Kuwait University
Office of Assistant Vice President for Evaluation and Measurement

Academic Aptitude Tests

Student Name		Version
		A

Civil ID No.

Instructions:

1. The aptitude tests consist of three tests.

Test	Number of Questions	Time
English	85	1 Hour
Mathematics	20 (No Calculator)	1 Hour
Chemistry	25	1 Hour

2. Mark all your answers on the **Answer Sheet** and in the proper section**.** On your answer sheet as shown below, using a pencil, darkenthe proper circle.

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3. Verify all personal and test data on answer sheet and don't make any changes unless approved by the proctor.
4. Write down your name and Civil ID# on the test booklet.
5. Copy the test's version on your answer sheet.
6. Follow the proctor's instruction during the test.
7. During testing, be quite and avoid any cheating situation.
8. Observe the allocated and the announced time for each test.

Chemistry Test

Gram Atomic Mass (g/mol):

Hydrogen   (H)   = 1.0
Oxygen   (O)   = 16.0
Flourine   (F)   = 19.0
Aluminum   (Al)   = 27.0
Sulfur   (S)   = 32.1
Potassium   (K)   = 39.1

Atomic Number:

Hydrogen   (H)   = 1
Carbon   (C)   = 6
Flourine   (F)   = 9
Sodium   (Na)   = 11
Chlorine   (Cl)   = 17
Argon   (Ar)   = 18
Iron   (Fe)   = 26
Iodine   (I)   = 53

Physical Constant:

Ion product constant for water (K_w) at 25 °C = 1,00 x 10^{-14}

Avogadro´s number (N_A) = 6.02 x 10^{23} / mole

1. A simple laboratory test to distinguish between aqueous solutions of sodium chloride (NaCl) and potassium nitrate (KNO_3) is to use an aqueous solution of ………………………

   (a) potassium chloride (KCl)
   (b) silver nitrate ($AgNO_3$)
   (c) hydrochloric acid (HCl)
   (d) nitric acid (HNO_3)

2. The chemical name of the polyatomic anion ($P_2O_7^{4-}$) is:

   (a) Pyrophosphate
   (b) Phosphite
   (c) Sulphate
   (d) Hydrogen phosphate

3. Which of the following molecules is given the wrong chemical formula?

   (a) Hydrogen sulfide (H_2S)
   (b) Water (H_2O)
   (c) Carbon disulfide (CS_2)
   (d) Carbon dioxide (Cd)

4. $Mg_3N_2(s)$ + $8HCl(aq)$ $\longrightarrow$ $3MgCl_2(aq)$ + $2NH_4Cl(aq)$
   According to the above balanced chemical equation, the correct mole ratio is:

   (a) 3 mole $MgCl_2(aq)$ to 8 mole $Mg_3N_2(s)$
   (b) 2 mole $NH_4Cl(aq)$ to 8 mole $Mg_3N_2(s)$
   (c) 1 mole $Mg_3N_2(s)$ to 3 mole $MgCl_2(aq)$
   (d) 3 mole $MgCl_2(aq)$ to 2 mole $Mg_3N_2(s)$

5. Which of the following chemical formulas contains the highest mass of sulfur (S)?

   (a) $Al_2(SO_4)_3$
   (b) $Al_2(S_2O_3)_3$
   (c) $Ce(HSO_4)_4$
   (d) $(NH_4)_2S_2O_8$

6. Which of the following chemical substances produces an acidic solution when added to water ?

   (a) KCl
   (b) Na
   (c) SO_2
   (d) $Ba(OH)_2$

7. If the solubility of potassium flouride (KF) at 18 °C is 92 g / 100 g water, then a solution in which 105 g (KF) are dissolved in 100 g water will be …………

   (a) Unsaturated
   (b) Supersaturated
   (c) Saturated
   (d) Colloidal

8. HCOOH(aq) $\rightleftharpoons$ H$^+$(aq) + HCOO$^-$(aq)

Which of the following equations is used to calculate the acid dissociation constant (K_a) of formic acid (HCOOH)?

