

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 - II

Time Allowed : 2 hours

Full Marks : 150

All questions carry equal marks of 2 each.

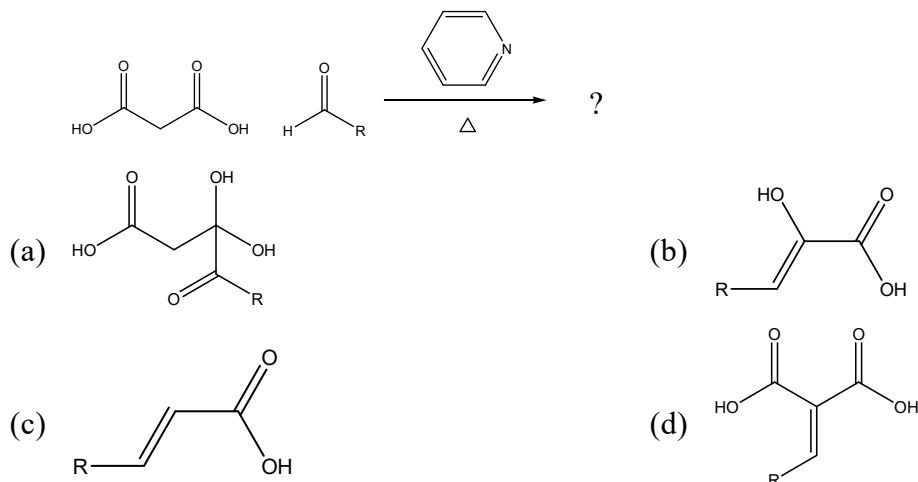
Attempt all questions.

1. Preservation denotes the wide variety of preventive and _____ activities performed to maintain one's holdings.
(a) environmental monitoring (b) remedial
(c) reformatting (d) re-housing
2. The enemies of records can be divided into 4 factors : physical, biological, chemical and _____, which act as agents of destruction.
(a) moisture (b) atmospheric pollution
(c) the human factor (d) temperature
3. Audio/visual materials include audio tapes, video tapes, film, photographs and _____
(a) microfilm (b) photocopy
(c) cassette (d) negatives
4. Many documents have been lost through time due to torn pages, rust from paper clips, improper storage containers, and exposure to negative elements such as pests, _____ and heat.
(a) water (b) light
(c) insects (d) rodents
5. Preservation is a term referring to passive protection of archival _____ in which no physical or chemical treatment to the stem occur.
(a) papers (b) documents
(c) library (d) materials
6. "Digital library has certain characteristics, which make them different from traditional library. It has expansive and accurate system of searching with large volumes of text, image and audio-video resources. Digital libraries do not need physical space to build collection and it can be accessed from anywhere, any time," said _____
(a) Susan Thomas (b) Jeremy Leighton John
(c) Endicott-Popovsky (d) Matthew Kirschenbaum
7. Among the 'Born-digital' content are notes, emails and other correspondence, databases, spreadsheets, presentations, photos, film, social media and _____
(a) maps (b) oral
(c) draft works (d) projects

8. The main key benefit of digital archiving is _____
 - (a) less expense
 - (b) locating information easier
 - (c) storage space
 - (d) preventing of loss
9. The term "born digital" is of uncertain origin. While it may have occurred to multiple people at various times, it was coined independently by web developer _____ in 1993.
 - (a) Doug Reside
 - (b) Randel (Rafi) Metz
 - (c) Henry M. Gladney
 - (d) Luciana Duranti
10. National Digital Preservation Programme (NDPP) of India <http://www.ndpp.in/> was launched by Ministry of Communications & Information Technology in _____.
 - (a) 2006
 - (b) 2008
 - (c) 2011
 - (d) 2014
11. Book Binding is the process of _____ and securing written within a cover.
 - (a) stitching
 - (b) assembling
 - (c) coating
 - (d) folding
12. Mechanical binding utilizes wire or _____ through a series of small holes to hold pages together as in spiral notebooks.
 - (a) Plastic
 - (b) Steel
 - (c) Copper
 - (d) Aluminium
13. Binding materials are needle, sewing thread, end paper, cloth/leather and _____.
 - (a) nail
 - (b) hard board
 - (c) scissor
 - (d) knife
14. _____ includes anything that must be done before printing in order to complete the printing job.
 - (a) Signatures
 - (b) Scoring
 - (c) Binding operation
 - (d) Saddle
15. _____ is binding using staples.
 - (a) Spiral binding
 - (b) Drawing
 - (c) Staple stitch
 - (d) Perforation
16. _____ of the Public Records Act, 1993 stipulates that "every records creating agency may set up such number of record room in such places as it deems fit and shall place each record room under the the charge of a record officer."
 - (a) Section 5(1)
 - (b) Section 6(4)
 - (c) Section 5(2)
 - (d) Section 7(3)
17. A Records Room/Stack Area should, as far as possible, be located on the _____ floor of a building.
 - (a) ground
 - (b) first
 - (c) second
 - (d) third
18. Humidity and temperature in conditioned Records Room should be measured regularly. The ambient conditions for storage of records are (i) temperature _____ and (ii) relative humidity 45+55%.
 - (a) 17 C-19 C
 - (b) 18 C- 20 C
 - (c) 22 C-25 C
 - (d) 21 C-23 C

