



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 संस्थान)**

**Ph: 0471-2443152, FAX: 0471-2446433, 2550728**

**Email-sct@sctimst.ac.in Website - www.sctimst.ac.in**

**WRITTEN TEST FOR THE POST OF**

**Jr. TECHNICAL ASSISTANT (INSTRUMENTS) – POLYMER DIVISION**

Roll No.

Date: 27.09.2017

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

27.9.17

1	The acid used in Lead storage cells is: [A] Phosphoric acid [C] Nitric acid	[B] Hydrochloric acid [D] Sulphuric acid	D
2	Soap is prepared by boiling caustic soda with which of the following? [A] Alcohol [C] Glycerine	[B] Kerosene [D] Fats	D
3	Bronze is alloy of [A] Copper and Zinc [C] Copper, Zinc and Tin	[B] Tin and Zinc [D] Iron and Zinc	C
4	The natural source of hydrocarbon is [A] Biomass [C] Carbohydrates	[B] Crude Oil [D] None of these	B
5	Which among the following metals provide amphoteric oxide? [A] Calcium [C] Sodium	[B] Aluminium [D] Silver	B
6	Chemical formula of quartz is [A] $\text{SiO}_2$ [C] $\text{TiO}_2$	[B] $\text{CaCO}_3$ [D] $\text{CaSO}_4$	A
7	Galvanized Iron is made coating Iron with [A] Lead [C] Zinc	[B] Nickel [D] Chromium	C
8	Which among the following alkali metals has the highest specific heat? [A] Lithium [C] Rubidium	[B] Potassium [D] Caesium	A
9	Which are the metallic constituents of hard water? [A] Magnesium, Calcium and Iron [C] Magnesium, Tin and Iron	[B] Iron, Tin and Calcium [D] Calcium and Magnesium	D

10	The system that uses radioactivity to decide the period of materials of prehistoric period is: [A] Uranium dating [C] Carbon dating	[B] Radium dating [D] Deuterium dating	C
11	Which among the following is a carbohydrate? [A] Nylon [C] Turpentine	[B] sucrose [D] Hydrogen peroxide	B
12	Maximum Iron ore is found in which of the following state? [A] $\text{FeCO}_3$ [C] $\text{Fe}_2\text{O}_3$	[B] $\text{FeS}_2$ [D] $\text{Fe}_3\text{O}_4$	C
13	Commercial nitric acid is colored because it contains dissolved [A] Colored impurities [C] Nitrous oxide	[B] Nitrogen dioxide [D] Oxygen	B
14	Which gas is used for artificial ripening of fruits? [A] Ethylene [C] Methane	[B] Ethane [D] Carbon dioxide	A
15	The chemical name of 'baking soda' is: [A] Sodium carbonate [C] Sodium bicarbonate	[B] Sodium chloride [D] Sodium nitrate	C
16	Which instrument is used to measure atmospheric humidity? [A] Tintometer [C] Tacheometer	[B] Thermometer [D] Hygrometer	D
17	Ocean depth can be measured by: [A] Audiometer [C] Actinometer	[B] Fathometer [D] Barkometer	B
18	Which device is used to measure the intensity of light? [A] Load cell [C] Heliometer	[B] Lux meter [D] Inkometer	B
19	Specific gravity of milk can be measured by [A] Elaeometer [C] Dosimeter	[B] Lactometer [D] Odometer	B
20	A transformer works with [A] Direct current [C] Both AC and DC	[B] Alternating current [D] None of these.	B
21	The unit of Plank's constant is [A] JS [C] $\text{JS}^2$	[B] J/S [D] None of these	A
22	The unit of electric charge is [A] Ampere [C] Ohm	[B] Coulomb [D] Kelvin	B



23	Which instrument is used to measure potential difference between two points in electrical circuit [A] Galvanometer [B] Ammeter [C] Ohmmeter [D] Voltmeter	D
24	The color of stars depend on [A] Distance [B] Temperature [C] Atmospheric pressure [D] Pollution of air	B
25	What is escape velocity? [A] 4.2 km/s [B] 8.4 km/s [C] 11.2 km/s [D] 13.5 km/s	C
26	The reason behind decrease in the boiling point of water at higher altitudes is: [A] High atmospheric pressure [B] Low atmospheric pressure [C] High atmospheric temperature [D] Low atmospheric temperature	B
27	If sodium chloride is added to water [A] Boiling point of water will increase [B] Boiling point of water will decrease [C] Freezing point of water will increase [D] Freezing point of water will not change	A
28	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	C
29	Instrument used to study the laws of vibrating string is: [A] Hydrometer [B] Hygrometer [C] Sonometer [D] Electrometer	C
30	Which device is used to measure the wavelength of X-rays? [A] Framing square [B] Bragg Spectrometer [C] Cyclotron [D] Mass spectrometer	B
31	Alpha particle is the nucleus of an atom of [A] Hydrogen [B] Helium [C] Oxygen [D] Carbon	B
32	Which of the following is false about wavelengths of electromagnetic radiation? [A] Radiation with short wavelengths have high energies [B] Energy does not depend on wavelength [C] Radiation with long wavelengths have low energies [D] Energy depends on wavelength	B
33	Which of the following is the wavelength of microwave radiation? [A] 10 – 780nm [B] 0.78 – 30 $\mu$ m [C] 0.6 – 10 m [D] 100 $\mu$ m-1 cm	D
34	How is wave number of electromagnetic radiation related to wavelength? [A] It is the reciprocal of wavelength [B] It is directly proportional to wavelength [C] It is not related to wavelength [D] It is equal to wavelength	A
35	UV -Visible spectroscopy deals with----- transitions in molecules	A

