



श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, तिरुवनन्दपुरम् - ६९५ ०११, केरल, भारत
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY
THIRUVANANTHAPURAM – 695 011 KERALA, INDIA
(An Institute of National Importance under Govt. of India)
(भारत सरकार के अधीन एक राष्ट्रीय महत्व सस्थान)
Ph: 0471-2443152, FAX: 0471-2446433, 2550728
Email-sct@sctimst.ac.in Website - www.sctimst.ac.in

WRITTEN TEST FOR THE POST OF
TECHNICAL ASSISTANT (INSTRUMENTS) – POLYMER ANALYSIS LABORATORY

Roll No.

Date: 25.09.2017

Time: 9.30 A.M

Duration: 90 Minutes

Total Marks: 80

INSTRUCTIONS TO THE CANDIDATE

1. Write your Roll Number on the top of the Question Booklet and in the OMR sheet.
2. Each question carries 1 mark.
3. There will not be any Negative marking.
4. Darken only the bubble corresponding to the most appropriate answer.
5. Marking more than one answer will invalidate the answer.
6. Candidate should sign in the Question paper and OMR sheet.
7. Candidate should hand over the question paper and OMR sheet to the invigilator before leaving the examination hall.

Signature of the Candidate

25.9.17

1	Which of the following is the wave number range of near infrared spectrometer? [A] 4000 – 200 cm^{-1} [C] 12500 – 4000 cm^{-1}	[B] 200 – 10 cm^{-1} [D] 50 – 1000 cm^{-1}	
2	Accuracy is [A] The closeness of a measured value to the real (true) value [C] A measure of how often an experimental value is repeated	[B] Closeness between two measured values [D] None of the above	
3	Which of the following is not a function of drive mechanism in Fourier Transform Infrared Spectrophotometer? [A] Movement of mirror to obtain a satisfactory interferogram [C] Allow 50% of the beam to pass	[B] Acquire a good interferogram pattern [D] Keep the speed of the moving mirror constant	
4	What is the significant figure in the experimental value 10.10? [A] 1 [C] 3	[B] 2 [D] 4	
5	Which of the following types of chromatography involves the process, where mobile phase moves through the stationary phase by the influence of gravity or capillary action? [A] Column Chromatography [C] Gas Chromatography	[B] Paper Chromatography [D] Planar Chromatography	
6	Which of the following is the disadvantage of hydrogen, which can be used as carrier gas in gas chromatography? [A] Dangerous to use [C] Reduced sensitivity	[B] Expensive [D] High density	
7	Out of the following, which one is a suitable reagent in complexometric titrations? [A] Potassium dichromate [C] Sodium hydroxide	[B] Barium sulphate [D] EDTA	
8	Which of the following is the commonly used support material for the packed column in gas chromatography? [A] Glass [C] Diatomaceous earth	[B] Metal [D] Stainless steel	

