ASKUALA Project: Chemistry Mock Exam for Grade 12 Students

April 2025

SUBJECT: CHEMISTRY **TIME ALLOWED: 2:30 HOURS**
SUBJECT CODE: 05 **NUMBER OF QUESTIONS 80**

Name _____Section_____Roll Number_____

PHYSICAL CONSTANTS

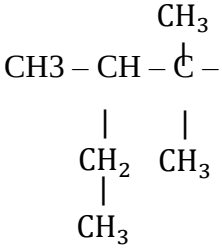
- Gas constant, R=8.314J/molK =0.0821L.atm/molK
- Avogadro's number = $6.023x10^{23}mol^{-1}$
- Planck's constant, $h=6.626x10^{-34}JS$
- Speed of light, $C=3X10^{8}$ m/s
- Faraday's constant(F) =96500C/mol

ATOMIC NUMBERS (Z) AND ATOMIC WEIGHTS (A)

Element	H	C	N	O	F	Na	Mg	Al	P	S	Cl	K	Ca	Mn	Fe	Ni	Cu
Z	1	6	7	8	9	11	12	13	15	16	17	19	20	25	26	28	29
A	1	12	14	16	19	23	24	27	31	32	35.5	39	40	55	56	59	65.5

Direction:- **This exam paper consist 80 multiple choice questions. Attempt to read all questions carefully then select the correct answer among the given alternative and put the Choice of your answer on the separate answer sheet provided (1Pt each).**

1. Which one is a step-growth polymer?
   A. Polyester B. PTFE C. Polystyrene D. PVC
2. All of the following are thermoplastic polymers; except:-
   A. Polyethylene B. Nylon C. Bakelite D. Dacron
3. All of the following are addition polymer; except:-
   A. Dacron B. PVC C. Polypropylene D. PMMA
4. Which polymer is sold under the trade name Lucite or Plexiglas?
   A. PTFE B. PET C. PMMA D. Nylon-66
5. Which one is the use of Teflon?
   A. It is used as airplane windows.
   B. It is used for making pipes and raincoats.
   C. It is used for making parachutes and ropes.
   D. It is used for coating cooking utensils.
6. The widely used PVC is a polymerized product of _____
   A. $CH_2 = CH_2$ B. $CH_2 = CCl_2$ C. $CH_2Cl – CH_2Cl$ D. $CH_2 = CHCl$
7. The IUPAC name for the structure of



   A. 4. 5 – dimethyl – heptyene
   B. 4, 4, 5 – trimethyl – 2 – heptyne
   C. 3, 4, 4 - trimethylhepthyne
   D. 3, 4 – dimethyl – 5 – hepthyne

