain the principle and technique of dark field microscope. Mention the advantages of dark field microscopy.
5+5+4=14

- (b) What is gel electrophoresis ? What are its types ? What does SDS stand for and what is the use of it in electrophoresis ? Give an account of the working principle of gel electrophoresis. Differentiate between PAGE and SDS-PAGE.
1+2+3+6+2=14