(a) $K_a = $ [HCOO$^-$] [H$^+$] / [HCOOH]
(b) $K_a = $ [HCOOH] / [HCOO$^-$] [H$^+$]
(c) $K_a = K_w$ / [H$^+$]
(d) $K_a = $ [HCOOH] [HCOO$^-$] [H$^+$]

9. Which of the following organic compounds is an aldehyde?

(a) $H_2NCH_2CO_2H$
(b) C_4H_{10}
(c) $CH_3CH_2CONH_2$
(d) CH_3CH_2CHO

10. When ammonia (NH_3) is dissolved in water, it.....................................

(a) Ionizes completely
(b) Turns blue litmus paper to red
(c) Forms weakly basic solution
(d) Produces protons

11. Which of the following reactions is a double displacement reaction?

(a) $2Al(s) + 3H_2SO_4(aq) \longrightarrow Al_2(SO_4)_3(aq) + 3H_2(g)$
(b) $2P(s) + 3Cl_2(g) \longrightarrow 2PCl_3(g)$
(c) $2NaN_3(s) \longrightarrow 2Na(s) + 3N_2(g)$
(d) $Pb(NO_3)_2(aq) + 2NH_4Cl(aq) \longrightarrow PbCl_2(s) + 2NH_4NO_3(aq)$

12. In the oxidation /reduction reaction of hydrogen sulfide (H_2S) with nitric acid (HNO_3), the element whose oxidation number changes from (-2) to (0) is:

$3H_2S(g) + 2HNO_3(aq) \longrightarrow 3S(s) + 2NO(g) + 4H_2O(l)$

(a) Nitrogen (N)
(b) Oxygen (O)
(c) Sulfur (S)
(d) Hydrogen (H)

13. Which of the following hydrocarbon compounds contains single covalent bonds in addition to a double cavalent bond?

(a) C_5H_8
(b) C_4H_8
(c) C_4H_6
(d) C_5H_{12}

14. Which of the following electronic configurations is acceptable for the cation (Fe^{3+})?

(a) [Ar]3d^5
(b) [Ar]3d^6
(c) [Ar]3d^3
(d) [Ar]3d^8

15. Which of the following contains a polar covalent bond?

    (a) Sodium chloride (NaCl)
    (b) Iodine molecule (I_2)
    (c) Methane gas molecule (CH_4)
    (d) Hydrogen flouride molecule (HF)

16. $\mathbf{m}BaCl_2(aq) + \mathbf{p}Na_3PO_4(aq) \longrightarrow \mathbf{q}Ba_3(PO_4)_2(aq) + \mathbf{r}NaCl(aq)$

    When the equation of the above chemical reaction is balanced, the values of the coefficients (**m, p, q, r**) are:

	m	p	q	r
(a)	3	2	1	6
(b)	1	2	6	3
(c)	6	3	2	1
(d)	2	3	1	6

17. A graduated cylinder contains 35.5 cm^3 of water. What is the reading of the level of water after 19.0 g of silver metal is submerged in the water?
    [density of silver = 10.5 g / cm^3]

    (a) 0.553 cm^3 (c) 35.5 cm^3
    (b) 1.81 cm^3 (d) 37.3 cm^3

18. Which of the following is a buffer solution?

    (a) Aqueous solution of (strong base + weak base)
    (b) Aqueous solution of (strong base + salt of this base)
    (c) Aqueous solution of (weak acid + salt of this acid)
    (d) Aqueous solution of (strong acid + salt of this acid)

19. $Fe_2O_3(s) + 3H_2(g) \rightleftharpoons 2Fe(s) + 3H_2O(g)$
    What is the equilibrium constant expression for the above equilibrium system?

