SHEGER CITY

CHEMISRTRY MODEL EXAMINATION FOR GRADE 12 IN 2024/2016

TIME

ALLOTTED **2:30** HOUR

NUMBER OF QUESTIONS 80

GENERAL DIRECTIONS

THIS EXAM PAPER HOLDS CHEMISRTRY MODEL EXAM.IN THIS EXAMINATION, THERE ARE A TOTAL OF 80 MULTIPLE CHOICE QUESTIONS.
READ EACH OF THEM CAREFULLY AND SELECT THE BEST ANSWER AND BLACKEN ONLY THE LETTER OF YOUR CHOICE ON THE SEPARATE ANSWER SHEET PROVIDED.FOLLOW THE INSTRUCTIONS ON THE ANSWER SHEET AND THE EXAMINATION PAPER CAREFULLY.

YOU ARE ALLOWED TO WORK THE EXAM FOR 2:30 HOURS.WHEN TIME IS CALLED, YOU MUST IMMEDIATELY STOP WORKING, PUT YOUR PENCIL DOWN, AND WAIT FOR FURTHER INSTRUCTIONS.

ANY FORM OF CHEATING OR AN ATTEMPT TO CHEAT IN THE EXAMINATION WILL RESULT AN AUTOMATIC DISMISSAL FROM THE EXAMINATION HALL AND CANCELLATION OF YOUR SCORE (S).
PLEASE MAKE SURE THAT YOU HAVE WRITTEN ALL THE RQUESTED INFORMATION ON THE ANSWER SHEET BEFORE YOU START TO WORK ON EXAMINATION.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO.

1. The correct (stable)electron configuration of an element with atomic number 29 is:

A. $[Ar]4s^2 3d^9$ B. $[Ar]4s^1 3d^{10}$ C. $[Ar]4s^2 4p^6 3d^3$ D. $[Ar]4s^2 4p^6 4d^3$

2. When 24 gram of magnesium metal reacts with oxygen, 30 gram of magnesium oxide is formed.

The percentage yield is. (At. mass of Mg=24, O=16)

A. 85% B. 65% C.75% D 95%

3. All of the following reactions are an endothermic reaction. EXCEPT.

A. $4Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s) +$ 352KJ

B. $N_2(g) + 2O_2(g) \rightarrow 2NO_2(g)$, $\Delta H=66.4KJ$

C. $CO_2(g) + \text{energy} \rightarrow C(s) + O_2(g)$

D. $CaCO_3(s) \rightarrow CaO(s) + CO_2(g) -$ energy

4. Who used the cathode ray to discover and determine its charge to mass ratio?

A. Robert millikan B. C. J .J. Thomson D.james Ruther ford Chadwick

5. Gas 'X' diffuses twice as fast as gas 'Y'. Gas 'Y' has a molecular mass of 64. What is the molecular mass of gas 'X'? A .250g B. 16g C. 128g D. 32g

6. Which of the following atomic model is NOT related to each other?

A. A billiard ball-Daltons

B. chocolate chip ice-cream model –J.J.Thomson

C. planetary atom –Ruther ford

D. The element in an atom can exit only restricted number of orbit-Rutherford

7. Which of the following is NOT correct about Kinetic Molecular theory of gases?

A. There are forces of attraction or repulsion between gas particles

B. The average Kinetic energy of gas particles are negligible

C. The average Kinetic energy of gas particle depends on the temperature of the gas

D. The volume of the particle of gas is negligible to the total volume of gases

8. How many grams are there in 2.5 mole of $CaCO_3$? (At. Mass of Ca=40g, C=12g)

A. 150g B. 250g C. 100g D. 200g

9. Consider the following equilibrium reaction, $PCl_3(g) + Cl_2(g) \leftrightarrow PCl_5(g)$ + heat

All of the followings are increases the yield of PCl_5 EXCEPT
A. Compressing the reaction vessel
B. Cooling the reaction vessel
C. Addition of the PCl_5
D. Removing of the PCl_5

10. The cathode rays were deflected towards the positive electric field, this indicates that
A. Cathode rays travel in straight line
B. Cathode rays consist of a particle nature
C. Cathode rays exist in all atom of an element
D. Cathode rays consist of negatively charged

11. During electrolysis of $CuSO_4$ solution with copper electrode, which one of the following is NOT correct?
A. The color of the solution is dark blue gradually light blue at the end it becomes colorless
B. The color of the solution is dark blue from the beginning up to end
C. The solution has acidic property
D. The mass of the anode gradually decreases

12. All of the following elements are produced by the electrolysis process. EXCEPT
A. Aluminum metal B. Calcium metal C. Zinc metal D. Potassium metal