8. The compound $CH_3CH_2CH_2CH_2CH_2OH$ and $CH_3 - CH_2 - CH_2 - CH_2COOH$ react in the presence of an acid catalyst to form _____
   A. carboxylic acid B. alcohol C. ester D. aldehyde
9. Which one of the following classes of hydrocarbon is less reactive?
   A. Alkane B. Alkene C. Alkyne D. Aromatic hydrocarbon
10. Alcohol that yield aldehyde on oxidation are classified as
   A. secondary alcohol B. primary alcohol C. dihydric alcohol D. trihydric alcohol
11. Which extraction process is used to convert sulfide in to oxides?
   A. Concentrating the ore B. Alloying C. production of metal D. Pre-treatment
12. During concentrating the ore; which method is chemical method?
   A. Leaching B. Froth floatation C. Amalgamation D. Gravity separation
13. Roasting is generally done in case of the:-
   A. oxide ores B. silicate ores C. sulphide ores D. carbonate ores
14. Extraction of gold and silver involves leaching with CN^- ion. Silver is later recovered by:-
   A. distillation B. zone refining C. liquation D. displacement with Zn
15. What type of catalyst is used in the contact process?
   A. V_2O_5 B. Fe C. Ni D. Pt
16. In the tanning process, the purpose of putting the skin into slaked lime solution is to:-
   A. Facilitate the removal of unwanted flesh C. Dehydrate the skin
   B. Facilitate the removal of hair D. Soften the skin
17. Nylon-66 is obtained by condensation polymerization of
   A. Adipic acid and hexamethylene diamine C. Phenol and formaldehyde
   B. Terephthalic acid and ethylene glycol. D. Acrilic acid and ethane diol
18. What is the purpose of adding cryolite during the extraction of aluminum from bauxite in the Hall process?
   A. To get pure aluminum oxide C. to lower the melting point of crude bauxite
   B. To dissolve impurities like iron oxides D. to decrease the conductivity of bauxite
19. Which of the following are the correct steps in glass production?
   A. Glass melting → Batch preparation→ Glass forming→ Inspection→ Annealing
   B. Glass melting→ Glass forming→ Batch preparation→ Annealing→ Inspection
   C. Batch preparation→ Glass forming→ Glass melting→ Annealing→ Inspection
   D. Batch preparation→ Glass melting → Glass forming→ Annealing→ Inspection
20. Salts that absorb water from the atmosphere and become solution are:
   A. deliquescent B. efflorescent C. hygroscopic D. Florescent
21. If a salt releases a reddish – brown gas up on heating with a dis-agreeable smell that turns moist blue litmus into red, which anion is most likely present in the salt?
   A. Bromide B. Nitrate C. Sulphate D. Carbonate
22. What is the molar mass of a polyethylene sample $[- CH_2 - CH_2 -]_n$, when n= 4600? (H = 1, C = 12)
   A. 1.288×10^3 g/mol C. 1.196×10^3 g/mol
   B. 1.196×10^4 g/mol D. 1.288×10^5 g/mol
23. Which of the following quantum number is not permitted in sub-level notation?
   A. $n = 2, \ell = 0$ B. $n = 3, \ell = 3$ C. $n = 4, \ell = 3$ D. $n = 1, \ell = 0$
24. Which salt yields a basic solution on dissolution in water?

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A. Salts of strong acid & strong base C. salts of weak base & strong acid
B. Salts of weak acid & strong base D. Salts of NaOH and HCl

25. Which pair of compounds forms a buffer solution?
A. KCl/HCl C. $NaNO_3/HNO_3$
B. CH_3COONa/H_2SO_4 D. NH_4Cl/NH_3

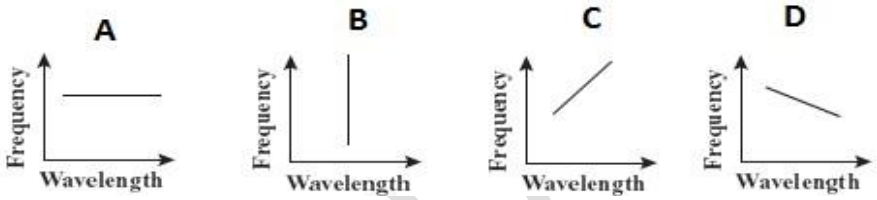
26. Which one of the following undergoes cation hydrolysis?
A. BaI_2 B $NaNO_3$ C. $MgSO_4$ D. CH_3COONa

27. Which of the following devices is designed to produce electromagnetic radiation with the **longest** wavelength in order to operate?
A. Light bulb B. microwave oven C. x-ray microscope D. FM radio transmitter

28. Which group of elements have variable valence and make colored compound?
A. Transition elements C. Rare earth metals
B. Representative elements D. P – block elements

29. When $Cr_2(SO_4)_3$ changed to CrO_3; the oxidation number of Chromium:-
A. Decrease as it undergo reduction C. Increase as it undergo oxidation
B. Increase as it undergo reduction D. Decrease as it undergo oxidation

30. Which of the following graphs **best** represents the relationship of the frequency of an electromagnetic wave to its wavelength?