19. Archival building must have working environments that are safe, secure, aesthetically pleasing, comfortable and _____
- (a) lasting (b) healthy
(c) systematic (d) easy approach
20. The floor of a Records Room should be such as to permit easy _____ of records.
- (a) access (b) movement
(c) reach (d) sizing
21. Private archives _____
- (a) is a documentary materials of a private or non-public nature
(b) is a collection of private papers of eminent persons
(c) is an indispensable complement to public archives
(d) encompasses the archives of non-public organisations including charities, religious bodies and private individuals etc..
22. One of the most important private papers preserved in the National Archives of India is _____
- (a) Dadabhai Naoroji (b) Narasimha Rao
(c) Jagjivan Ram (d) Rajiv Gandhi
23. Record Retention Schedule needs to be drawn by the _____
- (a) review committee (b) national archives of India
(c) state archives (d) concerned creating agencies
24. _____ is responsible for guidelines and preparation of Record Retention Schedule for records pertaining to facilitative functions common to all Ministries/Departments of Government of India.
- (a) concerned Ministry
(b) department of administration reforms & public grievances
(c) department of personal and administrative reforms
(d) record creating agencies
25. Record Retention Schedule prescribes requirements for the length of time, a government record must be _____
- (a) retained and review (b) maintained and disposed
(c) retained and disposed (d) kept and weed out
26. What type of bond is the bonding between H and F?
- (a) Covalent (b) Ionic
(c) Coordinate (d) Polar Covalent Bond
27. What is the rate at which A and B react to produce C and D for the reaction below?
- $$A + B \xrightleftharpoons[k_2]{k_1} C + D$$
- (a) $\text{rate}_1 = k_1 [A] [B]$ (b) $\text{rate}_1 = k_1 [C] [D]$
(c) $\text{rate}_1 = k_1 [A] [C]$ (d) $\text{rate}_1 = k_1 [A] / [B]$

28. Choose the appropriate product for the following reaction.



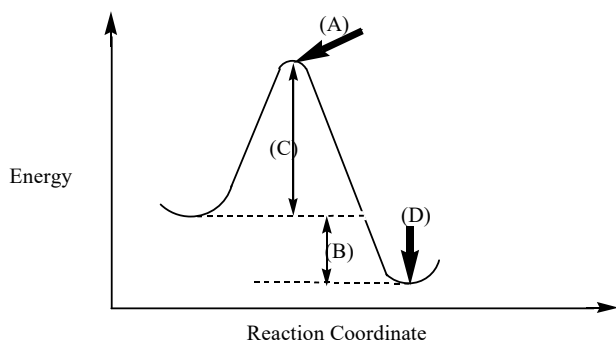
29. The Fraction (f) of successful collision and its relation to the temperature and activation energy can be given as;

- (a) $f = e^{-E_a/RT}$ (b) $f = e^{-RT/-E_a}$
 (c) $f = e^{-E_a/RT}$ (d) $e = f^{RT/-E_a}$

30. What is the shape of molecules with 5 coordination number?

- (a) Trigonal Planar (b) Octahedral
 (c) TrigonalBipyramidal (d) Tetrahedral

31. Which arrow describes the activation energy from the reaction energy profile?



- (a) (A) (b) (B)
 (c) (C) (d) (D)

32. Which of the following is a homogenous catalytic reaction?

- (a) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3$
 (b) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightarrow{\text{Pt}(\text{s})} 2\text{SO}_3$
 (c) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \xrightarrow{\text{Fe}(\text{s})} 2\text{NH}_3$
 (d) $\text{CH}_2=\text{CH}_2(\text{g}) + \text{H}_2(\text{g}) \xrightarrow{\text{Pt/Ni/Pd}(\text{s})} \text{CH}_3-\text{CH}_3(\text{g})$

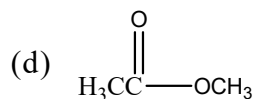
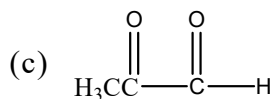
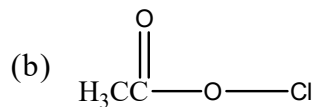
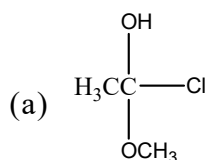
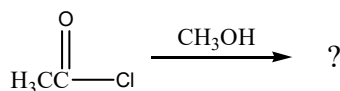
33. Which of the following do scientists used to describe the shapes and electron density of Molecular Orbitals?

