2018

BOTANY

BOT 104

INSTRUMENTATION AND LABORATORY TECHNIQUE

Full Marks: 80

Time: 3 hours

The figures in the margin indicates full marks for the questions

1. Answer the following Multiple Choice Questions: 1×9=9

i. The Magnification of a compound microscope depends upon:

I. Focal length of objective lens II. Focal length of eye piece

III. Tube length of eye piece

IV. Numerical aperture of the objective

V. Perfocal objective lens

Codes:

a. I, II and III b. I, II and IV

c. II, III and IV d. I, III and V

ii. The largest herbarium of the world is located in:

a. New York b. Kew

c. Geneva d. Berlin

iii. UV visible spectrophotometer is used for analyzing

a. Absorption of light b. Emission of light

c. Scattering of light d. All of the above

iv. Which of the following types of microscope, uses UV rays of higher wavelength?

a. Ultraviolet microscope b. Fluorescence microscope

c. Polarizing microscope d. Electron microscope

v. Which of the following wavelength is used for quantification of protein

a. 390 nm b. 665 nm

c. 425 nm d. 280 nm

vi. In Thin Layer Chromatography, the stationary phase is composed of

a. Silica gel b. $CaCO_3$

c. Agarose gel d. None of the above

vii. Which of the following is used as a carrier in Gas chromatography

a. Hydrogen b. Neon

c. Nitrogen d. Lithium

viii. Proteins are

a. Positively charged b. Negatively charged

c. Amphoteric d. None of the above

ix. Which of the following is a loading dye?

a. Ethidium Bromide b. Cotton blue

b. Bromophenol blue d. Safranin

2. Answer the following short questions: ***(any six)*** 2×6=12

a. What is double staining? What are the different types of stains used in double staining? 1+1=2

b. What is a pinhole lens? Why is it used in advanced microscopy? 1+1=2

c. Name any two major herbaria in the world. 2

d. Why is RIA considered as one of the most sensitive immunological technique? 2

e. Explain Beer's Lamberts law. 2

f. What is resolution? What are the factors affecting resolution of microscope? 1+1=2

g. What is meant by gel electrophoresis? What type of compounds may be separated by this technique? 1+1=2

h. Who is the father of chromatography? What are the two important phases of any chromatographic technique? 1+1=2

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

a. Differentiate between Bright field and Dark field microscopy. Explain in detail the working principle and applications of Phase contrast microscopy. 2+7=9

b. Define chromatography. What are the characteristics based on which compounds are separated by Gas chromatography? Give an account of the working principle of Gas chromatography. Write its applications. 1+2+4+2=9

c. What are the applications of western blotting? What types of membranes are used in blotting? What are the different ways of transfer in western blotting? 3+2+4=9

d. What is IR spectroscopy? Write the principle concept used in IR spectroscopy. How does it differ from Circular Dichroism? What are the applications of IR spectroscopy? 1+3+2+3=9

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

   a. Geiger Muller counter

   b. Herbaria and Herbarium

   c. Two-dimensional gel electrophoresis

   d. FISH

   e. Working principle of UV-spectrophotometry

5. Answer ***any one*** of the following broad questions: 1×12=12

   a. What is mean by radioisotope? Give in details the detection technique of radioisotope. Explain the application of radioisotope in biomedical research. 2+5+5=12

   Or

   b. Name different types of ELISAs based on technologies employed. Describe the principle and methods of each type of ELISA. Enumerate different applications of ELISA. 1+8+3=12

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