



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



SENE 2012/JUNE 2020

NUMBER OF QUESTIONS 80, TIME ALLOWED 90 MUNITES

GENERAL DIRECTIONS

THIS BOOKLET CONTAINS **CHEMISTRY** EXAMINATION.
IN THIS EXAMINATION, THERE ARE A TOTAL OF **80**
MULTIPLE CHOICE QUESTIONS. CAREFULLY SELECT THE
BEST ANSWER AND **BLACKEN** ONLY THE LETTER OF YOUR
CHOICE ON THE SEPARATE ANSWER SHEET PROVIDED.



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



DIRECTION: Each of the following questions is followed by four possible alternatives. Read each question carefully and **BLACKEN** the letter of your choice on the answer sheet provided.

- _____ 1. Which of the following numbers has six significant figures?
A. 40.6402 B. 0.04404 C. 0.002802 D. 42200
- _____ 2. Which of the following electromagnetic radiations has the largest energy?
A. X-ray B. UV-ray C. Gamma-ray D. Radio-wave
- _____ 3. One of the following is **not** true about alpha (α) particles?
A. They have a mass that is about four times that of a hydrogen atom.
B. The particle is doubly ionized of helium atom.
C. They have a charge twice the magnitude of electrons.
D. It is a form of energy but not a form of matter.
- _____ 4. How many orbitals are allowed for $n = 2$?
A. Six B. Four C. Nine D. Seven
- _____ 5. One of the following quantum number is not allowed in the hydrogen atom?
A. $n=1, l=0, m_l=0$
B. $n=2, l=1, m_l=1$
C. $n=8, l=7, m_l=6$
D. $n=2, l=0, m_l=2$
- _____ 6. Which branch of chemistry studies thermal, electrical, magnetic behaviour and their interaction with electromagnetic fields?
A. Organic Chemistry C. Physical Chemistry
B. Inorganic Chemistry D. Analytical Chemistry
- _____ 7. Which one of the following is not a measurable physical quantity?
A. Density B. Hardness C. Solubility D. Boiling point
- _____ 8. In which pair of the elements do the nuclei of atoms contain the same number of neutrons?
A. $^{24}\text{Mg}_{12}$ and $^{35}\text{Cl}_{17}$ C. $^{40}\text{Ar}_{18}$ and $^{30}\text{P}_{15}$
B. $^{39}\text{K}_{19}$ and $^{40}\text{Ca}_{20}$ D. $^{32}\text{S}_{16}$ and $^{30}\text{O}_{16}$
- _____ 9. Which set of quantum numbers is not permitted by the rules of quantum mechanics?
A. 2, -1, 1, -1/2 C. 4, 4, 2, 1/2
B. 4, 3, 2, 1/2 D. 2, 1, -1, -1/2
- _____ 10. Which of the following should have the smallest atomic radius?
A. Mg^{2+} B. Al^{3+} C. P D. F^-
- _____ 11. Which of the following is the correct electron configuration of $^{52}\text{Cr}_{24}$?
A. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
B. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^3$
C. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



- D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$
- _____ 12. Calculate the wave length of the third line paschen series from hydrogen?
A. $1.09 \times 10^{-6} \text{ m}$ C. $2.6 \times 10^{-4} \text{ nm}$
B. $2.6 \times 10^{-9} \text{ nm}$ D. $6.2 \times 10^{-6} \text{ nm}$
- _____ 13. Which one of the following factors does **not** affect the rate of chemical zero order reaction?
A. Catalyst B. Temperature
C. Surface area of reactants D. concentration of reactants
- _____ 14. One of the following does not obey the octet rule?
A. CO_2 B. BF_3 C. HNO_3 D. HClO_3
- _____ 15. Which one of the following is the strongest acid?
A. HClO_2 B. HClO_4 C. HClO_3 D. HClO
- _____ 16. Which one of the following molecules has a trigonal pyramidal molecular geometry?
A. BH_3 B. NH_3 C. BCl_3 D. ClF_3
- _____ 17. According to the molecular orbital theory, which one of the following molecules has a diamagnetic property?
A. NO B. O_2 C. O_2^{2-} D. B_2^+
- _____ 18. One of the following is **not** true for the half-life of a reaction?
A. Half-life depends on the initial concentration of a reactant for zero order reaction.
B. Half-life for first order reaction does not depend on the initial concentration of the reaction.
C. Half-life depends on the initial concentration of a reactant for second order reaction.
D. None of the above.
- _____ 19. What is the normality of a solution prepared by dissolving 6g of KNO_3 in water and diluting the solution to 250ml? (molar mass = $\text{KNO}_3 = 101 \text{ g/mol}$, $\text{H}_2\text{O} = 18 \text{ g/mol}$)
A. 0.24N B. 0.25N C. 0.6N D. 0.7N
- _____ 20. One of the following is **not** true about an ideal solution?
A. The heat of the solution is zero.
B. The solution deviates from Raoult's law.
C. The volume of the ideal solution is the sum of the volume of its components.
D. The components have similarity in their chemical structure.
- _____ 21. Which law relates the concentration of dissolved gas(cg) to its partial pressure?
A. Ideal gas Law C. Henry's Law
B. Charles's Law D. Raoult's Law
- _____ 22. What is the concentration of a solution parts per million (ppm), if 0.02g of Na_3PO_4 ?
A. 0.02ppm B. $1.99 \times 10^{-2} \text{ ppm}$ C. $1.99 \times 10^2 \text{ ppm}$ D. $0.002 \times 10^{-3} \text{ ppm}$
- _____ 23. Calculate the equivalent mass of H_2SO_4 , when H_2SO_4 is converted to HSO_4^- as follows:
$$\text{H}_2\text{SO}_4 \rightleftharpoons \text{H}^+ + \text{HSO}_4^-$$



