

SNo	Question	Option1	Option2	Option3	Option4	Correct Option
1	Electrons are	positively charged	negatively charged	sometimes positively and sometimes negatively charged	uncharged	2
2	Electrons are	only particles	only waves	both waves and particles	neither waves nor particles	3
3	Which of the following is used in electron microscope?	electron beams	magnetic fields	both (a) and (b)	light waves	3
4	The resolution of a light microscope is limited by	wavelength of light	structure of light microscope	our eyesight	refractive index of light	1
5	The greatest resolution in light microscopy can be obtained with _____	longest wavelength of visible light used	an objective with minimum numerical aperture	shortest frequency of visible light used	shortest wavelength of visible light used and an objective with the maximum numerical aperture	4
6	The two knobs used for focusing the image in microscopy include fine adjustment knob and	course adjustment knob	diaphragm	stage	objective lens	1
7	Highest magnification can be achieved in which of the following microscopes	simple light microscope	compound light microscope	electron microscope	all these microscopes can reach similar magnification level	3
8	Scanning electron microscopy helps us	see the surface texture of a sample	see the inside of a sample	see the atoms of a sample	see the electrons of a sample	1
9	Which of the following is not used in negative staining?	Uranyl acetate	Phospho Tungstate	Ammonium molybdate	Ferric Chloride	4
10	The instrument that produces a bright image of the specimen against a dark background is called a(n) _____ microscope.	Phase-contrast	Dark-field	Bright-field	transmission electron	2
11	Transmitted light microscope has a light source below the stage while a reflected microscope has a light source that is located	below the stage	above the sample	it has no light source	in the eyepiece	2
12	Which of the following is not a type of light microscope?	dark-field microscope	phase contrast microscope	electron microscope	bright-field microscope	3
13	Which of the following is used to focus the electrons when using an electron microscope	magnetic field	glass lens	light beam	fluorescent light	1
14	Which among these is the lightest (have least mass)?	proton	electron	neutron	hydrogen atom	2
15	A light microscope is set to 10x eyepiece and 40x objective. What is the total magnification?	140x	50x	400x	30x	3

16	When viewing a specimen, start focusing with the fine adjustment knob and then fine tune using the course adjustment knob. This statement is	true for all microscopes	false for all microscopes	true for light microscope but false for electron microscope	false for light microscope but true for electron microscope	2
17	Electron cryo microscopy is a term used to describe which of the following.	Microscopes with cold electron source	The sample is maintained at liquid nitrogen temperature	The microscope has a cold trap which is cooled to liquid nitrogen temperature but the sample is at room temperature	Sample is prepared and imaged in cryogenic temperature	4
18	Why are thin sections of specimens necessary in transmission electron microscope?	electrons have poor penetrating power	electrons have very low mass	electrons have a wave nature	electrons are radioactive	1
19	Osmium tetroxide is used in electron microscopy	as secondary fixative and contrasting agent	to protect the samples from damage caused by electron beam	to remove water from sample	to remove carbohydrates from the sample which otherwise damage the electron microscope	1
20	All of the following are true for both Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM) except	The illuminating source is an electron beam	The specimen must be sectioned prior to viewing	They can be used to view specimens smaller than 200 nm	Electromagnetic lenses are used	2
21	Electron microscope (EM) images have much higher resolution than images from light microscope, because	EM are much greater in size than light microscope	Electrons traveling as waves have wavelengths much shorter than visible light	EM are more expensive	The fluorescent screen of the EM generates images of much higher resolution	2
22	For viewing which of the following would a TEM not be a good choice?	actin filament	ribosomes	3D external surface of mitochondria	thin sections of nuclear envelope	3
23	With the use of ultra-microtome, we can section our sample into thickness of	1 nm	10 nm	100 nm	1000 nm	3
24	Which of the following has the highest energy?	light with a long wavelength	light with an intermediate wavelength	light with a short wavelength	it is impossible to tell from the information given	3
25	Which would be the best choice for viewing internal structures of a living protist such as a <i>Paramecium</i> ?	a bright-field microscope with a stain	a bright-field microscope without a stain	a dark-field microscope	a transmission electron microscope	3
26	Which type of microscope would be the best choice for viewing very small surface structures of a cell?	scanning electron microscope	transmission electron microscope	bright-field microscope	phase-contrast microscope	1
27	What mordant is used in Gram staining?	crystal violet	safranin	iodine	acid-alcohol	3
28	What is one difference between specimen preparation for a transmission electron microscope (TEM) and preparation for a scanning electron microscope (SEM)?	only the TEM specimen requires sputter coating	only the SEM specimen requires sputter coating	only the TEM specimen must be dehydrated	only the SEM specimen must be dehydrated	2
29	Which of the following has the lowest energy?	visible light	X-rays	ultraviolet rays	infrared rays	4
30	Statement 1: The resolution attainable with standard EM is less than the theoretical value. Statement 2: TEM and SEM are the same microscopy techniques.	Both the statements above are true	Both the statements above are false	Statement-1 is true but statement-2 is false	Statement-1 is false but statement-2 is true	3
31	Glutaraldehyde is a _____	metal	fixative	Non-metal	alloy	2

