No. of Printed Pages: 2

## { 19 } Sardar Patel University M. Sc. Genetics, First Semester Examination Friday, 22<sup>nd</sup> March, 2019 10:00 p.m. to 01:00 p.m.

## PS01CGEN22: Bioinstrumentation

Note: (i) Figures on right indicates marks.

(ii) Draw neat and labeled diagram, wherever necessary.

Max Marks: 70

	(	II) Draw Heat and labelet	-				
2.1	Attem	pt the followings			[08 x 1 =8]		
	,	Resolution of microscope is limited by a) Wavelength c) Angular apertures		b) numerical apertures d) All			
	ii)	C.W. Oatley discove a) SEM	red which of the fol b) SPM	lowing microscopy te c) AFM	chnique? d) TEM		
	ŕ	Organelles that diffe a) Isopycnic centrifu c) Differential centri	igation	n be separated by b) Rate zonal centri d) None	fugation		
	,	The SDS-PAGE is u a) Charge & Mass	b) Charge SPM	c) Mass	d) Shape		
	v) .	<ul><li>in its</li><li>a) Electric dipole</li><li>c) Electronic dipole</li></ul>		lly if its absorption c c) Magnetic dipole d) None			
	vi) ,	Induced magnetic causing a) Shielding of prot c) Shielding of elect	on	nforces the applied c) Deshielding of p d) Deshielding of e	roton		
	vii)	α-particle produces a) 10 – 20 μm	track length b) 15 – 40 μm	n in autoradiography c) 20 – 60 µm	d) 25 – 80 µm		
	viii)	The total energy of a) 100%	the electron beam of b) 90%	converted to x-ray is c) 10%	d) 1%		
Q.2	Atte	npt any <b>seven</b> of the	e followings		$[07 \times 2] = 14$		
	i)	What is interference					
	ii)	Write the basic function of a phase plate?					
	iii)	Explain the use of analytical centrifuge.					
	iv)	Enlist the factors effecting retention time in chromatographic techniques.					
	v)	What is isotachophoresis?					
	vi)	Define hyperchromic shift.					
	vii)	Write the significance of collimator.					
	Viii)	Give the application of radioactivity in biology.					
	ix)	What is the significance of radiation dosimetry?					

	Q.3	A)	Explain the instrumentation of TEM.	
		B)	Write the principle and application of optical compound microscope.	[6] [6]
-		B)	OR Write a note on hydrodynamic focusing.	[6]
	Q.4	A)	Explain the steps and principles behind each step in polyacrylamide gel electrophoresis.	
		B)	Describe the mechanism that allows analytes to separate in size exclusion chromatography.	[6]
		B)	Calculate the difference in centrifugal acceleration (g value) between the top, middle and bottom of a centrifuge tube. Assuming that the minimum, average and maximum radial distances of a centrifuge tube in a swing-out rotor of a bench centrifuge operating at 3000 r.p.m. are 45 mm, 70 mm and 95 mm respectively.	[6]
	Q.5	A)	Describe the spin-spin coupling of NMR in detail.	[6]
		В)	Deriving the equation of Beer-lambert law, give the principle of UV-VIS spectroscopy.	[6]
		В)	OR Write a note on automization system in atomic absorption spectroscopy.	[6]
	Q.6	A)	What are the steps involved in x-ray diffraction analysis. Explain any one method used for X-ray production.	[6]
		B)	Discuss the construction and working on biosensor. Enlist the application of biosensors.	[6]
		B)	Write a note on autoradiography.	[6]
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