

Chemistry, 2018 EC, entrance exam, version 2

Grade 12 · Chemistry · 2018 E.C.

Time allowed: 120 minutes**Questions:** 69**Total marks:** 69

Name _____ Grade _____ ID No. _____ Date _____

1. Which one is a step-growth polymer? (1)
A. Polyester B. PTFE
C. Polystyrene D. PVC
-
2. All of the following are thermoplastic polymers; except: (1)
A. Polyethylene B. Nylon
C. Bakelite D. Dacron
-
3. All of the following are addition polymer; except: (1)
A. Dacron B. PVC
C. Polypropylene D. PMMA
-
4. Which polymer is sold under the trade name Lucite or Plexiglas? (1)
A. PTFE B. PET
C. PMMA D. Nylon-66
-
5. Which one is the use of Teflon? (1)
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 _____ (1)
A. $\text{CH}_2 = \text{CH}_2$ B. $\text{CH}_2 = \text{CCl}_2$
C. $\text{CH}_2\text{Cl} - \text{CH}_2\text{Cl}$ D. $\text{CH}_2 = \text{CHCl}$
-
7. The compound $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ and $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2\text{COOH}$ react in the presence of an acid catalyst to form _____ (1)
A. carboxylic acid B. alcohol
C. ester D. aldehyde
-
8. Which one of the following classes of hydrocarbon is less reactive? (1)
A. Alkane B. Alkene
C. Alkyne D. Aromatic hydrocarbon
-
9. Alcohol that yield aldehyde on oxidation are classified as (1)
A. secondary alcohol B. primary alcohol
C. dihydric alcohol D. trihydric alcohol

-
10. During concentrating the ore; which method is chemical method? (1)
- | | |
|-----------------|-----------------------|
| A. Leaching | B. Froth floatation |
| C. Amalgamation | D. Gravity separation |
-
11. Roasting is generally done in case of the: (1)
- | | |
|------------------|-------------------|
| A. oxide ores | B. silicate ores |
| C. sulphide ores | D. carbonate ores |
-
12. Extraction of gold and silver involves leaching with CN^- ion. Silver is later recovered by: (1)
- | | |
|-----------------|-------------------------|
| A. distillation | B. zone refining |
| C. liquation | D. displacement with Zn |
-
13. What type of catalyst is used in the contact process? (1)
- | | |
|---------------------------|-------|
| A. V_2O_5 | B. Fe |
| C. Ni | D. Pt |
-
14. In the tanning process, the purpose of putting the skin into slaked lime solution is to: (1)
- | | |
|---|-----------------------------------|
| A. Facilitate the removal of unwanted flesh | B. Facilitate the removal of hair |
| C. Dehydrate the skin | D. Soften the skin |
-
15. Nylon-66 is obtained by condensation polymerization of (1)
- | | |
|--|--|
| A. Adipic acid and hexamethylene diamine | B. Terephthalic acid and ethylene glycol |
| C. Phenol and formaldehyde | D. Acrylic acid and ethane diol |
-
16. What is the purpose of adding cryolite during the extraction of aluminum from bauxite in the Hall process? (1)
- A. To get pure aluminum oxide
- B. To dissolve impurities like iron oxides
- C. To lower the melting point of crude bauxite
- D. To decrease the conductivity of bauxite
-
17. Salts that absorb water from the atmosphere and become solution are: (1)
- | | |
|-----------------|-----------------|
| A. deliquescent | B. efflorescent |
| C. hygroscopic | D. Florescent |
-
18. If a salt releases a reddish – brown gas upon heating with a disagreeable smell that turns moist blue litmus into red, which anion is most likely present in the salt? (1)
- | | |
|-------------|--------------|
| A. Bromide | B. Nitrate |
| C. Sulphate | D. Carbonate |
-
19. What is the molar mass of a polyethylene sample $[-\text{CH}_2 - \text{CH}_2-]_n$, when $n = 4600$? ($H = 1, C = 12$) (1)
- | | |
|--------------------------------------|--------------------------------------|
| A. $1.288 \times 10^3 \text{ g/mol}$ | B. $1.196 \times 10^4 \text{ g/mol}$ |
| C. $1.196 \times 10^3 \text{ g/mol}$ | D. $1.288 \times 10^5 \text{ g/mol}$ |
-
20. Which of the following quantum number is not permitted in sub-level notation? (1)
- | | |
|----------------------|----------------------|
| A. $n = 2, \ell = 0$ | B. $n = 3, \ell = 3$ |
| C. $n = 4, \ell = 3$ | D. $n = 1, \ell = 0$ |