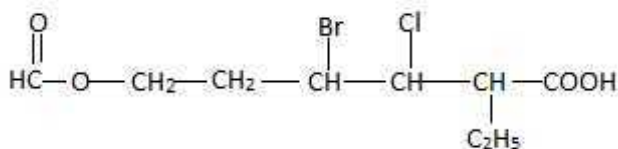
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GRADE - 12 CHEMISTRY MODEL EXAMINATION



- A. 49 B. 98 C. 32 D. 48
- _____ 24. If 0.1m of CaSO_4 solution causes an elevation of 0.042°C in the boiling point of water. What is the Van't Hoff factor (i) for this solution? ($K_{b_{\text{water}}} = 0.51^\circ\text{C/m}$)
- A. 0.082 B. 0.051 C. 0.0026 D. 0.11
- _____ 25. How many grams of NH_3 can be prepared from 77.3g of N_2 and 14.1g of H_2 gas?
- A. 13g B. 46.9g C. 79.9g D. 93.9g
- 26. Aluminium hydroxide reacts with HCl of stomach acid from water and aqueous AlCl_3 . How many grams of HCl is read with 2.5g of $\text{Al}(\text{OH})_3$?
- A. 1.17g B. 2.34g C. 3.51g D. 7.02g
- _____ 27. Which of the following liquid pairs show a negative deviation from Raoult's Law?
- A. $\text{CH}_3\text{CH}_2\text{CH}_2$ and H_2O B. CH_3COOH and CCl_4
C. C_6H_4 and CCl_4 D. CH_3OH and CH_4
- _____ 28. Consider the equilibrium:
- $$\text{H}_2(\text{g}) + \text{CO}_2 \rightleftharpoons \text{H}_2\text{O}(\text{g}) + \text{CO}(\text{g}),$$
- For which enthalpy change (ΔH) for this reaction is equal to +54 KJ. How is the amount of H_2 affected in the system?
- A. Increase in temperature decreases the amount of H_2 .
B. Addition of a catalyst increases the amount of H_2 .
C. Addition of a catalyst decreases the amount of H_2 .
D. All of the above
- _____ 29. One of the following is **not** the function of phase diagram?
- A. It is used to determine melting point, boiling point and sublimation, temperature and pressure.
B. It does not predicate the phase change.
C. It is used to determine the phase of a system at a given temperature and pressure.
D. It is used to determine the critical and the triple points of pressure and temperature.
- _____ 30. For the reaction
- $$\text{SO}_2(\text{g}) + \frac{1}{2} \text{O}_2(\text{g}) \rightleftharpoons \text{SO}_3(\text{g}) \quad k_1 = 56.6 \text{ at } 300^\circ\text{C}.$$
- Determine the value of K_c for the following reaction at the same temperature?
- $$2\text{SO}_3(\text{g}) \rightleftharpoons 2\text{SO}_2(\text{g}) + \text{O}_2(\text{g})$$
- A. 3.2×10^{-4} B. 2×10^{-3} C. 0.04 D. 2×10^{-6}
- _____ 31. What is the IUPAC name of the following carboxylic acid?