31. What is the maximum number of electrons in n = 5, $m\ell = -1$?
A. $6e^-$ B. $12\ e^-$ C. $8\ e^-$ D. $32e^-$

32. What is the oxidation $N^{O.}$ of "Cr" in the ionic compound ammonium dichromate, $(NH4)2Cr2O7$?
A. +3 B. +7 C. +6 D. +5

33. A metal corrodes if;
A. It serve as cathode in the corrosion process C. It serve as anode in the corrosion process
B. It does not react with oxygen D. It is plated with corrosion resistant metal

34. What is E° for the following balanced reaction? Use the information given below

$$\mathbf{4H^+_{(aq)} + Fe_{(s)} + NO^{3-}_{(aq)} \rightarrow Fe^{3+}_{(aq)} + NO_{(aq)} + 2H_2O_{(l)}}$$

I. $NO_3^- + 4H^+ + 3e- \rightarrow NO + 2H_2O$ $E°_{red} = +0.960$ V
II. $Fe^{3+} + 3e- \rightarrow Fe$ $E°_{red} = +0.771$ V
A. +0.189 V B. –0.189 V C. –1.731 V D. +1.731 V

35. The pH of an aqueous sodium fluoride (NaF) solution is _____ because _____
A. 7; Sodium fluoride is a neutral salt.
B. Above 7; Fluoride ion is a strong base.
C. Below 7; fluoride reacts with water to make hydrofluoric acid
D. Above 7; fluoride ion is a weak base

36. The substance formed at the anode; during the electrolysis of dilute sodium chloride is:-
A. Hydrogen B. Chlorine C. Sodium D. Oxygen

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37. If 0.2 mole of electron passed through two electrolytic cell connected in series that consist 1M $AgNO_3$ and 1M $CuSO_4$ solution; what mass of silver is produced?(Q = constant, M_{Ag} = 108g/mole, M_{Cu} = 64g/mole)

A. 27g B. 32g C. 54g D. 13.5g

38. The percentage dissociation of a 0.20M formic acid is 3.2%. What is its dissociation constant?

A. 2.1×10^{-2} B. 9.6×10^{-8} C. 2.1×10^{-4} D. 1.1×10^{-6}

39. The following reaction occurs in basic solution. **Identify the oxidizing agent**. Note the reaction equation is not balanced.

$$\mathbf{H_2O_{(l)} + Zn_{(s)} + NO_3^-(aq) + OH^-(aq) \rightarrow Zn(OH)_4^{2-}(aq) + NH_3(aq)}$$

A. Zn(*s*) C. H_2O(l) (the oxygen)

B. $NO_3^-(aq)$ (the nitrogen) D. $NH_3(aq)$ (the nitrogen) E. $OH^-(aq)$

40. The charge required to deposit 9 g of Al from Al^{3+} solution is (At. wt. of Al = 27.0)

A. 3216.3 C B. 96500 C C. 9650 C D. 32167 C

41. In the electrochemical reaction: $2Fe^{3+} + Zn \longrightarrow Zn^{2+} + 2Fe^{2+}$, on increasing the concentration of Fe^{2+}

A. increases cell emf C. increases the current flow

B. decreases the cell emf D. alters the pH of the solution

42. One of the differences between a voltaic cell and an electrolytic cell is that in an electrolytic cell ___

A. Electron's flow toward the anode

B. A non-spontaneous reaction is forced to occur

C. An electric current is produced by a chemical reaction

D. O_2 gas is produced at the cathode

E. Oxidation occurs at the cathode

43. The highest electrical conductivity of the following aqueous solutions is of

A. 0.1 M Sugar B. 0.1 M $MgCl_2$ C. 0.1 M $AlCl_3$ D. 0.1 M Ca_3N_2

44. In a solution of $CuSO_4$ how much time will be required to precipitate 2 g copper by 0.5 ampere current?

A. 12157.48 sec B. 102 sec C. 510 sec D. 642 sec

45. Based on the periodic table and general patterns of activity, which of the following would react with metallic calcium? (KBr, NaI, $FeCl_2$, $NiBr_2$)

A. KBr and NaI only C. $FeCl_2$ only

B. Both $FeCl_2$ and $NiBr_2$ D. $NiBr_2$ only

46. Ammonia is manufacture in industry according to the following reaction:

$$\mathbf{N_2 + 3H_2 \rightarrow 2NH_3}$$

Which one of the following is TRUE about currently used sources of the reactants?