32	In TEM, the tissue is stained by floating on drops of	hydrocarbons	slow-molecular weight stains	heavy metal solutions	oil immersion	3
33	Which of the following statements is true	n standard electron microscopy, samples are kept under high vacuum while imaging	electrons must not be spatially and temporally coherent in electron microscopy	compared with SEM, lower energy electrons are used in TEM	specimens must be kept hydrated while imaging in electron microscopes	1
34	One of the functions a critical point dryer performs is to	replace ethanol/acetone in the sample with liquid carbon dioxide	saturate the sample with ethanol and water mixture (5:95 v/v)	saturate the sample with ethanol and water mixture (70:30 v/v)	dry the sample with high temperature (around 60 °C)	1
35	The ability of a microscope to distinguish two objects as being separate is	magnification	resolution	adjustment	contrast enhancement	2
36	The major attractions of the scanning electron microscope (SEM) include all of the following except :	its high magnification	its great depth of focus	its ability to polarize light	its high resolution	3
37	The wavelength of visible light is typically in the range of	380 – 700 nm	380 – 700 μm	380 – 700 nm	380 – 700 pm	3
38	Images taken on an electron microscope are typically known as	macrograph	micrograph	monograph	pictograph	2
39	Electron microscope was invented by	Robert Hooke	Knoll and Ruska	Kepler and Galileo	Albert Einstein	2
40	1 nm is equal to	10^{-9} m	10^{-6} mm	10^{-3} μm	all of the above	4
41	Melting point of ice is	0 °C	18 °C	32 °C	100 °C	1
42	pH range is in between	0 to 7	1 to 7	0 to 14	1 to 14	3
43	Buffers have the ability to	increase the pH	decrease the pH	resist the change in pH	none of the above	3
44	You have been given 100 ml solution of 1 M HCl. You diluted this solution to a final volume of 400 ml. What is the molarity of HCl in the resultant solution?	4 M	1 M	0.33 M	0.25 M	4
45	Which of the following is arranged correctly in the increasing order of their usual size	ribosome < mitochondria < nucleus < cell	mitochondria < ribosome < nucleus < cell	ribosome < nucleus < mitochondria < cell	mitochondria < ribosome < Golgi body < cell	1
46	You have a solution of 10^{-6} M of HCl. What is the pH of this solution?	10	-6	6	10^{-6}	3
47	Which of the following is arranged in the order of their increasing size?	100 nm, 0.5 μm, 10^{-4} mm, 1 cm	300 nm, 0.2 μm, 10 cm, 1 m	50 nm, 0.1 μm, 10^{-6} m, 10^{-3} cm	100 nm, 0.01 μm, 10^{-1} cm, 10^{-2} m	3

48	In which of the following options, the steps are arranged chronologically for sample preparation for TEM?	Fixation, dehydration, infiltration and embedding, sectioning	Dehydration, fixation, infiltration and embedding, sectioning	Infiltration and embedding, sectioning, fixation, dehydration	Fixation, infiltration and embedding, dehydration, sectioning	1
49	In which of the following options, the steps are arranged chronologically for sample preparation for SEM?	Fixation, dehydration, critical point drying, sputter coating	Dehydration, fixation, critical point drying, sputter coating	Critical point drying, sputter coating, fixation, dehydration	Fixation, sputter coating, dehydration, critical point drying	1
50	Which of the following is arranged, in general, in the increasing order of their size	viruses, bacteria, tissues, cells	bacteria, viruses, cells, tissues	bacteria, viruses, tissues, cells	viruses, bacteria, cells, tissues	4