13. What will happen in the reaction $CH_3CH_2COOH(aq) + H_2O(l) \leftrightarrow H_3O^+(aq) + CH_3CH_2COO^-(aq)$ When CH_3CH_2COOK is added?
A. The concentration of H_3O^+ would be increases
B. The concentration of CH_3CH_2COOH and H_3O^+ both would be increase
C. The concentration of H_3O^+ and $CH_3CH_2COO^-$ both would be increases
D. The concentration of CH_3CH_2COOH would be increases

14. The anodic reaction in a lead storage battery, during charging is:
A. $Pb(s) + SO_4^{2-} \leftrightarrow PbSO_4(s) + 2e^-$
B. $PbO_2(s) + 4H^+(aq) + SO_4^{2-}(aq) + 2e^- \leftrightarrow PbSO_4(s) + 2H_2O(l)$
C. $PbSO_4(s) + 2e^- \leftrightarrow Pb(s) + SO_4^{2-}(aq)$
D. $PbSO_4(s) + 2H_2O(l) \leftrightarrow PbO_2(s) + 4H^+(aq) + SO_4^{2-}(aq) + 2e^-$

15. Consider the following unbalanced equation $KMnO_4 + KI + H_2SO_4 \rightarrow MnSO_4 + I_2 + H_2o$
The oxidizing agent is
A. $KMnO_4$ B. KI C. H_2SO_4 D. $MnSO_4$

16. The electrolysis of dilute H_2SO_4 is similar to the following. EXCEPT,
A. Electrolysis of saturated sodium chloride
B. Electrolysis of dilute potassium sulfate
C. Electrolysis of dilute potassium chloride
D. Electrolysis of water

17. What is the cell potential of the following voltaic cell? The standard cell potential, (E^0cell=-0.90v)

$Zn(s)/Zn^{2+}(0.1M)//Al^{3+}(aq)(0.0001M)/Al(s)$

A. +0.93v B. -0.93v D. -0.96v

C. +0.96v

18. If 2.7g of aluminum are produced by the electrolysis of Molten $AlCl_3$, how many electrons are removed from cathode? (At. mass of Al=27g)

A. 1.2 x 10^{24}electrons B. 6.02 x 10^{23}electrons C. 1.8 x 10^{23}electrons

D. 3.0 x 10^{23}electrons

19. Which one of the following COULD NOT be consider as addition polymerization?

A. poly propylene C. poly ethylene terephthalate

B. poly venyl chloride D. poly ethylene

20. Given data

$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$, E^0red=-2.37v

$Co^{2+}(aq) + 2e^- \rightarrow Co(s)$, E^0red=-0.28v

$Cu^{2+}(aq) + 2e^- \rightarrow Cu\ (s)$, E^0red=+0.34v

$Ni^{2+}(aq) + 2e^- \rightarrow Ni(s)$, E^0red=-0.25v

Which of the following reaction will occur non-spontaneous?

A. $Mg(s) + Co^{2+}(aq) \rightarrow Mg^{2+}(aq) + Co(s)$

B. $Ni^{2+}(aq) + Cu(s) \rightarrow Ni(s) + Cu^{2+}(aq)$

C. $Co(s) + Ni^{2+}(aq) \rightarrow Co^{2+}(aq) + Ni(s)$

D. $Mg(s) + Cu^{2+}(aq) \rightarrow Mg^{2+}(aq) + Cu(s)$

21. Determine the group, period and block of an element with atomic number 24.

A. G=VB, P=4 and b=d C. G=VIIA, P=4 and b=d

B. G=VIB, P=4 and b=d D. G=VA, P=4 and b=p

22. Which of the following reaction of alcohol does NOT involve the bond cleavage O–H?

A. The dehydration of alcohol

B. The reaction of alcohol with strongly electro-positive metal

C. Oxidation of primary alcohol

D. The reaction of organic acid with alcohol

23. Commercially nitric acid can be prepared by:

A. Haber process B. Frasch process C. Ostwald process

D. Contact process

24. Producer gas is a combination of

A. Carbon dioxide and Hydrogen C. Carbon monoxide and Hydrogen

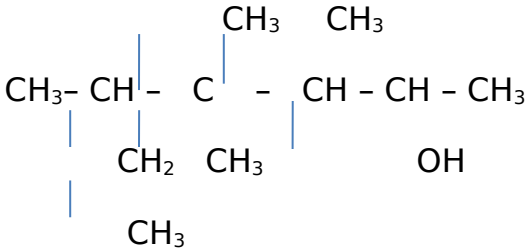
B. Carbon dioxide and nitrogen D. Carbon monoxide and Nitrogen