    (a) $K_p = [H_2O]^3 [Fe]^2 / [Fe_2O_3] / [H_2]^3$ (c) $K_p = [Fe_2O_3] [H_2]^3 / [H_2O]^3 [Fe]^2$
    (b) $K_p = P^3_{H2O} / P^3_{H2}$ (d) $K_p = P^3_{H2} / P^3_{H2O}$

20. What is the pH of a 2.35×10^{-2} M NaOH solution?

    (a) 12.37   (c) 1.62
    (b) 2.35   (d) 14.00

21. In which of the following does one mole of the compound have the highest percentage by mass of oxygen (O)?

    (a) Na_2CO_3 (106.0 g/mol)   (c) $Na_2B_4O_7.10H_2O$ (381.4 g/mol)
    (b) CH_3COONa (82.0 g/mol)   (d) $Na_2S_2O_3.5H_2O$ (248.2 g/mol)

22. $H_2SO_4(aq) + 2KOH(aq) \longrightarrow K_2SO_4(aq) + 2H_2O(l)$
    If 29.5 mL of 0.125 M KOH neutralizes completely 25.0 mL H_2SO_4 solution according to the above neutralization reaction, what is the molarity of the (H_2SO_4) acid solution?

    (a) 0.0738 M   (c) 1.84 M
    (b) 0.148 M   (d) 0.125 M

23. What is the molar mass of the hydrated aluminum potassium sulfate (alum) $(KAl(SO_4)_2.12H_2O)$?

    (a) 442.2 g / mol   (c) 474.3 g / mol
    (b) 282.3 g / mol   (d) 346.3 g / mol

24. What is the number of moles of nitrogen (N) present in 27.5 g of potassium ferrocyanide $(K_4Fe(CN)_6)$?
    [molar mass of potassium ferrocyanide $(K_4Fe(CN)_6)$ = 368.3 g/mol].

    (a) 0.0747 mol   (c) 0.149 mol
    (b) 0.448 mol   (d) 0.299 mol

25. How many fluorine (F) atoms are there in 65.0 g of carbon tetraflouride (CF_4)?
    [molar mass of carbon tetrafluoride (CF_4) = 88.0 g/mol]

    (a) 6.02×10^{23} atoms   (c) 2.40×10^{23} atoms
    (b) 4.50×10^{23} atoms   (d) 1.78×10^{24} atoms