A. Both nitrogen and hydrogen are obtained directly from air.

B. Both nitrogen and hydrogen are obtained as petroleum products.

C. Nitrogen is obtained from thermal decomposition of nitrates while hydrogen is from methane from natural gas.

D. Nitrogen is obtained from fractional distillation of liquid air while hydrogen is from the electrolytic decomposition of water.

47. Which transition of electron in the hydrogen atom will emit maximum energy?

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A. $n_5 \rightarrow n_4$ B. $n_3 \rightarrow n_2$ C. $n_4 \rightarrow n_3$ D. All emits the same energy

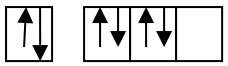
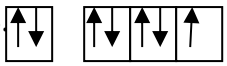
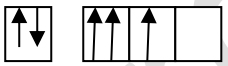
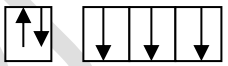
48. The radius of the second orbit of hydrogen is $2.12A^{0;}$ The radius of the first Orbit would be:
A. $0.53A^0$ B. $0.26A^0$ C. $1.06A^0$ D. $0.12A^0$

49. Which one has high melting point?
A. LiCl B. $MgCl_2$ C. NaCl D. $BeCl_2$

50. What is the quantum energy associated with the sodium –D line having a wave length of 589 nm?
A. $3.38 \times 10^{-19}J$ B. $5.4 \times 10^{-19}J$ C. $2.7 \times 10^{-19}J$ D. $4.56 \times 10^{-19}J$

51. Which sets of quantum number (n, ℓ, mℓ., ms) is not permitted by the rules of quantum Mechanics respectively?
A. $1,0,0,+\frac{1}{2}$ B. $3,2,-1,-\frac{1}{2}$ C. $4,3,2,-\frac{1}{2}$ D. $2,2,1,+\frac{1}{2}$

52. Maximum number of electrons in a subshell of an atom is determined by:-
A. $4\ell + 2$ B. $2n^2$ C. n^2 D. $2\ell + 1$

53. In which orbital diagram both Pauli's exclusion principle and Hund's rule are violated?
A.  B.  C.  D. 

54. What is the bond order and magnetic property respectively of F_2^+
A. 1.5, paramagnetic C. 2.0, diamagnetic
B. 2.5, diamagnetic D. 0.5, paramagnetic

55. The chemistry of lithium is very similar to that of magnesium even though they are placed in different groups. Its reason is:
A. Both are found together in nature
B. Both have nearly the same size
C. Both have similar electronic configuration
D. The ratio of their charge and size (i.e. charge density) is nearly the same

56. Which pair of elements belongs to same group?
A. Elements with atomic no. 17 and 38 C. Elements with atomic no. 17 and 53
B. Elements with atomic no. 20 and 40 D. Elements with atomic no. 11 and 33

57. The wavelength of which series lie towards the ultraviolet?
A. Lyman B. Balmer C. Paschen D. Bracket

58. How many sigma & pi bond are there in CH3-CN molecule respectively?
A. 4**δ** & 2**π** B. 3**δ** & 2**π** C. 4**δ** & 3**π** D. 5**δ** & 2**π**

59. Which of the following four molecules is/are polar: PH_3,OF_2, HF, SO_3?
A. Only HF and SO_3 C. Only HF and OF_2
B. Only HF D. PH_3, OF_2 and HF

60. What is the hybridization of the central atom in the BCl_3 molecule?
A. Sp B. sp^2 C. sp^3 D. sp^3d^1

61. What are the bond angles in NO_3^-?
A. 90º B. 109.5º C. 120º D. 90º and 120º

62. What is the hybridization of the carbon atoms in ethyne, C_2H_2?
A. sp2 B. sp3d C. sp3 Dd. Sp

63. The hybridization associated with the central atom of a molecule in which all the bond angles are 120^0 is:-

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A. Sp B. sp^2 C. sp^3 D. sp^3d

64. The central atom in a molecule has three regions of high electron density. What type of hybrid orbitals are formed by the central atom?