25. Which of the following is NOT used for the preparation of alkane?

A. Hydrogenation of alkene C. Halogenated alkane with active metal

B. Decarboxylation reaction D. De hydro halogenation of alkene

26. What is the IUPAC name of the following organic compound?



A. 3,4,4,5 – tetramethyl – 2 – heptanol C. 2 – Ethyl - 3,3,4 – trimethyl – 2 – hexanol

B. 3,4,4,5 – tetramethyl – 6 – heptanol D. 5 – Ethyl - 3,4,4 – trimethyl – 2 – hexanol

27. What is the concentration of 4.9 gram of sulphuric acid/H_2SO_4/ in 500mL of solution?

(At. Mass of H=1, O=16, S=32)

A. 0.1M B. 1M D. 0.5M

C. 0.2M

28. The conjugate base of $H_2PO_4^{-¿¿}$ is:

A. $PO_4^{3-¿¿}$ B. H_3PO_4 D. $H_2PO_4^{1-¿¿}$

C. $HPO_4^{2-¿¿}$

29. The POH of a solution 0.15M HA and unknown concentration of A^- is 8. Ka=$1.0x10^{-6}$, What is the concentration of A^-?

A. 1M B. 1.5M D. 0.15M

C. 0.75M

30. Which solution below has the highest concentration of Hydronium ion?

A. POH=4.5 B. POH=12.5 D. POH=11.5

C. POH=2.5

31. The most commonly used commercially and domestically method of food preservation is

A. Drying B. Freeze-drying C. Vacuum packing D. Freezing

32. The transformation of ester into alcohol and carboxylic acid is known as

A. Hydrolysis B. Dehydration C. Esterification D. Saponification

33. The total number of orbitals in the third main energy level (n=3) is

A. 16 B. 9 D. 3

C. 4

34. In the reaction $2NO(g) + Cl_2(g) \rightarrow 2NOCl(g)$

The following data were obtained from experimental result.

Run	$[NO]_0M$	$[Cl_2]_0M$	$(rate)_0M/min$
1	0.010	0.10	0.18

2	0.010	0.20	0.36
3	0.020	0.20	1.44

The overall order of a reaction is

A. 2 B. 4 D. 1

C. 3

35. A second order reaction A → B $[A]_0$=0.4M and $[A]_t$=0.2M after 20 minutes, the half-life ($t_{½}$) of a reaction is;

A. 15 minutes B. 20 minutes C. 25.6 minutes D. 20.8 minutes

36. A molecule having a general formula AX_3 has two unshared pair of electrons on A. What is the hybridization of A?

A. sp^3d B. sp^3 D. sp

C. sp^2

37. Which of the following has the height bond order?

(Atomic number of O=8, C=6, N=7)

A. $O_2^{1-¿¿}$ *B*. $O_2^{+¿¿}$ D. $O_2^{2-¿¿}$

C. $CN^{+¿¿}$

38. The energy required to remove an electron from a metal is $3.31x10^{-18}$J. What is the wave length of a light? C=$3.0x10^8$m/s, h=$6.63x10^{-34}$J.S

A. 12nm B. 90nm D. 80nm

C.60nm

39. How many significant figures are there in 300.00?

A. 4 B. 3 D. 5

C. 6

40. The field of chemistry which is concerned with the development of theoretical foundation and methods of chemical analyses is:

A. Biochemistry C. Industrial chemistry

B. Physical chemistry D. Analytical chemistry

41. In the laboratory, one of a grade 12 students ,measure the mass of an object is 0.97gram.The actual mass of an object is 1gram. What is the percentage error?

A. 4% B. 3% C.0.03%

D. 0. 04%

42. Which of the following electromagnetic radiation has the highest frequency?

A. Microwave B. X-rays C. Radio wave D. UV

43. The quantum number relates to the electrons only is:

A. Principal quantum number C. Spin quantum number

B. Azimuthal quantum number D. Magnetic quantum number

44. The first ionization energy of Boron is slightly lower than that of Beryllium because of

A. The size of Beryllium is greater than Boron
B. In Boron the electron is being lost from a doubly filled orbital
C. The nuclear charge of Boron is greater than Beryllium
D. The outer electron in Boron is in P-orbital not an S-orbital.

