LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PLANT BIOLOGY AND PLANT BIOTECHNOLOGY**

FOURTH SEMESTER – **APRIL 2024**

UPB 4601 – BIOLOGICAL TECHNIQUES

Date:15-04-2024 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
1.	**Fill in the blanks**	
a)	---------- is used to draw diagrams on paper by the principle of optical superimposition.	
b)	*Heamatoxylon campechianum* yields a natural dye ---------- for staining chromosomes.	
c)	Sonication technique uses frequencies greater than _____Hz .	
d)	AAS and AES are used to detect _____ in the sample.	
e)	The separation of charged biomolecules can be done through _____ chromatography.	
2.	**State whether the following statements are TRUE or FALSE**	
a)	Ethanol is a dehydrating chemical used during block preparation for microtome sectioning.	
b)	Calcofluor is the stain used to stain lignified cells.	
c)	The force acting towards the centre of rotation is the centrifugal force.	
d)	The mass-to-charge ratio is measured using mass spectroscopy.	
e)	SDS-PAGE cannot be used to separate nucleic acids.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Choose the correct answer**	
a)	One division of a stage micro meter is equal to ----------µm. i) 1 ii) 10 iii) 50 iv) 100	
b)	Microtome sections were mounted for staining during permanent slide preparation in i) Mayers solution ii) Mayer's albumin iii) Glycerine iv) DPX	
c)	Cryopreservation is the preservation of germplasm at very low temperature of around i)-0°C ii) – 101°C iii)-121°C iv) -196°C	
d)	The frequency used to bring about resonance in NMR is in _____ range i) UV ii) IR iii) Microwaves iv) Radio	
e)	The separation of molecules based on their molecular weight is done using _____ chromatography i) Ion exchange ii) Gel filtration iii) Gas iv) Affinity	
4.	**Answer the following, each in about 50 words**	
a)	Mention the importance of diaphragm in a bright field microscope.	
b)	List the advantages of karyotyping.	
c)	Define pH.	
d)	Write a note on X-ray diffraction.	
e)	Define Rf value.	
	SECTION B - K3 (CO2)	
	Answer any TWO of the following in 500 words **Draw diagrams / flowcharts wherever necessary**	**(2 x 10 = 20)**
5.	Narrate the methods of herbarium preparation for hydrophytes and xerophytes.	
6.	Classify and explain on the methods and steps involved in cryopreservation.	
7.	Prepare an overview on the principle and applications of gel filtration.	
8.	Illustrate the working and applications of mass spectroscopy.	

	SECTION C – K4 (CO3)
	Answer any TWO of the following in 500 words (2 x 10 = 20) **Draw diagrams / flowcharts wherever necessary**
9.	High light the types of fixation methods. Give examples of fixatives.
10.	Analyse elaborately on the working principle of the pH meter.
11.	Examine the types, principle and applications of luminometry.
12.	Explicate the principle behind HPLC.
	SECTION D – K5 (CO4)
	Answer any ONE of the following in 1000 words (1 x 20 = 20) **Draw diagrams / flowcharts wherever necessary**
13.	Describe the parts, ray diagram, applications of phase contrast microscope.
14.	Evaluate the working principle and applications of gas chromatography and add a note on Flame Ionization Detector.
	SECTION E – K6 (CO5)
	Answer any ONE of the following in 1000 words (1 x 20 = 20) **Draw diagrams / flowcharts wherever necessary**
15.	Categorize and elaborate on the different types of centrifugation.
16.	Compile the working principle of the single and double beam spectrophotometer and the photomultiplier tube with applications.

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