

#### श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौघोगिकी संस्थान,तिरुवनन्दपुरम् - ६९५ ०११,केरल, भारत SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY THIRUVANANTHAPURAM – 695 011 KERALA, INDIA

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# WRITTEN TEST FOR MFCP TECHNICAL ASSISTANT (INSTRUMENTS) A TO B – DIVISION OF DENTAL PRODUCTS

Roll No.	

Date: 25.09.2024

Time: 9.00 A.M

**Duration: 60 Minutes** 

Total Marks: 50

#### INSTRUCTIONS TO THE CANDIDATE

- 1. Write your Roll Number on the top of the Question Booklet and in the answer sheet.
- 2. Write legibly the alphabet of the most appropriate answer in the separate answer sheet provided.
- 3. There will not be any Negative marking.
- Over-writing is not permitted.
- 5. Candidate should sign in the question paper and answer sheet.
- 6. No clarifications will be given.
- 7. Candidate should hand over the answer sheet and question paper to the invigilator before leaving the examination hall.

Signature of the Candidate



#### Questions for the Exam of

### MFCP to the post of Technical Assistant (Instruments) A to B

1.	Hydro	carbons are organic compounds with element
	a.	Both hydrogen and carbon
	b.	Carbon
	C.	Hydrogen
	d.	Oxygen
2.	Whic	h of the following fibres are made of polyamides?
	a.	Nylon
	b.	Rayon
	C.	Orlon
	d.	Dacron
3.	Polye	thylene is
	a.	Random copolymer
	b.	Homopolymer
	C.	Alternate copolymer
	d.	Crosslinked copolymer
4.	Amon	g the following a natural polymer is
	a.	Cellulose
	b.	PVC
	C.	Teflon
	d.	Polyethylene
5.	Selec	t the most intense line among the following.
	a.	Pre-resonance Raman line



Raman Stokes line

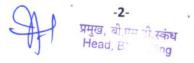
Raman anti-stokes line

Raleigh line

b.

c. d.

6.	Which	n among the following is Raman inactive?
	a.	H <sub>2</sub> O symmetric stretch
	b.	H <sub>2</sub> O bending
	C.	CO <sub>2</sub> bending
	d.	CO <sub>2</sub> symmetric stretch
7.	Which	n of the following polymers contains -C-C- linkages only?
	a.	condensation polymers
	b.	copolymers
	C.	addition polymers
	d.	none of the mentioned
8.		are used in electrospinning method.
	a.	Electrodes with opposite charges
	b.	Transducers
	C.	Capacitors
	d.	Carbon plates
9.	In sca	anning electron microscope (SEM)
	a.	The electrons interact with atoms in the sample
	b.	The protons interact with atoms in the sample
	C.	The neurons interact with atoms in the sample
	d.	The Xray interact with atoms in the sample
10.	The ter	rm used to describe the collective sharing of a sea of valence electrons
	in meta	als is
	a.	Metallic bond
	b.	Covalent bonding
	C.	lonic bonding
	d.	H-bonding
11.	The	simpler chemical units in polymers are called
	a.	monomers.
-	b.	oligomers
	C.	Macromers
	d.	Pentamers



- 12 In the Raman spectrometer, the laser source with wavelength 1064 nm is made of:
  - a. Ar ion
  - b. Xe ion
  - c. He-Ne
  - d. Nd-YAG
- 13. Which region in an IR spectrum is known as finger print region?
  - a. 3500-2800 cm-1
  - b. 1800-1100 cm-1
  - c. 2800-1400 cm-1
  - d. 1400-600 cm-1
- 14 In UV-Visible spectrophotometer the source used for providing electromagnetic radiations in the UV region (190-390 nm)is:
  - a. Halogen lamp
  - b. Tungsten lamp
  - c. Deuterium lamp
  - d. Quartz lamp
- 15. If the scattered and incident radiations have same energy such type of scattering is called:
  - a. Raman scattering
  - b. Stokes scattering
  - c. Rayleigh scattering
  - d. AntiStokes scattering
- The analysis relating to shape, contours and micro structural organization of materials is termed as
  - a. Morphological
  - b. Topographical
  - c. Physico-chemical
  - d. None of the above