45. Which of the following compounds contain ion, covalent and dative bond?
A.NH_4NO_3 B. KNO_3 D. $Ca_3(PO)_2$
C. $MgCO_3$

46. All of the following molecules contain a hydrogen bond. EXCEPT
A. Hydrogen sulphide B. Glycerol C. Hydrogen fluoride
D. Ammonia

47. How many sigma and pi/π/ bonds are present in methylbenzene/Toluene/?
A. 3 pi and 10 sigma bond C. 3pi and 16 sigma bond
B. 3 pi and 15 sigma bond D. 3 pi and 12 sigma bond

48. The reaction of nitric oxide with hydrogen as follow
$2NO(g) + 2H_2(g) \rightarrow N_2(g)\ 2H_2O(g)$
The rate of appearance of $N_2(g)$ is $4.0x10^{-5}$M/S. What is the rate of disappearance of NO(g)?
A.$4.0x10^{-5}$M/S B. $2.0x10^{-5}$M/S C. $6.0x10^{-5}$M/S D. $8.0x10^{-5}$M/S

49. Which of the following is NOT the characteristics of photo electric effect
A. work function is the minimum amount of energy required to remove an electron from the metal surface
B .the electrons that are emitted came off at energies that depends on the intensity of light
C .the photo electric effect occurs when light bombards the surface of a metal and electrons are ejected
D .the electrons that are emitted came off at energies that depend on the frequency of light

50. The value of kc for the reaction, $COCl_2(g) \leftrightarrow CO(g) + Cl_2(g)$ is $2.4x10^{-8}$ at a certain temperature. If the concentration of CO(g) at this temperature is $1.0x10^{-4}$M, what is the concentration of $COCl_2(g)$?
A. 4.2M B. 0.42M D. 0.042M
C. 0.0042M

51. Which of the following chemicals is used as a bleaching agent in the manufacturing of sugar in sugar industry?
A. Hydrogen peroxide C. Sulphur dioxide
B. Sodium bisulphate D. Calcium bisulphate

52. The number of component is one and the number of phase is two, then the system is known as
A. Trivariant B. Bivariant C. Invariant D. Monovariant

53. Which of the following pairs does NOT represent the chemical formula and its name?
A. KNO_3 – saltpeter C. KOH – caustic soda
B. $Na_2CO_3.10H_2O$ – washing soda D. $CaCO_3$ – marble

54. All of the followings are the properties of carboxylic acid. EXCEPT
A. Most carboxylic acids are soluble in water
B. The solubility in water decreases with increasing molecular mass
C. The boiling points of carboxylic acid is higher than alcohol with comparable mass
D. The higher carboxylic acids have little order than the lower carboxylic acid

55. The oxidation number of N in NH_3, NO_3^{1-}, NO_2, and N_2 are respectively.
A. -3, +5, +3 and 0 B. -3, +5, +4 and 0 C. +3, +5, +4 and 0
D. +3, +4, +3 and 0

56. Which of the following has the highest lattice energy?
A. MgI_2 B. $MgCl_2$ D. $MgBr_2$
C. MgF_2

57. A neutral molecule having a general formula AX_5 has one unshared pair of electron on A. What is the shape of a molecule?
A. Octahedral B. Square pyramidal C. Trigonal bipyramidal
D. T-shaped

58. Which of the following is NOT the characteristic of the equilibrium expression?
A. For a reaction written in reverse is the reciprocal of that for original reaction.
B. When the balanced equation for a reaction is multiplied by a factor of n, the equilibrium for a new reaction is the original expression raised to the n^{th} power
C. The units of kc are determined by the powers of the various concentration terms.
D. The equilibrium constant has the same value at various temperature.

59. In the electrolysis of brine with inert electrode. Which one of the following is NOT correct?
A. Chlorine gas is liberated through the anode C. Hydrogen gas is produced at the cathode
B. The solution has a basic property D. Sodium metal is deposited at the cathode

60. Two cells are connected in series. One contain $Mg(NO_3)_2$ and the other contain $CuSO_4$ as the electrolyte. What mass of copper is deposited when 0.6 gram of magnesium is deposited at the cathode? (At. Mass of Mg=24, Cu=64g)
A. 1.6g B. 0.23g D. 0.8g
C. 1.4g

61. The species that contain both Bronsted-Lowery acid-base concept is:
A. $H_2PO_4^{1-¿¿}$ B. HNO_3 D. $PO_4^{3-¿¿}$
C. $PH_4^{+¿¿}$

62. Given information

No.	Base	Kb value
I.	Ethylamine	$4.7x10^{-4}$
II.	Hydrazine	$1.7x10^{-6}$
III.	Methylamine	$4.4x10^{-4}$
IV.	Ammonia	$1.8x10^{-5}$

Which one of the following has highest conjugate acid of the above base?
A. I B. III D. II
C. IV

63. What volume of chlorine gas are produced at STP in the electrolysis of molten Aluminum chloride /$AlCl_3$/ by a current of 40A for 2hr? (At. Mass of Al = 27 , Cl = 35.5)
A. 23.6L B. 33.6L D. 35.6L
C. 30.6L