Answers - English Exam
إجابات اختبار اللغة الانجليزية

Q's#	Answers	Q's#	Answers	Q's#	Answers	Q's#	Answers	Q's#	Answers
1 -	Ⓐ Ⓑ Ⓒ Ⓓ	19 -	Ⓐ Ⓑ Ⓒ Ⓓ	37 -	Ⓐ Ⓑ Ⓒ Ⓓ	55 -	Ⓐ Ⓑ Ⓒ Ⓓ	73 -	Ⓐ Ⓑ Ⓒ Ⓓ
2 -	Ⓐ Ⓑ Ⓒ Ⓓ	20 -	Ⓐ Ⓑ Ⓒ Ⓓ	38 -	Ⓐ Ⓑ Ⓒ Ⓓ	56 -	Ⓐ Ⓑ Ⓒ Ⓓ	74 -	Ⓐ Ⓑ Ⓒ Ⓓ
3 -	Ⓐ Ⓑ Ⓒ Ⓓ	21 -	Ⓐ Ⓑ Ⓒ Ⓓ	39 -	Ⓐ Ⓑ Ⓒ Ⓓ	57 -	Ⓐ Ⓑ Ⓒ Ⓓ	75 -	Ⓐ Ⓑ Ⓒ Ⓓ
4 -	Ⓐ Ⓑ Ⓒ Ⓓ	22 -	Ⓐ Ⓑ Ⓒ Ⓓ	40 -	Ⓐ Ⓑ Ⓒ Ⓓ	58 -	Ⓐ Ⓑ Ⓒ Ⓓ	76 -	Ⓐ Ⓑ Ⓒ Ⓓ
5 -	Ⓐ Ⓑ Ⓒ Ⓓ	23-	Ⓐ Ⓑ Ⓒ Ⓓ	41 -	Ⓐ Ⓑ Ⓒ Ⓓ	59 -	Ⓐ Ⓑ Ⓒ Ⓓ	77 -	Ⓐ Ⓑ Ⓒ Ⓓ
6 -	Ⓐ Ⓑ Ⓒ Ⓓ	24 -	Ⓐ Ⓑ Ⓒ Ⓓ	42 -	Ⓐ Ⓑ Ⓒ Ⓓ	60 -	Ⓐ Ⓑ Ⓒ Ⓓ	78 -	Ⓐ Ⓑ Ⓒ Ⓓ
7 -	Ⓐ Ⓑ Ⓒ Ⓓ	25 -	Ⓐ Ⓑ Ⓒ Ⓓ	43 -	Ⓐ Ⓑ Ⓒ Ⓓ	61 -	Ⓐ Ⓑ Ⓒ Ⓓ	79 -	Ⓐ Ⓑ Ⓒ Ⓓ
8 -	Ⓐ Ⓑ Ⓒ Ⓓ	26 -	Ⓐ Ⓑ Ⓒ Ⓓ	44 -	Ⓐ Ⓑ Ⓒ Ⓓ	62 -	Ⓐ Ⓑ Ⓒ Ⓓ	80 -	Ⓐ Ⓑ Ⓒ Ⓓ
9 -	Ⓐ Ⓑ Ⓒ Ⓓ	27 -	Ⓐ Ⓑ Ⓒ Ⓓ	45 -	Ⓐ Ⓑ Ⓒ Ⓓ	63 -	Ⓐ Ⓑ Ⓒ Ⓓ	81 -	Ⓐ Ⓑ Ⓒ Ⓓ
10 -	Ⓐ Ⓑ Ⓒ Ⓓ	28 -	Ⓐ Ⓑ Ⓒ Ⓓ	46 -	Ⓐ Ⓑ Ⓒ Ⓓ	64 -	Ⓐ Ⓑ Ⓒ Ⓓ	82 -	Ⓐ Ⓑ Ⓒ Ⓓ
11 -	Ⓐ Ⓑ Ⓒ Ⓓ	29 -	Ⓐ Ⓑ Ⓒ Ⓓ	47 -	Ⓐ Ⓑ Ⓒ Ⓓ	65 -	Ⓐ Ⓑ Ⓒ Ⓓ	83 -	Ⓐ Ⓑ Ⓒ Ⓓ
12 -	Ⓐ Ⓑ Ⓒ Ⓓ	30 -	Ⓐ Ⓑ Ⓒ Ⓓ	48 -	Ⓐ Ⓑ Ⓒ Ⓓ	66 -	Ⓐ Ⓑ Ⓒ Ⓓ	84 -	Ⓐ Ⓑ Ⓒ Ⓓ
13 -	Ⓐ Ⓑ Ⓒ Ⓓ	31 -	Ⓐ Ⓑ Ⓒ Ⓓ	49 -	Ⓐ Ⓑ Ⓒ Ⓓ	67 -	Ⓐ Ⓑ Ⓒ Ⓓ	85 -	Ⓐ Ⓑ Ⓒ Ⓓ
14 -	Ⓐ Ⓑ Ⓒ Ⓓ	32 -	Ⓐ Ⓑ Ⓒ Ⓓ	50 -	Ⓐ Ⓑ Ⓒ Ⓓ	68 -	Ⓐ Ⓑ Ⓒ Ⓓ		
15 -	Ⓐ Ⓑ Ⓒ Ⓓ	33 -	Ⓐ Ⓑ Ⓒ Ⓓ	51 -	Ⓐ Ⓑ Ⓒ Ⓓ	69 -	Ⓐ Ⓑ Ⓒ Ⓓ		
16 -	Ⓐ Ⓑ Ⓒ Ⓓ	34 -	Ⓐ Ⓑ Ⓒ Ⓓ	52 -	Ⓐ Ⓑ Ⓒ Ⓓ	70 -	Ⓐ Ⓑ Ⓒ Ⓓ		
17-	Ⓐ Ⓑ Ⓒ Ⓓ	35 -	Ⓐ Ⓑ Ⓒ Ⓓ	53 -	Ⓐ Ⓑ Ⓒ Ⓓ	71 -	Ⓐ Ⓑ Ⓒ Ⓓ		
18-	Ⓐ Ⓑ Ⓒ Ⓓ	36 -	Ⓐ Ⓑ Ⓒ Ⓓ	54 -	Ⓐ Ⓑ Ⓒ Ⓓ	72 -	Ⓐ Ⓑ Ⓒ Ⓓ		