9	Capillary columns are open tubular columns constructed from which of the following materials? [A] Glass [C] Stainless steel	[B] Metal [D] Fused silica	
10	Alpha particle is the nucleus of an atom of [A] Hydrogen [C] Oxygen	[B] Helium [D] Carbon	
11	The hydraulic press depends upon [A] Coulomb's law [C] Boyle's law	[B] Pascal's principle [D] Bernoulli's principle	
12	The collector supply voltage is 6 V and the voltage drop across a resistor of 600 Ω in the collector circuit is 0.6 V, in a transistor connected in common emitter mode. If the current gain is 20, the base current is: [A] 0.25 mA [C] 0.12 mA	[B] 0.05 mA [D] 0.02 mA	
13	What is the level of voltage between the input terminals of an op-amp? [A] Virtually zero [C] 18 V	[B] 5 V [D] 22V	
14	In amplitude modulation, the bandwidth is: [A] Twice the audio signal frequency [C] Thrice the carrier wave frequency	[B] Thrice the audio signal frequency [D] Twice the carrier wave frequency	
15	Molality of 120 g of acetic acid dissolved in 100 g of ethyl alcohol is [A] 10 [C] 20	[B] 5 [D] 15	
16	A neutral molecule XF_3 has a zero dipole moment. The element X is most likely [A] chlorine [C] nitrogen	[B] boron [D] carbon	
17	Among the following compounds which will exhibit a sharp peak at $\sim 3300 \text{ cm}^{-1}$ in IR spectrum [A] 1,2-butadiene [C] 1-butyne	[B] 1,3-butadiene [D] 2-butyne	
18	Among the oxyacids of phosphorus, the dibasic acid is [A] $\text{H}_4\text{P}_2\text{O}_7$ [C] HPO_3	[B] H_3PO_2 [D] H_3PO_3	
19	The amount of solute (molar mass 60 g mol^{-1}) that must be added to 180 g of water so that the vapour pressure of water is lowered by 10%, is [A] 30 g [C] 120 g	[B] 60 g [D] 12 g	
20	Nylon 6,6 is prepared by [A] Addition polymerization [C] group transfer polymerization	[B] Condensation polymerization [D] Ring opening polymerization	
21	The most common moulding technique used for the manufacture of thermoplastic products is: [A] Compression moulding [C] Extrusion	[B] Blow moulding [D] Injection moulding	

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22	The instrument used to measure the molecular weight of an organic compound is [A] NMR spectrometer [B] Gas chromatograph [C] IR spectrometer [D] Mass spectrometer	
23	Isotonic solutions have same [A] molality [B] normality [C] formality [D] osmotic pressure	
24	The HOMO in CO is [A] π bonding [B] π -antibonding [C] σ -bonding [D] σ -antibonding	
25	The first metal used by man was: [A] Bronze [B] Copper [C] Gold [D] Iron	
26	The main chemical constituent of clay is: [A] Aluminium borosilicate [B] Aluminium silicate [C] Zeolites [D] Silicon oxide	
27	The number of electrons presents in H^+ is [A] Three [B] Two [C] One [D] Zero	
28	Monomer of starch is [A] Glucose [B] Fructose [C] Sucrose [D] Ribose	
29	Amino acids are the basic units of [A] lipids [B] oligosaccharides [C] hormones [D] proteins	
30	Which of the following reagent is most effective in replacing $-OH$ group in an alcohol by $-Cl$ group? [A] HCl gas [B] Concentrated HCl [C] SOCl [D] SOCl ₂	
31	Palmitic acid is [A] $CH_3(CH_2)_{14}COOH$ [B] $CH_3(CH_2)_{16}COOH$ [C] $CH_3(CH_2)_{18}COOH$ [D] $CH_3(CH_2)_{20}COOH$	
32	Which of the following is the wavenumber of UV and Visible radiation? [A] 1×10^6 to $1.3 \times 10^4 m^{-1}$ [B] 1×10^6 to $1.3 \times 10^4 m$ [C] $13 - 27 m^{-1}$ [D] 1×10^6 to $1.3 \times 10^4 m^2$	
33	Bathochromic shift is also known as [A] Hyper chromic shift [B] Hypochromic shift [C] Red shift [D] Hypsochromic shift	
34	The approximate wavelength of green color is [A] 450-500 nm [B] 500-570 nm [C] 570-590 nm [D] 590-620 nm	
35	In the most widely used beam splitter, a thin film of _____ is sandwiched between two plates of low refractive index solid. [A] Mylar [B] Silicon carbide [C] Ferrous oxide [D] Silver chloride	