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



- A. 4-Bromo-2-Ethyl-3-Chloro-Octanedioic acid.
B. 5-Bromo-4-Chloro-Octanedioic acid.
C. 4-Bromo-2-Ethyl-3-Chloro-heptadioic acid.
D. 4-Bromo-6-Ethyl-5-Chloro-heptadioic acid.
- _____ 32. Which one of the following carboxylic acid has the highest solubility in water?
A. CH_3COOH C. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
B. HCOOCOOH D. $\text{HCOOCH}_2\text{CH}_2\text{CH}_2\text{COOH}$
- _____ 33. All of the following are Arrhenius base except _____ ?
A. $\text{KOH} + \text{H}_2\text{O} \rightarrow \text{K}^+ + \text{OH}^-$
B. $\text{NaCO}_3 + \text{H}_2\text{O} \rightarrow \text{Na}^+ + \text{CO}_3^{2-}$
C. $\text{LiOH} + \text{H}_2\text{O} \rightarrow \text{Li}^+ + \text{OH}^-$
D. $\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4^+ + \text{OH}^-$
- 34. From the following given reaction,
 $\text{H}_2\text{SO}_4 + \text{CH}_3\text{NH}_2 \rightarrow \text{H}_2\text{SO}_4^- + \text{CH}_3\text{NH}_2^+$, CH_3NH_2 acts as a _____ ?
A. Conjugate Base C. Conjugate Acid
B. Base D. Acid
- _____ 35. The K_a values of an acid A, B, C and D are: 2×10^{-6} , 2.1×10^{-2} , 2×10^{-5} and 1.6×10^{-10} respectively. Which one is the strongest acid?
A. B B. C C. D D. A
- _____ 36. Calculate the dissociation constant of an acid (K_a) when 0.2M of a weak acid is ionized to $1.6 \times 10^{-3}\text{M}$?
A. 1.28×10^{-5} B. 1.6×10^{-12} C. 1.8×10^{-5} D. 2.6×10^{-6}
- _____ 37. Which one of the following is not amphoteric species?
A. HSO_4^- B. H_2O C. HCO_3^- D. HCl
- _____ 38. One of the following is **not** the effect of common ion?
A. It shifts the equilibrium.
B. It suppresses the ionization of a weak acid or a weak base.
C. It increases the dissociation of a weak acid or a weak base.
D. None of the above.
- _____ 39. What is the spectator ion in the given reaction below?
 $\text{KCl}(\text{aq}) + \text{Ca}(\text{NO}_3)_2(\text{aq}) \rightarrow \text{CaCl}_2(\text{s}) + \text{KNO}_3(\text{aq})$
A. Ca^{+2} and NO_3^- C. Ca^{+2} and Cl^-
B. K^+ and NO_3^- D. K^+ and Cl^-
- _____ 40. Calculate the POH of a buffer solution, containing 0.1M of NH_3 and 0.1M of NH_4Cl solution, when 1 ml of KOH is added to 100ml of the buffer solution?
A. 9.7 B. 4.73 C. 5.5 D. 9



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



- _____ 41. A 25 ml sample of 0.5M acetic acid (CH_3COOH) is titrated with 0.5M of NaOH solution. What is the PH of the solution before addition of any NaOH? ($k_a = 1.8 \times 10^{-5}$)
- A. 1.6 B. 2.28 C. 2.58 D. 3.17
- _____ 42. What is the quantity of heat absorbed by 50 Kg of rocks if their temperature is increased by 12°C ? (Specific heat of a rock = 0.825 J/g K)
- A. $4.9 \times 10^5 \text{ J}$ B. $4.18 \times 10^4 \text{ J}$ C. $4.5 \times 10^9 \text{ J}$ D. $6.5 \times 10^6 \text{ J}$
- _____ 43. Which system can exchange energy but not mass across its boundary?
- A. Open System C. Isolated System
B. Closed System D. State Function
- _____ 44. What is the POH of the solution containing,
 $[\text{H}_3\text{O}^+] = 1 \times 10^{-4} [\text{OH}]$?
- A. 9 B. 5 C. 6 D. 8
- _____ 45. Which of the following buffer solutions has a PH value less than 7?
- A. $\text{CH}_3\text{COOH} \mid (\text{CH}_3\text{COO})_2\text{Ca}$ C. $\text{NH}_4\text{OH} \mid \text{NH}_4\text{Cl}$
B. $\text{H}_2\text{SO}_4 \mid \text{Na}_2\text{SO}_4$ D. $\text{HCN} \mid \text{NaCN}$
- _____ 46. The standard enthalpies formation for N_2O , C_3H_8 , CO_2 and H_2O are 82, -104, -393.5 and -242KJ/mol respectively. What is the standard enthalpy change for the reaction?
- $10\text{N}_2\text{O} (\text{g}) + \text{C}_3\text{H}_8 \rightarrow 10\text{N}_2 (\text{g}) + 3\text{CO}_2 + 4\text{H}_2\text{O} (\text{g})$
- A. 2864.5 KJ B. 2648.5 KJ C. -2863.5 KJ D. -2864.5 KJ
- _____ 47. What is the change in the internal energy for the process in which the system absorbs 102J of heat and 22J of work is done by the surrounding?
- A. 80J B. 124J C. 78J D. -80J
- _____ 48. In a chemical process both ΔH and ΔS have values greater than zero. At what condition the reaction would be spontaneous?
- A. $\Delta H > T\Delta S$ C. $\Delta H - \Delta TS = 0$
B. $T\Delta S = \Delta H$ D. $\Delta H < T\Delta S$
- _____ 49. Which one of the following polymer, monomer is wrongly matched?
- A. Perspex - methyl methacrylate
B. PUC - chloro ethane.
C. Teflon - propylene
D. Cellulose - B-glucose
- _____ 50. Which one of the following is more abundant among organic molecules?
- A. Cellulose B. Glucose C. Starch D. Proteins
- _____ 51. Which is the sign of entropy change for sublimation of iodine?
- A. Positive B. Negative C. Zero D. No charge
- _____ 52. What is the change in internal energy when 2 moles of CO is converted to 2 moles of CO_2 at 1 atm at 25°C ? ($R = 8.314 \text{ J/mol K}$)
- $2\text{CO} (\text{g}) + \text{O}_2 (\text{g}) \rightarrow 2\text{CO}_2 (\text{g}) \quad \Delta H = -566 \text{ KJ}$