	[A] Vibrational [C] Rotational	[B] Electronic [D] Translational	
36	Beer Lambert's law gives the relation between which of the following?		
	[A] Reflected radiation and concentration [C] Energy absorption and concentration	[B] Scattered radiation and concentration [D] Energy absorption and reflected radiation	C
37	In which of the following ways, absorption is related to transmittance?		
	[A] Absorption is the logarithm of transmittance [C] Absorption is the negative logarithm of transmittance	[B] Absorption is the reciprocal of transmittance [D] Absorption is a multiple of transmittance	C
38	Raman Spectroscopy deals with		
	[A] Absorption of light [C] Scattering of light	[B] Transmittance of light [D] Absorption and transmittance	C
39	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	B
40	Which of the following is the wave number of near infrared spectrometer?		
	[A] $4000 - 200 \text{ cm}^{-1}$ [C] $12500 - 4000 \text{ cm}^{-1}$	[B] $200 - 10 \text{ cm}^{-1}$ [D] $50 - 1000 \text{ cm}^{-1}$	C
41	Laser action occurs if there is ----- in the absorbing medium		
	[A] Scattering [C] Total internal reflection	[B] Transmittance [D] Population inversion	D
42	Which of the following is not a technique for preparing solid samples in IR spectroscopy?		
	[A] Solids run in solution [C] KBr pellet	[B] Mull technique [D] Thin films	D
43	Which of the following is not true about Fourier Transform Infrared (FTIR) spectrometer?		
	[A] It is of non-dispersive type [C] Size has been reduced over the years	[B] It is useful where repetitive analysis is required [D] Size has increased over the years	D
44	In the most widely used beam splitter, a thin film of _____ is sandwiched between two plates of low refractive index solid. Fill the blank with the suitable option.		
	[A] Mylar [C] Ferrous oxide	[B] Silicon carbide [D] Silver chloride	A
45	Which of the following is not the 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	C
46	Which of the following molecules will give a pure rotational spectrum		
	[A] $\text{H}_2$ [C] $\text{HCl}$	[B] $\text{CO}_2$ [D] $\text{O}_2$	C



47	In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure? [A] Column chromatography [B] Planar chromatography [C] Liquid chromatography [D] Gas chromatography	A
48	In chromatography, the stationary phase can be _____ supported on a solid [A] Solid or liquid [B] Liquid or gas [C] Solid only [D] Liquid only	A
49	In chromatography, which of the following can the mobile phase be made of? [A] Solid or liquid [B] Liquid or gas [C] Gas only [D] Liquid only	B
50	Which of the following cannot be used as adsorbent in Column adsorption chromatography? [A] Magnesium oxide [B] Silica gel [C] Activated alumina [D] Potassium permanganate	D
51	Which of the following types of chromatography involves the separation of substances in a mixture over a 0.2mm thick layer of an adsorbent? [A] Gas liquid [B] Column [C] Thin layer [D] Paper	C
52	Microsoft word is a: [A] Word processing program [B] Spread sheet program [C] Presentation program [D] None of these	A
53	Word wrap means [A] Aligning text with the right margin [B] Inserting spaces between words [C] Moving text automatically to the next line [D] None of these	C
54	While typing a paragraph [A] Press Enter key at the end of each word [B] Press Enter key at the end of each line [C] Press Enter key at the end of each paragraph [D] None of these	C
55	To delete a selected sentence, press the following key: [A] Backspace [B] Del [C] Any of the above [D] None of the above	C
56	Which would you choose to save a document with a new name? [A] Click File, Save as [B] Click File, Save [C] Press Ctrl + S [D] None of these	A
57	To copy a selected text, press the key [A] Alt + Shift + C [B] Ctrl + Shift + V [C] Ctrl + C [D] All of the above	C
58	Two resistors of resistances 200 k $\Omega$ and 1 M $\Omega$ respectively form a potential divider with outer junctions maintained at potentials of + 3 V and -15 V. Then, the potential at the junction between the resistors is: [A] + 1V [B] - 0.6 V	C