36	The nucleus of an atom consists of [A] electrons and neutrons [B] electrons and protons [C] protons and neutrons [D] all of the above	
37	Which of the following is the commonly used carrier gas in gas chromatography? [A] Hydrogen [B] Nitrogen [C] Xenon [D] Oxygen	
38	What must be done to the solid samples for it to be introduced into the column without using solid injection syringes in gas chromatography? [A] Introduced in hot-zone of the column [B] Dissolved in volatile liquids [C] Introduced using rotary sample valve [D] Introduced using sampling loops	
39	Integrated chip (IC) is developed by: [A] J. S. Kilby [B] Robert Nayak [C] C. Babbage [D] C. V. Raman	
40	First supercomputer of the world is: [A] PARAM [B] CRAY-1 [C] Tianhe-2 [D] IBM-370	
41	Which of the following is the fastest type of computer? [A] Laptop [B] Personal Computer [C] Super computer [D] Work station	
42	Which is not an integral part of computer? [A] CPU [B] Mouse [C] Monitor [D] UPS	
43	What type of device is a computer printer? [A] Input [B] Input/Output [C] Output [D] Storage	
44	Which one of the following is not a hardware? [A] Processor chip [B] Printer [C] Mouse [D] Java	
45	How many bytes are there in one gigabyte? [A] 10^3 bytes [B] 10^6 bytes [C] 10^9 bytes [D] 12^{12} bytes	
46	The size of any word/number in a computer is measured in terms of [A] bits [B] bytes [C] meter [D] litre	
47	The most commonly used bleaching agent is [A] Alcohol [B] Carbon dioxide [C] Chlorine [D] Sodium chloride	
48	Linux is a type of software [A] Shareware [B] Commercial [C] Proprietary [D] Open source	
49	Which method can be applied to determine purity of a metal? [A] Boyles law [B] Pascal's Law [C] Archimedes principle [D] Newton's law	

50	Ultraviolet light can be used in water treatment as: [A] Disinfectant [B] Precipitator [C] Hydrolyser [D] Flocculator	
51	The frequency band used in the downlink of satellite communication is: [A] 9.5 to 2.5 GHz [B] 896 to 901 MHz [C] 3.7 to 4.2 GHz [D] 840 to 935 MHz	
52	A body travelling with uniform acceleration crosses two points A and B with velocities 20 ms^{-1} and 30 ms^{-1} respectively. The speed of the body at the mid-point of A and B is nearest to: [A] 25.5 ms^{-1} [B] 25 ms^{-1} [C] 24 ms^{-1} [D] 22 ms^{-1}	
53	A passenger getting down from a moving bus falls in the direction of the motion of the bus. This is an example for: [A] Moment of inertia [B] Second law of motion [C] Third law of motion [D] Inertia of motion	
54	Cetyltrimethyl ammonium bromide is a popular [A] Anionic detergent [B] Cationic detergent [C] Non-ionic detergent [D] Sweetener	
55	An instrument has sensitivity of 1000 ohm/volt. On the 100 volt scale, this instrument will have internal resistance of: [A] 10 ohms [B] 10,000 ohms [C] 100,000 ohms [D] 1000 ohms	
56	Halogens exist in -1, +1, +3, +5 and +7 oxidation states. The halogen that exists only in -1 state is: [A] F [B] Cl [C] Br [D] I	
57	The aqueous solution of which of the salt has pH close to 7? [A] FeCl_3 [B] CH_3COONa [C] Na_2CO_3 [D] $\text{CH}_3\text{COONH}_4$	
58	What are the number of moles of CO_2 which contains 16g of oxygen [A] 0.5 [B] 0.2 [C] 0.4 [D] 1.0	
59	The formula $\text{C}_6\text{H}_5\text{-CO-CH}_3$ represents [A] Ethyl acetate [B] Phenyl acetate [C] Acetophenone [D] Acetone	
60	The hardest form of carbon is [A] Coke [B] Graphite [C] Diamond [D] Charcoal	
61	Amongst the following, a free radical inhibitor is [A] benzyl peroxide [B] benzene [C] hydroquinone [D] hydrocarbons	
62	Which of the following method is used for determining the weight average molecular weight of a polymer? [A] Gravimetry [B] Osmotic pressure [C] Viscometry [D] Light scattering	