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



- A. 563.5 KJ B. -565.5 KJ C. 890.5 KJ D. -56 KJ
- _____ 53. What is the mass of 2 molecules of NH_3 ?
A. $2.6 \times 10^{23} \text{g}$ B. $5.6 \times 10^{-23} \text{g}$ C. $-5.6 \times 10^{23} \text{g}$ D. $2.6 \times 10^{-23} \text{g}$
- _____ 54. Which is the sign of entropy change for sublimation of iodine?
A. 600ml B. 400ml C. 120ml D. 1200ml
- _____ 55. What is the enthalpy change (ΔH) for the overall reaction of,
 $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$, from the following given reactions?
1. $\text{C}(\text{s}) + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_4(\text{g})$, $\Delta H_1 = -1600 \text{KJ}$
2. $2\text{O}^{2-}(\text{g}) \rightarrow \text{O}_2(\text{g})$, $\Delta H_2 = -490 \text{KJ}$
3. $\text{H}_2(\text{g}) + \text{O}^{2-}(\text{g}) \rightarrow \text{H}_2\text{O}(\text{g})$, $\Delta H_3 = -930 \text{KJ}$
4. $\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$, $\Delta H_4 = -1610 \text{KJ}$
5. $\text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_2\text{O}(\text{g})$, $\Delta H_5 = 44 \text{KJ}$
- A. -1468 KJ B. -228.6 KJ C. +1468 KJ D. +228.76 KJ
- 56. One of the following is a non-reduction-oxidation reaction?
A. $2\text{AgNO}_3 + \text{Zn} \rightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$
B. $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
C. $\text{NaCl} + \text{KNO}_3 \rightarrow \text{NaNO}_3 + \text{KCl}$
D. $3\text{H}_2\text{S} + 2\text{HNO}_3 \rightarrow 3\text{S} + 2\text{NO} + 4 \text{H}_2\text{O}$
- _____ 57. In the given reaction which substance is a reducing agent?
 $\text{C} + 2\text{N}_2\text{O} \rightarrow \text{CO}_2 + 2\text{N}_2$
A. N_2O B. CO_2 C. N_2 D. C
- _____ 58. How many moles of chloride ions are present in 100ml of 0.5M Calcium chloride (CaCl_2)?
A. 0.05 B. 0.1 C. 0.02 D. 0.6
- _____ 59. One of the following is false about the strength of acid?
A. The larger value of $\text{P}k_a$, the weaker the acid.
B. The larger value of k_a , the stronger the acid.
C. The larger value of $\text{P}k_a$, the stronger the acid.
D. The greater amount of hydrogen ions, the stronger the acid.
- _____ 60. One of the following molecules cannot form hydrogen bonding?
A. NH_3 B. CH_3OH C. CH_4 D. HF
- _____ 61. An alternative special case in which a system exchanges no heat with the surrounding is?
A. Adiabatic process C. Isothermal process
B. Isobaric process D. Isotonic process
- _____ 62. In titration process of a weak acid with strong base, at equivalent point the solution has _____ property.
A. Acidic C. Neutral
B. Basic D. Either acidic or basic
- _____ 63. In what condition does the change in enthalpy equals the amount of heat gained or lost?