17.	Micro-C	T is a 3D imaging technique utilizing to see inside an object,
	slice by	slice
	a.	X-rays
	b.	Gamma rays
	C.	UV rays
	d.	Microwave
18.	The ted	chnique available to characterize the molecular weight distribution of
	polyme	ers is
	a.	GPC
	b.	HPLC
	C.	UV-Visible
	d.	FTIR
19.	What is	the basic principle of DLS?
	a.	Based on the Brownian motion of dispersed particles
	b.	Newtonial flow
	C.	Difference in polarity
	d.	Change in dipole moment
20	The re	esistance of a material to localized plastic deformation.
	a.	Hardness
	b.	Compressive strength
	C.	Tensile strength
	d.	Toughness
21.	Equat	tion for calculation of Diametral Tensile Strength (DTS)
	a.	DTS = $PI \pi DL$
	b.	$DTS = 2P/ \pi DL^2$
	C.	DTS = $2PI \pi D^2L$
	d.	DTS = $2PI \pi DL$
22	Equat	tion for calculation of compressive strength (CS)

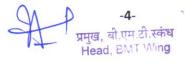
2 Equation for calculation of compressive strength (CS)

a.  $CS = P/\pi r^2$ 

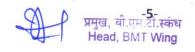
b.  $CS = 2P/\pi r^2$ 

c.  $CS = 2P/\pi r$ 

d.  $CS = 2P/\pi 2r$ 



- 23. Equation for calculation of flexural strength(FS)
  - a.  $\sigma = PL/2bd^2$
  - b.  $\sigma = 3PL/bd^2$
  - c.  $\sigma = 3PL/2bd^2$
  - d.  $\sigma = 3PL/2bd$
- 24. The standard used for flexural strength evaluation of dental composite
  - a. ISO specification No.4049
  - b. ISO specification No.4045
  - c. ISO specification No.7012
  - d. ISO specification No.4042
- 25. The disappearance of ----- peak characteristic of free -N=C=O group indicated total conversion of the isocyanate in FTIR spectra.
  - a. 2270 cm<sup>-1</sup>
  - b. 1270 cm<sup>-1</sup>
  - c. 1740 cm<sup>-1</sup>
  - d. 2040 cm<sup>-1</sup>
- 26. The mechanism of photoinitiation of (-) camphorquinone is because of.
  - a. electron transfer
  - b. neutron transfer
  - c. proton transfer
  - d. ion transfer
- 27. According to Born-Oppenheimer Approximation,
  - Rotational, vibrational and electronic energy levels are independent of one another.
  - b. Rotational, vibrational and electronic energy levels are dependent.
  - c. Rotational, vibrational and electronic energy levels are equal.
  - d. Rotational, vibrational and electronic energy levels are zero.
- 28 Red Shift or Bathochromic shift is
  - a. A shift of absorption maximum towards longer wavelength
  - b. A shift of absorption maximum towards shorter wavelength
  - c. A broadening of the peak without any shift of absorption maximum.
  - d. A reduction in the peak height with broadening.



- 29. Which one is an additive manufacturing process 3D printing a. Extrusion b. Solvent casting C. Electrospinning d. The initiator used in a chemical cure composite is 30 Camphorquinone (CQ) a. Ethanol b. Benzoyl peroxide (BPO) C. Phenyl salicylate d. Most popular resin used for dental composite preparation is 31. BPA a. MMA b. **BisGMA** C. **BisEMA** d. 32 The activator used in combination with the photo-initiator in visible light cure composite is Tertiary amine a. Secondary amine b. C. primary amine d. Ammonia Nature of chemical bond in glass ionomer cement (GIC) 33. Ionic a. Covalent b. Metalic C. H-bonding d. UV-Visible spectroscopy is based on 34
  - c. Pascal's law

a.

b.