- (a) LCAO (b) VSEPR
 (c) s-orbitals (d) p-orbitals

34. What would be the Michaelis-Menten Equation if a substrate S binds reversibly to an enzyme E to form an enzyme-substrate complex ES? (P= Product)



- (a) $v = V_{\max} [P] / K_m + [S]$ (b) $v = V_{\max} [S] / K_m + [P]$
 (c) $v = V_{\max} [S] + K_m + [ES]$ (d) $v = V_{\max} [S] / K_m + [S]$
35. The Ionization Energy trend;
- (a) Decreases across the period (left to right) and increases in a group (Top to bottom)
 (b) Increases across the period (left to right) and decreases in a group (Top to bottom)
 (c) Decreases across the period (left to right) and decreases in a group (Top to bottom)
 (d) Increases across the period (left to right) and increases in a group (Top to bottom)
36. Why do Lanthanides show greater reactivity than transition elements?
- (a) due to shielding of unpaired electrons of inner 4f-orbital by outer 5s, 5p, and 5d orbitals.
 (b) due to lanthanide contractions
 (c) due to larger ionic radii
 (d) none of the above
37. What is the reaction associated with organozinc reagents for addition to carbonyl compounds?
- (a) Mannich Reaction (b) Reformasky reaction
 (c) Michael Addition (d) Grignard reagents
38. What is the product for the following nucleophilic substitution reaction?



39. Which of the following depicts types of hybridizations?
- (a) $sp^2, sp^3, sp^4, sp^2d^3, sp^3d^2$ (b) $sp^2, sp^3, sp^4, sp^2d^3, sp^3d^4$
 (c) $sp, sp^2, sp^3, sp^3d, sp^3d^2$ (d) $sp, sp^2, sp^3, sp^3d, sp^2d^3$
40. How many electrons are present in the d-orbital of the penultimate energy level and in the outer most 's' orbital?
- (a) 1 to 2 (b) 1 to 10
 (c) 1 to 6 (d) 1 to 9
41. What is the hybridization of Magnesium hydride?
- (a) sp^2 orbital overlap (b) sp orbital overlap
 (c) 3s orbital overlap (d) sp-s orbital overlap
42. Which of the following would be involved for Friedel-crafts Acylation?
- (a) $\text{H}_2\text{SO}_4/\text{HNO}_3$ (b) RCl
 (c) ROCl (d) AlCl_3

43. What is the electronic configuration of Copper?
(a) $3d^{10}4s^1$ (b) $3d^94s^2$
(c) $3d^{10}4s^2$ (d) None of these
44. H-Cl has partially positive charge in hydrogen atom and partially negative charge in chlorine atom respectively, Why?
(a) because it is a covalent bond
(b) because it is Polar covalent Bond
(c) because of Dipole moments
(d) because of the Polarity of the hydrogen and chlorine atoms
45. If for example the predictability of the Universe increases and never decreases due to global change, to what law would it fit best?
(a) Second Law of Thermodynamic (b) First Law of Thermodynamic
(c) Third Law of Thermodynamic (d) There can be no such law
46. The force of attraction or repulsion between charges follows:
(a) square law (b) inverse square law
(c) both (a) & (b) (d) quadratic force law
47. The electric field inside a perfectly conducting media is
(a) ∞ (b) 0
(c) 120π (d) depends on the value of the charge
48. The electric field intensity of an infinite long charge line varies
(a) Inversely proportional to the square of the distance from it
(b) inversely proportional to the square root of the distance from it
(c) Inversely proportional to the distance from it
(d) It remains constant
49. Electric field potential due to a point charge
(a) falls inversely proportional to the distance
(b) falls inversely proportional to the square of the distance
(c) falls inversely proportional to the square root of the distance
(d) It does not change with density
50. Ohm's law does not apply to
(a) a.c circuits
(b) conductors
(c) semi-conductors
(d) conductors when there is a change in temperature
51. The unit of conductance is
(a) Henry (b) Ohm
(c) Mho (d) Farad
52. Closed circuit techniques are based on
(a) Thevenin theorem (b) Norton theorem
(c) Kirchhoff's current law (d) Kirchhoff's voltage law

