

# MIZORAM PUBLIC SERVICE COMMISSION

## TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF CHEMIST-II (ARCHIVES) UNDER ART & CULTURE DEPARTMENT, GOVERNMENT OF MIZORAM, FEBRUARY, 2020

### TECHNICAL PAPER - I

Time Allowed : 2 hours

Full Marks : 150

*All questions carry equal marks of 2 each.*

*Attempt all questions.*

- Records are ....
  - information created, received and maintained as evidence and information by an organization or person
  - information created, collect and maintained as evidence and information by an organization or public
  - information recorded and maintained for future use
  - information established, received and maintained by an organization or public
- Archives are ....
  - documents that have been collected for presevation
  - records that have been selected for permanent preservation
  - records that have been maintained for official use
  - documents collected and maintained for public interest
- National Archives of India, the custodian of Government records was established in the year
  - 11 April, 1893
  - 17 January, 1922
  - 11 March, 1891
  - 21 June, 1896
- Records for preservation has been classified into
  - Four (A, B, C & D)
  - Six (A, B, C, D, E & F)
  - Five (A, B, C, D & E)
  - Three (A, B & C)
- \_\_\_\_\_ is the author of the book 'A Manual of Archive Administration'
  - T. R. Schellenberg
  - Hilary Jenkinson
  - Michael Piggott
  - Oliver W. Holmes
- The cellulose fibers in paper draw in moisture when relative humidity levels exceed
  - 55 %
  - 70 %
  - 65 %
  - 60 %
- The worst enemies of books and other organic materials are
  - Rodents and insects
  - Starch and Rodents
  - Insects and materials contain protein
  - Fevicol and starch
- \_\_\_\_\_ is regarded as an independent and prime cause of deterioration of paper
  - Dust
  - Cellulose
  - Light
  - Vermin

9. Rapid and serious deterioration of paper is caused by
- (a) pigments
  - (b) oxidation of cellulose
  - (c) temperature
  - (d) sulphur-dioxide
10. According to Etiwel Mutero, the ideal temperature for paper records is
- (a) 20-24 degrees
  - (b) 12-15 degrees
  - (c) 15-17 degrees
  - (d) 18-20 degrees
11. A computerisation and digitalization programme for an “Automated Retrieval System” with the help of tailor made software known as “Archival Information Management System (AIMS)” was launched in
- (a) 1990
  - (b) 2004
  - (c) 1998
  - (d) 2015
12. Reprography literally means
- (a) reproducing graphics through electrical or mechanical means
  - (b) writing again in place of original
  - (c) the art and science of reproducing documents
  - (d) images produced by the action of light on light-sensitive materials
13. The process of making photographs on a greatly reduced size is called
- (a) microfiche
  - (b) holograph
  - (c) microphotography
  - (d) ultrafiche
14. To prepare a microfilm and copies from it, the required equipment is
- (a) Camera, Processor, Magnetic tape, Microfilm printer, Reader Printer
  - (b) Camera, Processor, Magnetic tape, Microfilm printer, Enlarger
  - (c) Camera, Processor, Inspection equipment, Microfilm printer, Reader Printer
  - (d) Camera, Processor, Reader, Microfilm printer, Enlarger
15. Organization in which records are placed anywhere in file, where there is free space for record, is referred to as
- (a) Hashing file organization
  - (b) Sequential file organization
  - (c) Heap file organization
  - (d) Clustered file organization
16. Cellulose acetate foil is used for
- (a) repairing documents
  - (b) pasting
  - (c) lamination
  - (d) reinforcement of paper
17. Restorative treatments often assume complexities because of the varied nature of documentary components, namely,
- (a) paper and chemical
  - (b) paper and ink
  - (c) paper sheet and manuscript
  - (d) paper and writing
18. Maps, engineering drawings, plans and other similar outsized documents need special care and treatment when these become
- (a) weak and fragile
  - (b) cracked
  - (c) brittle
  - (d) tear
19. \_\_\_\_\_ is essential in view of authentic, legal and cultural value of document.
- (a) classification
  - (b) special care
  - (c) easy access
  - (d) scientific preservation