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



- A. When the pressure is increased.
B. At constant pressure.
C. When the temperature is increased.
D. At constant temperature.
- _____ 64. One of the following is not true about alkaline battery?
A. The anode is zinc metal.
B. The electrolyte is basic.
C. It is cheaper than leclanche cell.
D. Cathode is manganese dioxide.
- _____ 65. Which one of the following is the correct cell notation of
 $\text{Al(s)} + \text{Cu}^{+2}(\text{aq}) \rightarrow \text{Cu(s)} + \text{Al}^{+3}(\text{aq})$
A. $\text{Al} \mid \text{Al}^{+3} \parallel \text{Cu} \mid \text{Cu}^{+2}$
B. $\text{Al} \mid \text{Al}^{+3} \parallel \text{Cu}^{+2} \mid \text{Cu}$
C. $\text{Cu} \mid \text{Cu}^{+2} \parallel \text{Al}^{+3} \mid \text{Al}$
D. $\text{Cu} \mid \text{Cu}^{+2} \parallel \text{Al} \mid \text{Al}^{+3}$
- _____ 66. An electrochemical cell constructed for the reaction of
 $\text{Mg(s)} + 2\text{Ag}^{+}(\text{aq}) \rightarrow \text{Mg}^{+2}(\text{aq}) + 2\text{Ag(s)}$ has a $E^{\circ}_{\text{cell}} = 3.17\text{v}$ and the standard reduction potential for $\text{Ag}^{+}(\text{aq})$ is 0.8v. What is the E_{red} of $\text{Mg}^{+2}(\text{aq})$?
A. -0.14v B. +2.37v C. -2.37v D. -0.8v
- _____ 67. One of the following substances does not transfer electricity?
A. $\text{CaCl}_2(\text{s})$ B. $\text{HNO}_3(\text{aq})$ C. $\text{NaCl}(\text{aq})$ D. Graphite
- _____ 68. An aqueous solution of 0.001M HCl is ionized into its cations and anions. What is the PH of this solution?
A. 10 B. 4 C. 3 D. 11
- _____ 69. What are the expected producers of electrolysis of an aqueous solution of concentrated sodium chloride?
A. Hydrogen is oxidized at the anode
B. Sodium is reduced at the cathode
C. Chlorine is oxidized at the anode
D. Oxygen is oxidized at the anode
- _____ 70. When electricity is passed through aqueous solution of calcium fluoride 12 grams of calcium is deposited at the cathode.
What must be the number of faradays in this solution? (Molar mass of Ca: 40 g/mol, Cl: 35.5 g/mol)
A. 2F B. 0.6F C. 0.8F D. 2.6F
- _____ 71. What mass of copper (II) is produced in 2 hours by the electrolysis of molten CuCl_2 with a current of 12 ampere (A)? (Molar mass Cu: 64 g/mol, Cl: 35.5 g/mol)
A. 28.65g B. 22.41g C. 2.81g D. 64.90g
- _____ 72. One of the following is the 3rd abundant metallic element?
A. Si B. Al C. Fe D. Ca
- _____ 73. From the following given elements, which one is the least reactive?



DEJAZMACH WONDIRAD PREPARATORY SCHOOL
GRADE - 12 CHEMISTRY MODEL EXAMINATION



- A. Mn B. Au C. Cu D. Zn
- _____ 74. The conversion of nitrogen into compound is called?
A. De-nitrification
B. Nitrogen Fixation
C. Deforestation
D. All of the above
- _____ 75. Which one of the following is not the property of thermo-setting plastics?
A. They are long chain linear polymers.
B. They are hard and strong.
C. They cannot be recycled
D. They have cross-linked structure
- _____ 76. One of the following is different from others?
A. Maltose B. Glucose C. Cellulose D. Lactose
- _____ 77. Which one of the following is a natural polymer?
A. Nylon B. Glycogen C. Polyester D. Bakelite
- _____ 78. The chemical formula of cinnabar is?
A. ZnS B. HgS C. Cu₂S D. PbS
- _____ 79. 0.2 moles of KNO₃ is dissolved in 8 moles of water. Calculate the mole fraction of cations in this solution?
A. 8.41 B. 0.22 C. 0.95 D. 0.02
- _____ 80. Which one of the following solutions will have the lowest freezing point?
A. Ammonium Chloride C. 4-4-dimethyl heptane
B. Sodium Sulphate D. Magnesium bromide

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Good Lack
Stay at Home!