Handwritten signature and date: 2-9-13

63	The monomer of natural rubber is [A] Butadiene [C] 2-methyl-1,2-butadiene	[B] Chloroprene [D] 2-methyl-1,3-butadiene	
64	Zwitterion is a [A] Neutral species [C] Doubly charged species	[B] Singly charged species [D] Multifunctional species	
65	Formalin is an aqueous solution of [A] methyl alcohol [C] acetaldehyde	[B] formaldehyde [D] acetic acid	
66	Which of the following is not a source used in Mid Infrared Spectrophotometer? [A] Nernst glower [C] Globar	[B] High pressure mercury arc lamp [D] Nichrome wire	
67	Which of the following is not a feature of carrier gas used in gas chromatography? [A] It must be chemically inert [C] It should not be completely pure	[B] It should be suitable for the detector employed [D] It should be cheap	
68	A carrier frequency of 1MHz and peak value of 10 V is amplitude modulated with a signal frequency of 10 kHz with peak value of 0.5 V. Then the modulation index and the side band frequencies respectively are: [A] 0.05 and 1 ± 0.010 MHz [C] 0.05 and 1 ± 0.005 MHz	[B] 0.5 and 1 ± 0.010 MHz [D] 0.5 and 1 ± 0.005 MHz	
69	Which among the following is a carbohydrate? [A] Nylon [C] Turpentine	[B] Cane sugar [D] Hydrogen peroxide	
70	Which gas is used for artificial ripening of fruits? [A] Ethylene [C] Methane	[B] Ethane [D] Carbon dioxide	
71	Which of the following gas is present under pressure in soft drinks? [A] Nitrogen [C] Carbon dioxide	[B] Oxygen [D] Hydrogen	
72	Which enzyme converts sugar into ethyl alcohol? [A] Invertase [C] Maltase	[B] Zymase [D] Diastase	
73	Instrument used to study the laws of vibrating string is: [A] Hydrometer [C] Sonometer	[B] Hygrometer [D] Electrometer	
74	The newton's first law is also referred to as: [A] Law of inertia [C] Law of moments	[B] Law of friction [D] Law of motion	
75	Which of the following is not a synthetic rubber? [A] Bakelite [C] Butyl rubber	[B] SBR [D] Nitrile rubber	

76	Which among the following has the highest boiling point? [A] 0.1 M Na_2SO_4 [C] 0.1 M MgCl_2	[B] 0.1 M glucose [D] 0.1 M $\text{Al}(\text{NO}_3)_3$	
77	The maximum oxidation state exhibited by actinide ions is [A] +5 [C] +7	[B] +4 [D] +8	
78	The volume of hydrogen combining with 24 litres of oxygen to form water is [A] 24 litres [C] 48 litres	[B] 22.4 litres [D] 12 litres	
79	With increase in shear rate, the viscosity of a dilatant material will: [A] Remain constant [C] Increase	[B] Decrease [D] Remain unchanged initially and then increase	
80	The hydronium ion is [A] H_3O^+ [C] HO^-	[B] H_2^+ [D] H^+	

Answer Key

1	C	41	C
2	A	42	D
3	C	43	C
4	D	44	D
5	D	45	C
6	A	46	A
7	D	47	C
8	C	48	D
9	D	49	C
10	B	50	A
11	B	51	C
12	B	52	A
13	A	53	D
14	A	54	B
15	C	55	C
16	B	56	A
17	C	57	D
18	D	58	A
19	B	59	C
20	B	60	C
21	D	61	C
22	D	62	D
23	D	63	D
24	D	64	C
25	B	65	B
26	B	66	B
27	D	67	C
28	A	68	A
29	D	69	B
30	D	70	A
31	A	71	C
32	A	72	B
33	C	73	C
34	B	74	A
35	A	75	A
36	C	76	B
37	B	77	C
38	B	78	C
39	A	79	C
40	B	80	A