Handwritten mark:  $\frac{1}{2} \times 9.12$

59	<p>[C] zero [D] - 12 V</p> <p>The graph between resistivity and temperature, for a limited range of temperatures, is a straight line for a material like:</p> <p>[A] Copper [B] Nichrome [C] Silicon [D] Mercury</p>	A
60	<p>Choose the correct statement:</p> <p>[A] A paramagnetic material tends to move from a strong magnetic field to weak magnetic field [B] A magnetic material is in the paramagnetic phase below its Curie temperature [C] The resultant magnetic moment in an atom of a diamagnetic substance is zero [D] Typical domain size of a ferromagnetic material is 1 nm</p>	C
61	<p>A <math>2\mu\text{C}</math> charge moving around a circle with a frequency of <math>6.25 \times 10^{12}</math> Hz produces a magnetic field 6.28 T at the centre of the circle. The radius of the circle is:</p> <p>[A] 2.25 m [B] 0.25 m [C] 13.0 m [D] 1.25 m</p>	D
62	<p>A galvanometer of resistance <math>100\Omega</math> is converted to a voltmeter of range 10 V by connecting a resistance of <math>10\text{k}\Omega</math>. The resistance required to convert the same galvanometer to an ammeter of range 1 A is:</p> <p>[A] <math>0.4\Omega</math> [B] <math>0.3\Omega</math> [C] <math>1.2\Omega</math> [D] <math>0.1\Omega</math></p>	D
63	<p>An <math>L</math>-<math>C</math>-<math>R</math> series AC circuit is at resonance with 10 V each across <math>L</math>, <math>C</math> and <math>R</math>. If the resistance is halved, the respective voltages across <math>L</math>, <math>C</math> and <math>R</math> are:</p> <p>[A] 10 V, 10 V and 5 V [B] 10 V, 10 V and 10 V [C] 20 V, 20 V and 5 V [D] 20 V, 20 V and 10 V</p>	D
64	<p>A 50 Hz AC current of peak value 2 A flows through the primary coil. If the mutual inductance between the pair of coils is 150 mH, then the peak value of voltage induced in the second coil is:</p> <p>[A] 30 V [B] 60 V [C] 15 V [D] 300 V</p>	A
65	<p>A transformer is used to light a 100 W and 110 V lamp from a 220 V main supply. If the main current is 0.5 A, then the efficiency of the transformer is nearly:</p> <p>[A] 89% [B] 100% [C] 95% [D] 91%</p>	D
66	<p>A 100 W bulb produces an electric field of <math>2.9 \text{ Vm}^{-1}</math> at a point 3 m away. If the bulb is replaced by 400 W bulb without disturbing other conditions, then the electric field produced at the same point is:</p> <p>[A] <math>2.9 \text{ Vm}^{-1}</math> [B] <math>3.5 \text{ Vm}^{-1}</math> [C] <math>5 \text{ Vm}^{-1}</math> [D] <math>5.8 \text{ Vm}^{-1}</math></p>	D
67	<p>Bond order for the species <math>\text{O}_2^+</math> is</p> <p>[A] 1.5 [B] 2.5 [C] 1 [D] 2</p>	B
68	<p>The decreasing order of acidic character among ethane (I), ethene (II), ethyne (III) and propyne (IV) is</p> <p>[A] (I) &gt; (II) &gt; (III) &gt; (IV) [B] (II) &gt; (III) &gt; (I) &gt; (IV) [C] (III) &gt; (IV) &gt; (II) &gt; (I) [D] (IV) &gt; (III) &gt; (II) &gt; (I)</p>	C



69	The alkene that will give the same product with HBr in the absence as well as in the presence of peroxide is: [A] 2-butene [C] propene	[B] 1-butene [D] 1-hexene	A
70	Hyperconjugation is most useful for stabilising which of the following carbocations? [A] Neo-pentyl [C] Iso-propyl	[B] Tert-butyl [D] Ethyl	B
71	Choose the weakest acid among the following [A] $F_3C-COOH$ [C] $CH_3-COOH$	[B] $F-CH_2-COOH$ [D] $(CH_3)_2CH-COOH$	D
72	The isomerism that arises due to restricted bond rotation is [A] Metamerism [C] Position isomerism	[B] Optical isomerism [D] Geometrical isomerism	D
73	Chlorination of benzene in the presence of halogen carrier is an example of [A] Aromatic nucleophilic substitution [C] Aromatic nucleophilic addition	[B] Aromatic electrophilic substitution [D] Aromatic electrophilic addition	B
74	Amine that cannot be prepared by Gabriel phthalimide synthesis is [A] Aniline [C] Methylamine	[B] Benzylamine [D] Iso-butylamine	A
75	Which of the following is the least basic amine? [A] Ethylamine [C] Aniline	[B] Diethylamine [D] Benzylamine	C
76	Which of the following bases is not present in DNA? [A] Uracil [C] Thymine	[B] Adenine [D] Guanine	A
77	Gel permeation chromatography (GPC) is a technique to find out----- of polymers [A] Mechanical properties [C] Rheological property	[B] Molecular weight [D] Structure	B
78	Which among the following polymers, has the highest glass transition temperature [A] Polyethylene [C] polypropylene	[B] Polystyrene [D] Polytetrafluoroethylene	D
79	Which of the following general behavior is shown by polymers [A] Newtonian [C] Elastic	[B] Viscous [D] Viscoelastic	D
80	Chemical agents used to promote bonding between polymer and filler particles are known as [A] Wetting agents [C] Coupling agents	[B] Plasticizers [D] Flow promoters	C

Handwritten mark: A