SCIENTIFIC ASSISTANT (INSTRUMENTS) TO SR.SCIENTIFIC ASSISTANT (INSTRUEMNTS)- I MFCP

26.09.2023 AT 09.30AM

QUESTION PAPER

1.	Which is the most important aspect of biomaterial-tissue interaction		Ans :
	A.	Biocompatibility	A
	B.	Bioavailability	
	C.	Bioequivalence	
	D.	Bioluminiscence	
2.	The molar mass of an element is equal to which of the following?		Ans :
	A.	Avogadro's number	D
	B.	Atomic number	
	C.	Mass number	
	D.	Relative atomic mass	
3.	Phase never gained in sublimation is ……..		Ans :
	A.	solid	
	B.	liquid	B
	C.	gas	
	D.	vapors	
4.	A material having different properties in different directions is known as:		Ans :
	A.	Amorphous	C
	B.	Austenite	
	C.	Anisotropic	
	D.	Crystalline	
5.	Most widely used biological tissue chemical cross linking agent is …….		Ans :
	A.	Formaldehyde	D
	B.	Ethanol	
	C.	Isopropanol	
	D.	Glutarldehyde	
6.	The molar mass of carbon is 12 g mol^{-1}. How many moles are there in 3g of carbon ?		Ans :
	A.	0.25 mol	A
	B.	0.4 mol	
	C.	4 mol	

D. 36 mol

7. Interdisciplinary field in biomedical engineering aims at regenerating new biological tissues using cells is ..... Ans : C

A. Cell culture
B. Tissue culture
C. Tissue engineering
D. Molecular medicine

8. Which among the following is used for developing shape memory devices ? Ans : B

A. 316L stainless steel
B. Nitinol
C. Cobalt based alloy
D. Platinum alloy

9. Science of chemical characterization is ..... Ans : A

A. Analytical chemistry
B. Physical chemistry
C. Organic chemistry
D. Inorganic chemistry

10. Humidity in air is measured by .... Ans : B

A. Hydrometer
B. Hygrometer
C. Manometer
D. Hubometer

11. Dry ice is Ans : B

A. solid ammonia
B. solid carbon dioxide
C. solid carbon monoxide
D. solid nitrogen

12. The element which stabilizes alpha phase of Ti alloys is ..... Ans : D

A. Mo
B. V
C. Nb
D. Al

13.	Progressive localized damage due to repeated application of load and which leads to crack formation, crack growth and the implant failure is called …..		Ans :
	A.	Fatigue	A
	B.	Creep	
	C.	Corrosion	
	D.	Remodeling	
14.	Energy dispersive system uses which of the following detectors?		Ans :
	A.	Optical detector	B
	B.	Semiconductor detector	
	C.	Thermistor	
	D.	Bolometer	
15.	A thermal treatment process aimed to reduce the free surface and achieving densification of ceramic body is called …….		Ans :
	A.	Quenching	B
	B.	Sintering	
	C.	Hardening	
	D.	Tempering	
16.	Frankel and Schottky imperfections are		Ans :
	A.	Dislocations in ionic crystals	C
	B.	Grain boundaries in covalent crystals	
	C.	Vacancies in ionic crystals	
	D.	Vacancies in covalent crystals	
17.	Which of these terms refer to the stable anchorage of implant by direct bone-to- implant contact ?		Ans :
	A.	Osteoconduction	B
	B.	Osseo integration	
	C.	Osteoinduction	
	D.	Cementing	
18.	In which region of the infrared spectrum would you expect to find a peak characteristic of a triple bond stretch?		Ans :
	A.	4000 – 3000 cm^{-1}	D
	B.	2500 – 2000 cm^{-1}	

C. $2000 - 1500\ cm^{-1}$

D. $1500 - 750\ cm^{-1}$

19. The polymer commonly used for making acetabular component of total hip replacement is ..... Ans : B

A. PMMA

B. UHMWPE

C. PTFE

D. HDPE

20. Which one of the following pieces of information cannot be obtained from an infra-red spectrum ? Ans : A

A. Molecular mass

B. Presence of C=O bonds

C. Presence of O-H bonds

D. Identity of a compound through comparison with other spectra

21. When small amount of sodium chloride is introduced into a flame, its colour turns yellow. This is due to ..... Ans : B