20. The machines commonly in use for lamination of documents are
- Scientific and Rotary laminator
  - Adhesive coated tissue paper and Flat bed laminator
  - Flat bed and Rotary laminator
  - Solvent and machine laminator
21. One of the functions of the Archival Advisory Board is to
- advise the Government
  - give directions to collect records
  - deal with institutions
  - disposed documents
22. No public records bearing security classification shall be transferred to the
- National Archives of India
  - Departmental Record Room
  - Secretariat Record Room
  - Archives of Mizoram
23. Every record creating agency shall nominate one of its officers as records officer to discharge the functions under this
- Jurisdiction
  - Section
  - Act
  - Programme
24. The head of the Archives shall accept for deposit and preservation public records of permanent nature which have been retained after recording by the records creating agency in its records room for the last
- fifteen years or more
  - thirty five years or more
  - twenty five years or more
  - twenty years or more
25. No record created before the year 1892 shall be
- transferred
  - collected
  - fumigated
  - destroyed
26. Heisenberg's uncertainty principle for an electron revolving in an atom is expressed as
- $\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$
  - $\Delta x \cdot \Delta p \geq \frac{h}{2\pi}$
  - $\Delta x \cdot \Delta p \leq \frac{h}{4\pi}$
  - $\Delta x \cdot \Delta p \leq \frac{h}{2\pi}$
27. The *d*-orbital with the orientation along x and y axes is
- $d_{z^2}$
  - $d_{xy}$
  - $d_{x^2-y^2}$
  - $d_{yz}$
28. Which set of quantum number represent the unpaired electron of chlorine?
- n=2, l=1, m=0
  - n=2, l=1, m=1
  - n=3, l=0, m=0
  - n=3, l=1, m=0
29. Which principle/rule limits the maximum number of electrons in an orbital to two?
- Aufbau principle
  - Pauli's exclusion principle
  - Hunds rule of maximum multiplicity
  - Heisenberg's uncertainty principle
30. The number of radial node in a 3*p* orbital is
- 3
  - 2
  - 1
  - 0

31. Decrease in atomic size along a period in the periodic table is mainly due to  
(a) increase in atomic number (b) increase in number of shells  
(c) increase in number of intervening electrons (d) increase in effective nuclear charge
32. On moving down in a group of *p*-block, the stability of G-2 oxidation state  
(a) remains the same (b) decreases  
(c) increases (d) irregular
33. The element with the highest electron affinity value is  
(a) F (b) Cl  
(c) H (d) Li
34. Which among the following is expected to show highest ionization energy?  
(a) Li (b) Na  
(c) K (d) Rb
35. Which one of the following is not pseudohalogen?  
(a)  $\text{CN}^-$  (b)  $\text{SCN}^-$   
(c)  $\text{N}_3^-$  (d)  $\text{NO}^-$
36. In physical adsorption, the gas molecules are held to the solid surface by  
(a) sigma bond (b) hydrogen bond  
(c) van der Waals' forces (d) strong chemical forces
37. Peptization involves  
(a) formation of peptide bond (b) precipitation of the colloidal sol  
(c) hydrolysis of proteins (d) breaking of a precipitate to colloidal state
38. Freundlich adsorption isotherms are not applicable at  
(a) low pressure (b) high pressure  
(c) room temperature (d) 273K
39. Light scattering in colloidal system is known as  
(a) Brownian motion (b) Diffraction  
(c) Electrophoresis (d) Tyndall effect
40. Gold number of a lyophilic sol refers that  
(a) lower is its value, the greater is its peptizing power  
(b) lower is its value, the greater is its protecting power  
(c) larger is its value, the greater is its protecting power  
(d) larger is its value, the greater is its peptizing power
41. What is the pH of 0.001M HCl solution?  
(a) 1 (b) 2  
(c) 3 (d) 4
42. The buffer solution will have the maximum buffer capacity when the concentrations of  
(a) acid and its salt are equal in solution (b) acid is lower than its salt in solution  
(c) acid is higher than its salt in solution (d) None of these
43. For a weak acid with  $\alpha$  as its degree of dissociation, the value of dissociation constant is given by  
(a)  $K_a = C\alpha$  (b)  $K_a = C^2\alpha$   
(c)  $K_a = C\alpha^2$  (d)  $K_a = C^2\alpha^2$