21. Which salt yields a basic solution on dissolution in water? (1)
- A. Salts of strong acid & strong base B. Salts of weak acid & strong base
C. Salts of weak base & strong acid D. Salts of NaOH and HCl
-
22. Which pair of compounds forms a buffer solution? (1)
- A. KCl/HCl B. $\text{CH}_3\text{COONa}/\text{H}_2\text{SO}_4$
C. $\text{NaNO}_3/\text{HNO}_3$ D. $\text{NH}_4\text{Cl}/\text{NH}_3$
-
23. Which one of the following undergoes cation hydrolysis? (1)
- A. BaI_2 B. NaNO_3
C. MgSO_4 D. CH_3COONa
-
24. Which of the following devices is designed to produce electromagnetic radiation with the longest wavelength in order to operate? (1)
- A. Light bulb B. Microwave oven
C. X-ray microscope D. FM radio transmitter
-
25. Which group of elements have variable valence and make colored compound? (1)
- A. Transition elements B. Representative elements
C. Rare earth metals D. P – block elements
-
26. When $\text{Cr}_2(\text{SO}_4)_3$ changed to CrO_3 ; the oxidation number of Chromium: (1)
- A. Decrease as it undergo reduction B. Increase as it undergo reduction
C. Increase as it undergo oxidation D. Decrease as it undergo oxidation
-
27. What is the maximum number of electrons in $n = 5, m_l = -1$? (1)
- A. 6e B. 12 e
C. 8 e D. 32e
-
28. What is the oxidation number of "Cr" in the ionic compound ammonium dichromate, $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$? (1)
- A. +3 B. +7
C. +6 D. +5
-
29. A metal corrodes if; (1)
- A. It serve as cathode in the corrosion process
B. It does not react with oxygen
C. It serve as anode in the corrosion process
D. It is plated with corrosion resistant metal
-
30. What is E° for the following balanced reaction? Use the information given below. $4\text{H}^+(\text{aq}) + \text{Fe}(\text{s}) + \text{NO}_3^-(\text{aq}) \rightarrow \text{Fe}^{3+}(\text{aq}) + \text{NO}(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$ I. $\text{NO}_3^- + 4\text{H}^+ + 3\text{e}^- \rightarrow \text{NO} + 2\text{H}_2\text{O}$ $E^\circ_{\text{red}} = +0.960 \text{ V}$ II. $\text{Fe}^{3+} + 3\text{e}^- \rightarrow \text{Fe}$ $E^\circ_{\text{red}} = -0.771 \text{ V}$ (1)
- A. +0.189 V B. -0.189 V
C. -1.731 V D. +1.731 V

31. The pH of an aqueous sodium fluoride (NaF) solution is _____ because _____ (1)
- 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
32. The substance formed at the anode during the electrolysis of dilute sodium chloride is: (1)
- A. Hydrogen
B. Chlorine
C. Sodium
D. Oxygen
33. The percentage dissociation of a 0.20 M formic acid is 3.2%. What is its dissociation constant? (1)
- A. 2.1×10^{-2}
B. 9.6×10^{-8}
C. 2.1×10^{-4}
D. 1.1×10^{-6}
34. The following reaction occurs in basic solution. Identify the oxidizing agent. Note the reaction equation is not balanced. $\text{H}_2\text{O}(\text{l}) + \text{Zn}(\text{s}) + \text{NO}_3^-(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{Zn}(\text{OH})_4^{2-}(\text{aq}) + \text{NH}_3(\text{aq})$ (1)
- A. Zn(s)
B. $\text{NO}_3^-(\text{aq})$ (the nitrogen)
C. $\text{H}_2\text{O}(\text{l})$ (the oxygen)
D. $\text{NH}_3(\text{aq})$ (the nitrogen)
E. $\text{OH}^-(\text{aq})$
35. In the electrochemical reaction: $2\text{Fe}^{3+} + \text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{Fe}^{2+}$, on increasing the concentration of Fe^{2+} (1)
- A. increases cell emf
B. decreases the cell emf
C. increases the current flow
D. alters the pH of the solution
36. One of the differences between a voltaic cell and an electrolytic cell is that in an electrolytic cell ____ (1)
- 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
37. The highest electrical conductivity of the following aqueous solutions is of (1)
- A. 0.1 M Sugar
B. 0.1 M MgCl_2
C. 0.1 M AlCl_3
D. 0.1 M Ca_3N_2
38. In a solution of CuSO_4 how much time will be required to precipitate 2 g copper by 0.5 ampere current? (1)
- A. 12157.48 sec
B. 102 sec
C. 510 sec
D. 642 sec
39. 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) (1)
- A. KBr and NaI only
B. Both FeCl_2 and NiBr_2
C. FeCl_2 only
D. NiBr_2 only