A. sp^2 *B.* sp^3d C. sp^3 D. sp^3d^2

65. Which of the following species has a linear shape?

A. I_3^- B. SO_2 C. O_3 D. ClO_2

66. Silicon dioxide (SiO2) and diamonds are best described as

A. molecular substances with coordinate covalent bonding
B. molecular substances with ionic bonding
C. network solids with covalent bonding
D. network solids with ionic bonding

67. Which molecular structure will have the bond angle of 120^0 around the central atom?

A. Triangular planar C. Triangular bipyramid
B. Seesaw D. Octahedral

68. Which of the following molecule is polar?

A. N_2 B. PH_3 C. CCl_4 D. CO_2

69. A molecule with five bonding pair and one lone pair electron has

A. octahedral shape C. square pyramid shape
B. trigonal bigyramid shape D. tetrahedral shape

70. The bond angle in H_2O is

A. = $BeCl_2$ B. < NH_4^+ C. > CO_2 D. > BF_3

71. Which of the following is true regarding the **<u>concentration of products</u>**, for a chemical reaction **<u>that is already at</u> <u>equilibrium,</u>** assuming no disruptions to the equilibrium?

A. The concentrations of products will not change because there are no more reactants.
B. The concentrations of products will not change because the limiting reagent is gone.
C. The [ ] of products will not change because the forward and reverse rates are equal.
D. The concentrations of products will change continually because of reversibility.

72. For the chemical equilibrium $A + 2B \rightleftharpoons 2C$, the value of the equilibrium constant, K_C, is 16. What is the value of the equilibrium constant for the following reaction?

$1/2A + B \rightleftharpoons C$ $K_C = ?$

A. 4.0 B. 0.20 C. 40 D. 400

73. For the reaction **$N_2O_4 \rightleftharpoons 2NO_2$; $\Delta H = +14kJ$**. The extent of the reaction can be increased by:-

A. Increasing the pressure C. Increasing the temperature
B. Using a catalyst D. Introduce inert gas at constant volume

74. In which of the following cases the reaction goes farthest to completion?

A. $Kc = 10^{-2}$ B. $Kc = 10^3$ C. $Kc = 10^2$ D. $Kc = 10^{-3}$

75. The equilibrium constant for the reaction **$2X+Y \rightleftharpoons X_2Y$** is K. Then what is the equilibrium constant for the reaction: $3X_2Y \rightleftharpoons 6X+3Y$?

A. $\sqrt{\left(\frac{1}{k}\right)}$ B. K^3 C. 3K D. $\left(\frac{1}{k}\right)^3$

76. Which of the following statements is true about an ideal gas? It is a hypothetical gas that obeys the gas laws

A. at low temperature and low pressure C. closely at high temperatures and low pressures
B. at low temperature and high pressure D. closely at high temperatures and high pressures

77. Two gases A and B were applied to the two ends of 40 cm long glass tube. the two gases met at a distance of 30 cm from the side where gas B is applied which statement is true about these gases

A. The rate of diffusion of A is bigger than the rate of diffusion of B.

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B. The density of A is smaller than the density of B
C. The rate effusion of B is smaller than the rate effusion of A
D. The malar mass of A is bigger than the molar mass of B.

78. If an unknown gas diffuses 1.75 times faster than sulfur dioxide gas, what is the molar mass of the unknown gas? (molar mass of "SO2" is 64)

A. 21.16 B. 36.57 C. 48 D. 96

79. During a phase change, the temperature of a substance

A. increases. B. stays the same. C. decreases. D. Unknown

80. Which one of the following items does *not* characterize an oxidizing agent?

A. An oxidizing agent gains electrons.
B. An oxidizing agent causes another species to be oxidized.
C. The oxidation number of an oxidizing agent decreases.
D. A good oxidizing agent is a metal in a high oxidation state, such as Mn7+.
E. An example of a good oxidizing agent is an alkali metal, such as Na.

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