53. The expression $\nabla \cdot \vec{B} = 0$ is based on
- (a) Continuity equation
 - (b) Faraday's law
 - (c) Gauss's law
 - (d) Ohm's law
54. If two conductors carry current in opposite direction they will
- (a) attract each other
 - (b) repel each other
 - (c) there is no force between them
 - (d) both (a) & (b)
55. An inertial frame of reference is frame
- (a) in which first law of motion is valid
 - (b) in which law of inertia is valid
 - (c) which is not moving with uniform velocity
 - (d) both (a) & (b)
56. Quantum effects are important only when observing
- (a) small objects
 - (b) very large objects
 - (c) atomic size objects
 - (d) atomic spectra
57. Which phenomenon is best explained by the particle nature of light
- (a) Polarization
 - (b) Doppler effect
 - (c) Interference
 - (d) Photoelectric effect
58. The energy of a photon varies directly with
- (a) frequency
 - (b) wavelength
 - (c) speed
 - (d) rest mass
59. According to Heisenberg Uncertainty Principle
- (a) $E = mc^2$
 - (b) $\Delta x \Delta p \geq \frac{\hbar}{2}$
 - (c) $\frac{h}{p}$
 - (d) $\Delta x \Delta p = 2\hbar$
60. Time dependent Schrodinger equation is given by
- (a) $H\psi = E$
 - (b) $H\psi = E^2$
 - (c) $H\psi = E\psi$
 - (d) $H\psi = E^4$
61. Combining of two light nuclei of low mass to produce a heavy nucleus is called
- (a) Nuclear fusion
 - (b) Nuclear fission
 - (c) Spontaneous fission
 - (d) Double beta decay
62. When an alpha particle is emitted from an unstable nucleus, the atomic mass number of the nucleus
- (a) increases by 2
 - (b) decreases by 2
 - (c) increases by 4
 - (d) decreases by 4
63. Fermi energy level for intrinsic semiconductors lies
- (a) at middle of the band gap
 - (b) close to conduction band
 - (c) close to valence band
 - (d) within the valence band
64. A reversed biased PN Junction has
- (a) very narrow depletion layer
 - (b) almost no current
 - (c) very low resistance
 - (d) large current flow

65. Energy band gap size for semiconductors is in the range
- (a) 1-2 eV
 - (b) 2-3 eV
 - (c) 3-4 eV
 - (d) > 4 eV

Direction (Questions 66 & 67): What number comes next in the series?

66. 5, 10, 17, 26, ...?..., 50
- (a) 32
 - (b) 37
 - (c) 43
 - (d) 49
67. 25 : ...?..... :: 49 : 2401
- (a) 125
 - (b) 215
 - (c) 325
 - (d) 625

Direction (Questions 68 - 70): Read the following passage carefully and choose the best answer to each of the questions out of the four alternatives:

In addition to constituting an economic form of discrimination, the denial of domestic partner benefits reflects a discriminatory culture that defines “family” in heterosexual terms. There has been much discussion on the need to develop family-responsive workplaces that support employees’ work–life balance, but the assumption of heterosexual families permeates most of these discussions. Even as new and innovative practices are designed to meet the emerging needs of heterosexual employees, the basic needs of LGB employees in most organizations remain unmet and virtually invisible. While LGB employees constitute between 4–17 percent of the workforce, most do not enjoy the basic “family-friendly” privileges of their heterosexual counterparts; many LGB employees do not have health care benefits for their partners and cannot take time off work if their partner becomes ill or dies. In short, the definition of family as a heterosexual construct constitutes a pervasive form of institutional discrimination in the workplace.

68. “Pervasive” has the opposite meaning as
- (a) perverse
 - (b) persistent
 - (c) contained
 - (d) important
69. “Permeate” has the same meaning as
- (a) pervade
 - (b) permit
 - (c) contain
 - (d) include
70. According to the passage, the definition of family is
- (a) invisible
 - (b) discriminatory
 - (c) innovative
 - (d) balanced

Direction (Questions 71 & 72): Given below are problem figures. Choose the best alternative among the answer figures:

71.

@	@	@	@
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@	@	@	@
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(a) (b) (c) (d)

72.

1	A	A	1	A	\$	A	\$	1	\$
#	\$	#	\$	#	1	1	#	A	#

1	#	\$	1	\$	A	\$	1
A	\$	#	A	1	#	A	#

(a) (b) (c) (d)

Direction (Questions 73 & 75): Choose the best answer to each of the questions:

73. Six roads lead to a village. They may be indicated by letters A, B C and digits 1, 2, 3. When there is a storm, B is blocked. When there are floods, A, 1 and 2 will be affected. When road 1 is blocked, C is blocked. At a time when there are floods and a storm, which road can still be used?

- (a) 3 (b) C
(c) B (d) 2

74. Six children A, B, C, D, E and F are split into two groups of three each and are made to stand in two rows in such a way that a child in one row is exactly facing a child in the other row. D is not at the ends of any row and is to the right of E, who is facing C. F is to the left of B, who is facing D. which of the following groups of children are in the same row?

- (a) DEF (b) ADB
(c) ABC (d) None of these

75. Insert the missing character

B	15	?
3	N	21

- (a) T (b) S
(c) R (d) U