Beer Lambert's law.

Newton's first law

d. Newton's first law



- 35. Nanoparticle is one with particle size 1 - 100 nm a. >100nm b. < 1000nm C. d. 50-100nm 36 The filler used in glass ionomer cement (GIC) is Quartz filler a. Fluoro-aluminosilicate glass powder b. PMMA powder C. Ordinary glass powder d. ORMOCER stands for 37. a. Organic Modified Composite Glass ionomer cement resin b. Organic Modified glass C. Organic Modified Ceramics d.
- 38 The most common commercially available resorbable membrane for periodontal regeneration is fabricated from
  - Gelatin
  - b. Collagen
  - c. Alginate
  - d. Cellulose
- 39. Bis GMA was first developed by
  - a. Henry A Hill
  - b. Charles C Price
  - c. Alan Huggins
  - d. Raphael Bowen
- 40. Polymers are
  - a. Macromolecules
  - b. Micromolecules
  - c. Nanomolecules
  - d. Zero-weight molecules

**-7**-प्रमुख, बी.एम.टी.स्कंध Head, BMT Wing

- 41. During photo-polymerization of a dental composite, the following process occurs
  - a. Free radical polymerization
  - b. lonic polymerization
  - Condensation reaction
  - d. Coordination complex formation reaction
- 42 Detector used in FT Raman is
  - a. Germanium or Indium gallium arsenide (InGaAs) detectors
  - b. Indium Germanium arsenide (InGeAs) detectors
  - c. Deuterated alanine doped Tri-Glycine Sulphate
  - d. Scintillation detector
- 43. Weight average molecular weight of a polymer can be determined by
  - a. Gel permeation chromatography (GPC)
  - b. Viscosity measurements,
  - c. Gravimetry
  - d. End group analysis
- 44 Unit of tensile strength is
  - a. Newtons per meter (N/m).
  - b. Newtons per square meter (N/m²).
  - c. Newtons
  - d. Pounds
- 45. FTIR spectrometer detectors for high sensitivity applications,
  - a. Germanium or Indium gallium arsenide (InGaAs) detectors
  - b. Indium Germanium arsenide (InGeAs) detectors
  - c. liquid nitrogen cooled MCT
  - d. room temperature DLaTGS
- 46. The following technique is used for measuring the average size and the size distribution of particles in a suspension.
  - a. Gel permeation chromatography (GPC)
  - b. Viscosity measurements
  - c. UV-Vis Spectroscopy
  - d. Dynamic Light Scattering



47. -----is a tooth-colored restorative material that uses a resin base and prereacted glass ionomer (PRG) technology. Giomer a. GIC b. Composite C. Resin modified GIC d. 48. Which are hybrid materials of traditional glass ionomer cement with a small addition of light-curing resin. Composite a. Resin-modified glass ionomer materials b. Giomer C. GIC d. 49. The total fundamental modes of vibrations for NH3 is 6. Out of these how many bending modes of vibrations are there? a. 2

b.

C.

d.

a.

b.

C.

d.

50.

4

3

1

Nylon-6 is made from

Butadiene

Adipic acid

Chloroprene

Caprolactum



# Technical Assistant (Instanments) A to B.

## **Answer Key**

## Division of Dental Products

Question	Correct
	answer
1.	а
2.	а
3.	b
4.	а
5.	С
6.	С
7.	С
8.	а
9.	а
10.	a
11.	а
12.	d
13.	d
14.	С
15.	С
16.	а
17.	a
18.	а
19.	а
20.	а
21.	d
22.	а
23.	С
24.	а
25.	а
V. 37.7.05	

Question	Correct	
	answer	
26.	С	
27.	а	
28.	а	
29.	а	
30.	С	
31.	С	
32.	а	
33.	а	
34.	а	
35.	а	
36.	b	
37.	d	
38.	b	
39.	d	
40.	а	
41.	а	
42.	а	
43.	а	
44.	b	
45.	С	
46.	d	
47.	а	
48.	b	
49.	С	
50.	d	