50. How many sigma & pi bond are there in $\text{CH}_3\text{-CN}$ molecule respectively? (1)
- A. 4σ & 2π B. 3σ & 2π
C. 4σ & 3π D. 5σ & 2π
51. Which of the following four molecules is/are polar: PH_3 , OF_2 , HF , SO_3 ? (1)
- A. Only HF and SO_3 B. Only HF
C. Only HF and OF_2 D. PH_3 , OF_2 and HF
52. What is the hybridization of the central atom in the BCl_3 molecule? (1)
- A. sp B. sp^2
C. sp^3 D. sp^3d^1
53. What are the bond angles in NO_3^- ? (1)
- A. 90° B. 109.5°
C. 120° D. 90° and 120°
54. What is the hybridization of the carbon atoms in ethyne, C_2H_2 ? (1)
- A. sp^2 B. sp^3d
C. sp^3 D. sp
55. The hybridization associated with the central atom of a molecule in which all the bond angles are 120° is: (1)
- A. sp B. sp^2
C. sp^3 D. sp^3d
56. The central atom in a molecule has three regions of high electron density. What type of hybrid orbitals are formed by the central atom? (1)
- A. sp^2 B. sp^3d
C. sp^3 D. sp^3d^2
57. Which of the following species has a linear shape? (1)
- A. I_3^- B. SO_2
C. O_3 D. ClO_2
58. Silicon dioxide (SiO_2) and diamonds are best described as (1)
- 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
59. Which molecular structure will have the bond angle of 120° around the central atom? (1)
- A. Triangular planar B. Seesaw
C. Triangular bipyramid D. Octahedral
60. A molecule with five bonding pair and one lone pair electron has (1)
- A. octahedral shape B. trigonal bipyramid shape
C. square pyramid shape D. tetrahedral shape

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61. The bond angle in H_2O is (1)
- A. $\approx \text{BeCl}_2$ B. $< \text{NH}_4^+$
C. $> \text{CO}_2$ D. $> \text{BF}_3$
-
62. Which of the following is true regarding the concentration of products, for a chemical reaction that is already at equilibrium, assuming no disruptions to the equilibrium? (1)
- 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.
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63. For the chemical equilibrium $\text{A} + 2\text{B} \rightleftharpoons 2\text{C}$, the value of the equilibrium constant, K_c , is 16. What is the value of the equilibrium constant for the following reaction? $\frac{1}{2}\text{A} + \text{B} \rightleftharpoons \text{C}$, $K_c = ?$ (1)
- A. 4.0 B. 0.20
C. 40 D. 400
-
64. For the reaction $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$; $\Delta H = +14 \text{ kJ}$. The extent of the reaction can be increased by: (1)
- A. Increasing the pressure B. Using a catalyst
C. Increasing the temperature D. Introduce inert gas at constant volume
-
65. In which of the following cases the reaction goes farthest to completion? (1)
- A. $K_c = 10^{-2}$ B. $K_c = 10^3$
C. $K_c = 10^2$ D. $K_c = 10^{-3}$
-
66. Which of the following statements is true about an ideal gas? It is a hypothetical gas that obeys the gas laws (1)
- A. at low temperature and low pressure
B. at low temperature and high pressure
C. closely at high temperatures and low pressures
D. closely at high temperatures and high pressures
-
67. 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 " SO_2 " is 64) (1)
- A. 21.16 B. 36.57
C. 48 D. 96
-
68. During a phase change, the temperature of a substance (1)
- A. increases. B. stays the same.
C. decreases. D. Unknown
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69. Which one of the following items does not characterize an oxidizing agent? (1)
- 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 Mn^{7+} .
E. An example of a good oxidizing agent is an alkali metal, such as Na.