64. An indicator Bromceresol green has yellow colour in acidic form and Blue colour in basic form with Kin 1.0×10^{-6} and its PH value is 4.Then the colour of solution will be
A. Blue B. orange D. yellow
C. red

65. Which of the following species do NOT possess addition reaction?
A. C_3H_6 B. C_4H_6 D. C_6H_{14}
C. C_5H_{10}

66. The Hydrocarbon that used for furnace fuel is
A. Kerosine B. Gasoline C. Diesel oil D. Petroleum

67. Which substance is produced when ethyne gas is trimerized at high temperature?
A. Benzene B. Toluene C. Cyclohexane D. Trinitro toluene/T.N.T/

68. In the thermite welding process. Which one of the following powdered metal is used to react with Iron (III) Oxide? A. Magnesium B. Aluminum C. Silver D. Potassium

69. How many monomers units are there in 32,760 gram of polyethylene? (At. Mass of C=12, H=1)
A. 1260 B. 1170 C. 1520 D. 1280

70. If you want to plate out of iron fork with a silver metal, which one is CORRECT about electroplating process?
A. The silver metal must be placed at the cathode

B. The electrolyte must contain the ion of iron metal
C. The iron fork must be placed at the anode
D. The silver metal must be oxidized at the anode

71. Which one of the following is one of the ingredient to produce hard soap in the reaction of vegetable oil and animal fat?
A. caustic potash C. soda ash
B. caustic soda D. washing soda

72. All of the following substance is used in dry cleaning. EXCEPT.
A. Carbon tetrachloride C. Tetra chloro ethane
B. Chloroform D. Dichloro ethene

73. All of the following are causes of land pollution. EXCPET.
A. Harm full heavy metal ions buried waste leaching
B. Dumping of non biodegradable waste
C. large scale use of synthetic fertilizer
D. chlorofluoro carbon substance

74. In a particular experiment to prepare chloro benzene, when 10 gram of benzene reacts with 35.5 gram of chlorine, according to the equation $C_6H_6 + Cl_2 \rightarrow C_6H_5Cl + HCl$ How many mole of the reactant left over?
A. 0.2 mole C. 0.3 mole
B. 0.125 mole D. 0.5 mole

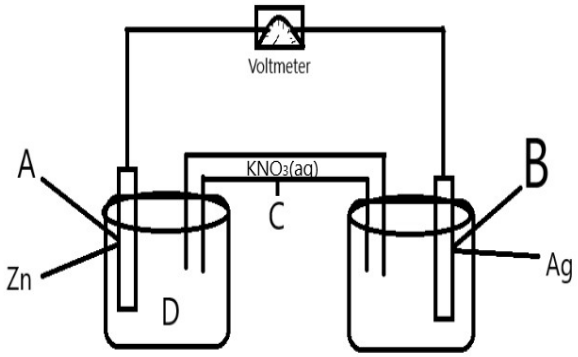
75. Which of the following alloys does NOT represent the exact components?
A. Stainless steel (Fe, Cr and Ni) B. Magnalium (Mg, Al, Cu and Mn)
C. Bronze (Cu and Sn) D. Aluminum bronze (Al and Cu)

76. When ethene decolorizes bromine in carbon tetra chloride. The product formed after the reaction is:
A. 1,2-dibromo ethane C. 1,1,2,2-tetra bromo ethane
B. 1,1-dibromo ethane D. 1,2-dibromo ethene

77. Which of the following classes of Hydrocarbons has the highest heat of combustion?
A. Alkane B. Aromatic hydrocarbon C. Alkene D. Alkyne

78. Which one of the following is NOT true about chemical bonding?
A. The attraction force between cation and anion gives electrovalent bond.
B. The attraction force between the bonding electrons and their nuclei gives covalent bond.
C. The attraction force between the cation of the metal and the delocalized electrons gives metallic bond.
D. The attraction force between ammonia molecules is a hydrogen bond.

79. Consider the voltaic cell diagram and answer the following question



E^0red Zn^{2+}/Zn = -0.76v

E^0red Ag^+/Ag = +0.80v

The letter A, B, C and D are represented respectively

A. Cathode, anode, salt bridge and electrolyte

B. Anode, cathode, salt bridge and electrolyte

C. Cathode, salt bridge, electrolyte and anode
D. Wire, anode, cathode and electrolyte
80. Based on question 79, which one of the following is NOT correct?
A. Electrons flow from A to B
B. Electrons flow from B to A
C. Oxidation reaction occur at A
D. The anion from a salt bridge migrate to D