A. flame absorption

B. flame emission

C. fluorescence

D. phosphorescence

22. How many normal modes of vibrational are possible for a benzene molecule? Ans : B

A. 6

B. 30

C. 12

D. 31

23. Bone mineral is ..... Ans : B

A. Calcite

B. Hydroxyapatite

C. Tricalcium phosphate

D. Calcium oxalate

24.	How many atoms per unit cell are in HCP structure		Ans :
	A.	1	D
	B.	2	
	C.	4	
	D.	6	
25.	When using ultramicrotome for sectioning, what is the purpose of using glass knife ?		Ans :
	A.	To trim the cutting edge of sample blocks so as to make it flat	B
	B.	To section the specimens into thin slices	
	C.	To hold the sample blocks	
	D.	Visibility of the process of sectioning	
26.	Why TEM images have much higher resolution than images from light microscopes?		Ans :
	A.	TEM is much greater in size than light microscope	D
	B.	TEM can achieve greater magnification	
	C.	The fluorescent screen of TEM can generate high resolution images	
	D.	Electrons traveling as waves have wavelengths much shorter than visible light	
27.	High level of thinning of ceramic and metal samples of TEM could be achieved through		Ans :
	A.	Ion etching	A
	B.	Acid etching	
	C.	Ion leaching	
	D.	Sectioning	
28.	Backscattered image in SEM is taken to identify …..		Ans :
	A.	Surface nano features	C
	B.	Chemical elements	
	C.	Phase in the material	
	D.	Fluorescence	
29.	In the analytical instrument AES-ICP, the term ICP refers to ….		Ans :
	A.	Intensively concentrated photons	D
	B.	Instrument common platform	
	C.	Inductively coupled photons	

	D.	Inductively coupled plasma	
30.	Contrast enhancement of biological samples in TEM could be achieved through		Ans :
	A.	Alizarin red staining	B
	B.	Osmium staining	
	C.	Gold coating	
	D.	VonKossa staining	
31.	The 'shear gas' used in atomic emission spectroscopy is		Ans :
	A.	Argon	B
	B.	Nitrogen	
	C.	Oxygen	
	D.	Helium	
32.	What is the role of 'Nebuliser' in AES-ICP instrument ?		Ans :
	A.	Atomisation of the sample liquid	A
	B.	Pumping of the sample liquid	
	C.	Blending of sample with solvent	
	D.	Selection of sample from array	
33.	Which metal coating is better than gold to prepare biological samples for SEM, when EDS analysis also is needed ?		Ans :
	A.	Silver	A
	B.	Platinum	
	C.	Copper	
	D.	Osmium	
34.	Which method helps in finding the glass transition temperature of a polymer ?		Ans :
	A.	DMA	C
	B.	TGA	
	C.	DSC	
	D.	EDS	
35.	A crystal is held together entirely by		Ans :
	A.	Gravitational force	B
	B.	Electrostatic force	

	C.	Magnetic force	
	D.	Nuclear force	
36.	Measurement which is close to true value is …….		Ans :
	A.	accurate	A
	B.	average	
	C.	precise	
	D.	error	
37.	Systematic errors can be removed by …….		Ans :
	A.	buying new instrument	D
	B.	breaking instrument	
	C.	dusting instrument	
	D.	recalibrating instrument	
38.	Which one of the following statements about X-rays is NOT true ?		Ans :
	A.	They have a wavelength about 1 angstrom	C
	B.	These can be generated by bombarding high energy electrons on a metal surface	
	C.	Due to their short wavelength, they are used in Radars	
	D.	They are used as radiation to treat certain cancers.	
39.	Addition of acid to indicator will shift equilibrium towards ……		Ans :
	A.	right	B
	B.	left	
	C.	up	
	D.	down	
40.	Which metal ion produces a characteristic yellow colour in a flame test?		Ans :
	A.	K^+	C
	B.	Cu^{2+}	
	C.	Na^+	
	D.	Ca^{2+}	
41.	One of most common solvent used for crystallization is ……..		Ans :
	A.	water	A
	B.	syrup	

C. normal saline

D. sulphuric acid

42. The region of an infra-red spectrum where many absorptions take place is known as the... Ans : B

A. thumbprint region

B. fingerprint region

C. footprint region

D. handprint region

43. A measurement which on repetition gives same or nearly same result is called ..... Ans : C

A. accurate measurement

B. average measurement

C. precise measurement

D. estimated measurement

44. Why is the oxygen-hydrogen absorption of CH_3OH such a broad band in the infrared ? Ans : D

A. Rotational energy levels broaden the absorption.

B. Hyperconjugation resonance broadens the absorption.

C. Resonance broadens the absorption.

D. Hydrogen bonding broadens the absorption.

45. The region of the electromagnetic spectrum in which the emission lines of atomic hydrogen will NOT appear - Ans : B

A. visible

B. X-ray

C. infra-red

D. ultraviolet

46. Which of the following is <u>not</u> an IR vibrational mode? Ans : A

A. rolling

B. stretching

C. scissoring

D. wagging

47. Some ionic species show emission lines in the spectra very similar to those Ans :

	of atomic hydrogen. Identify such a set of species from those given below	
	A. Li, Na, K	D
	B. He, Li, Be	
	C. He, Li^{+}, Be^{2+}	
	D. He^{+}, Li^{2+}, Be^{3+}	
48.	Which of the following components of a monochromator is the dispersing element?	Ans :
	A. collimating lens	B
	B. diffraction grating	
	C. entrance slit	
	D. detector	
49.	The hydrogen ion concentration of a solution is $10x10^{-7}M$. The pH of the solution will be:	Ans :
	A. 7	D
	B. 1	
	C. 8	
	D. 6	
50.	Thermal radiation comes in the range of	Ans :
	A. Infrared radiation	A
	B. UV radiation	
	C. Gamma radiation	
	D. Beta radiation	