44. The ionic product of water will increase, if
- (a) pressure is reduced (b) pressure is increased  
(c) temperature is reduced (d) temperature is increased
45. Henderson-Hasselbalch equation is represented as
- (a)  $\text{pH} = \text{pK}_a - \log \frac{[\text{Salt}]}{[\text{Acid}]}$  (b)  $\text{pH} = \text{pK}_a + \log \frac{[\text{Salt}]}{[\text{Acid}]}$   
(c)  $\text{pH} = \text{pK}_a + \log \frac{[\text{Acid}]}{[\text{Salt}]}$  (d)  $\text{pH} = \text{pK}_a - \log \frac{[\text{Acid}]}{[\text{Salt}]}$
46. Hyperconjugation involves delocalisation of
- (a) s electrons (b) p-electrons  
(c) lone pair of electrons (d) all of these
47. The +I effect group among the following is
- (a)  $-\text{NO}_2$  (b)  $-\text{CN}$   
(c)  $-\text{COCl}$  (d)  $-\text{CH}_3$
48. Which one of the following is an electrophile?
- (a)  $\text{NH}_3$  (b)  $\text{BF}_3$   
(c)  $\text{H}_2\text{O}$  (d)  $\text{Cl}^-$
49. Homolytic bond cleavage will lead to
- (a) free radicals (b) cations  
(c) anions (d) non-bonding pair of electrons
50. Lewis base can be regarded as
- (a) electrophiles (b) free radicals  
(c) nucleophiles (d) carbocations
51. One of physical quantities which is not a derived quantity is
- (a) velocity (b) acceleration  
(c) force (d) length
52. Coefficient of viscosity may be expressed in units of
- (a)  $\text{kg s m}^{-2}$  (b)  $\text{kg m s}^{-2}$   
(c)  $\text{N s m}^{-2}$  (d)  $\text{N m s}^{-2}$
53. Dimensions of coefficient of friction are
- (a)  $[\text{M}] [\text{L}] [\text{T}]^{-2}$  (b)  $[\text{M}]^{-1} [\text{L}]^{-1} [\text{T}]^2$   
(c)  $[\text{M}] [\text{L}]^{-1} [\text{T}]^{-1}$  (d) It's a dimensionless quantity
54. Formula of angular momentum of moving body is
- (a)  $L = r / p$  (b)  $L = r \times p$   
(c)  $L = r \cdot p$  (d)  $L = r + p$
55. Fundamental equation that relates pressure to fluid's speed and height is known as
- (a) equation of continuity (b) Bernoulli's equation  
(c) light equation (d) speed equation
56. Special theory of relativity treats problems involving
- (a) inertial frame of reference (b) non-inertial frame of reference  
(c) non-accelerated frame of reference (d) accelerated frame of reference

57. Change in Gravitational Potential Energy can be written as  
(a)  $mgh$  (b)  $mh$   
(c)  $mg$  (d)  $gh$
58. In an isothermal process for perfect gas, sum of heat flow and work input is  
(a) Zero (b) Maximum  
(c) Minimum (d) Infinite
59. An ideal heat engine operates between 600 K and 900 K. efficiency of engine is  
(a) 90% (b) 45%  
(c) 33% (d) 70%
60. Second law of thermodynamics implies that cycle efficiency of thermodynamic process must be  
(a) greater than unity (b) less than unity  
(c) equal to unity (d) None of these
61. For any irreversible process, net entropy change is  
(a) positive (b) zero  
(c) negative (d) infinite
62. Which one of the following thermodynamic quantities is **not** a state function?  
(a) Gibbs free energy (b) Enthalpy  
(c) Entropy (d) Work
63. Value of constant 'a' in van der Waals equation increases with increase in  
(a) pressure (b) volume  
(c) intermolecular forces (d) temperature
64. Speed of wave 'v' is given by  
(a) wavelength of the wave / frequency of the wave  
(b) wavelength of the wave  $\times$  frequency of the wave  
(c) frequency of the wave / wavelength of the wave  
(d) 1 / 2 of 1
65. Size of image is always smaller than object in  
(a) convex mirror (b) concave mirror  
(c) silver mirror (d) plane mirror
66. To describe change in speed of light in a medium, term used is called  
(a) index of reflection (b) index of refraction  
(c) index of defraction (d) index of acoustics
67. Power of lens is  
(a)  $1/p$  (b)  $1/q$   
(c)  $1/f$  (d)  $1/l$
68. Direction of waves is parallel to distance of vibration in  
(a) transverse waves (b) longitudinal waves  
(c) both transverse and longitudinal waves (d) none of the waves
69. Two waves with phase difference  $180^\circ$  have resultant amplitude of  
(a) one (b) zero  
(c) same as the single wave (d) doubles the single wave

70. Effect of diffraction is greatest if waves pass through a gap with width equal to  
(a) frequency (b) wavelength  
(c) amplitude (d) wavefront
71. In Michelson's interferometer, a bright fringe will be replaced by next bright fringe if we move the movable mirror by an amount equal to  
(a) wavelength of light (b) wavelength of light/2  
(c) wavelength of light/3 (d) wavelength of light/4
72. Lissajous figure is the pattern produced by the intersection of two sinusoidal curves the axes of which are at \_\_\_\_\_ to each other.  
(a) 0 degree (b) 45 degree  
(c) 90 degree (d) 120 degree
73. Second law of thermodynamics defines  
(a) Heat (b) Work  
(c) Enthalpy (d) Entropy
74. Temperature of a gas is produced due to  
(a) Its heating value (b) Kinetic energy of molecules  
(c) Attraction of molecules (d) Repulsion of molecules
75. If T is the time period of any planet around the Sun and r is the semimajor axis of the orbit, then according to Kepler's Law  
(a) T is proportional to r (b)  $T^2$  is proportional to  $r^3$   
(c)  $T^3$  is proportional to  $r^2$  (d) T is proportional to  $r^2$

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