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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.
4. 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

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Questions for the Exam of

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

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1. Hydrocarbons are organic compounds with element _____
   a. Both hydrogen and carbon
   b. Carbon
   c. Hydrogen
   d. Oxygen

2. Which of the following fibres are made of polyamides?
   a. Nylon
   b. Rayon
   c. Orlon
   d. Dacron

3. Polyethylene is
   a. Random copolymer
   b. Homopolymer
   c. Alternate copolymer
   d. Crosslinked copolymer

4. Among the following a natural polymer is
   a. Cellulose
   b. PVC
   c. Teflon
   d. Polyethylene

5. Select the most intense line among the following.
   a. Pre-resonance Raman line
   b. Raman Stokes line
   c. Raleigh line
   d. Raman anti-stokes line

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6. Which among the following is Raman inactive?
   a. H_2O symmetric stretch
   b. H_2O bending
   c. CO_2 bending
   d. CO_2 symmetric stretch

7. Which 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 scanning 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 term used to describe the collective sharing of a sea of valence electrons in metals is
   a. Metallic bond
   b. Covalent bonding
   c. Ionic bonding
   d. H-bonding

11. The simpler chemical units in polymers are called
   a. monomers.
   b. oligomers
   c. Macromers
   d. Pentamers

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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

16 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

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17. Micro-CT 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 technique available to characterize the molecular weight distribution of polymers 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 resistance of a material to localized plastic deformation.

a. Hardness
b. Compressive strength
c. Tensile strength
d. Toughness

21. Equation for calculation of Diametral Tensile Strength (DTS)

a. DTS = $P/\pi DL$
b. DTS = $2P/\pi DL^2$
c. DTS = $2P/\pi D^2L$
d. DTS = $2P/\pi DL$

22 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 = $2P/\pi 2r$

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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^{-1}

b. 1270 cm^{-1}

c. 1740 cm^{-1}

d. 2040 cm^{-1}

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 ,

a. 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.

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29. Which one is an additive manufacturing process

a. 3D printing

b. Extrusion

c. Solvent casting

d. Electrospinning

30 The initiator used in a chemical cure composite is

a. Camphorquinone (CQ)

b. Ethanol

c. Benzoyl peroxide (BPO)

d. Phenyl salicylate

31. Most popular resin used for dental composite preparation is

a. BPA

b. MMA

c. BisGMA

d. BisEMA

32 The activator used in combination with the photo-initiator in visible light cure composite is

a. Tertiary amine

b. Secondary amine

c. primary amine

d. Ammonia

33. Nature of chemical bond in glass ionomer cement (GIC)

a. Ionic

b. Covalent

c. Metalic

d. H-bonding

34 UV-Visible spectroscopy is based on

a. Beer Lambert's law.

b. Newton's first law

c. Pascal's law

d. Newton's first law

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35. Nanoparticle is one with particle size

a. 1 – 100 nm

b. >100nm

c. < 1000nm

d. 50-100nm

36 The filler used in glass ionomer cement (GIC) is

a. Quartz filler

b. Fluoro-aluminosilicate glass powder

c. PMMA powder

d. Ordinary glass powder

37. ORMOCER stands for

a. Organic Modified Composite

b. Glass ionomer cement resin

c. Organic Modified glass

d. Organic Modified Ceramics

38 The most common commercially available resorbable membrane for periodontal regeneration is fabricated from

a. 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

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41. During photo-polymerization of a dental composite, the following process occurs

a. Free radical polymerization

b. Ionic polymerization

c. 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/m^2).

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

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47. ---------- is a tooth-colored restorative material that uses a resin base and pre-reacted glass ionomer (PRG) technology.
    a. Giomer
    b. GIC
    c. Composite
    d. Resin modified GIC

48. Which are hybrid materials of traditional glass ionomer cement with a small addition of light-curing resin.
    a. Composite
    b. Resin-modified glass ionomer materials
    c. Giomer
    d. GIC

49. The total fundamental modes of vibrations for NH_3 is 6. Out of these how many bending modes of vibrations are there?
    a. 2
    b. 4
    c. 3
    d. 1

50. Nylon-6 is made from
    a. Butadiene
    b. Chloroprene
    c. Adipic acid
    d. Caprolactum

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Technical Assistant (Instruments) A to B.

Answer Key

Division of Dental Products

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

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

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