Answers - Mathematics Exam
إجابات اختبار الرياضيات

Q's#	Answers	Q's#	Answers	Q's#	Answers	Q's#	Answers
1 -	Ⓐ Ⓑ Ⓒ Ⓓ	6 -	Ⓐ Ⓑ Ⓒ Ⓓ	11 -	Ⓐ Ⓑ Ⓒ Ⓓ	16 -	Ⓐ Ⓑ Ⓒ Ⓓ
2 -	Ⓐ Ⓑ Ⓒ Ⓓ	7 -	Ⓐ Ⓑ Ⓒ Ⓓ	12 -	Ⓐ Ⓑ Ⓒ Ⓓ	17 -	Ⓐ Ⓑ Ⓒ Ⓓ
3 -	Ⓐ Ⓑ Ⓒ Ⓓ	8 -	Ⓐ Ⓑ Ⓒ Ⓓ	13 -	Ⓐ Ⓑ Ⓒ Ⓓ	18 -	Ⓐ Ⓑ Ⓒ Ⓓ
4 -	Ⓐ Ⓑ Ⓒ Ⓓ	9 -	Ⓐ Ⓑ Ⓒ Ⓓ	14 -	Ⓐ Ⓑ Ⓒ Ⓓ	19 -	Ⓐ Ⓑ Ⓒ Ⓓ
5 -	Ⓐ Ⓑ Ⓒ Ⓓ	10 -	Ⓐ Ⓑ Ⓒ Ⓓ	15 -	Ⓐ Ⓑ Ⓒ Ⓓ	20 -	Ⓐ Ⓑ Ⓒ Ⓓ

Answers - Chemistry Exam
إجابات اختبار الكيمياء

Q's#	Answers	Q's#	Answers	Q's#	Answers	Q's#	Answers	Q's#	Answers
1 -	Ⓐ ● Ⓒ Ⓓ	6 -	Ⓐ Ⓑ ● Ⓓ	11 -	Ⓐ Ⓑ Ⓒ ●	16 -	● Ⓑ Ⓒ Ⓓ	21 -	Ⓐ Ⓑ ● Ⓓ
2 -	● Ⓑ Ⓒ Ⓓ	7 -	Ⓐ ● Ⓒ Ⓓ	12 -	Ⓐ Ⓑ ● Ⓓ	17 -	Ⓐ Ⓑ Ⓒ ●	22 -	● Ⓑ Ⓒ Ⓓ
3 -	Ⓐ Ⓑ Ⓒ ●	8 -	● Ⓑ Ⓒ Ⓓ	13 -	Ⓐ ● Ⓒ Ⓓ	18 -	Ⓐ Ⓑ ● Ⓓ	23 -	Ⓐ Ⓑ ● Ⓓ
4 -	Ⓐ Ⓑ ● Ⓓ	9 -	Ⓐ Ⓑ Ⓒ ●	14 -	● Ⓑ Ⓒ Ⓓ	19 -	Ⓐ ● Ⓒ Ⓓ	24 -	Ⓐ ● Ⓒ Ⓓ
5 -	Ⓐ ● Ⓒ Ⓓ	10 -	Ⓐ Ⓑ ● Ⓓ	15 -	Ⓐ Ⓑ Ⓒ ●	20 -	● Ⓑ Ⓒ Ⓓ	25 -	Ⓐ Ⓑ Ⓒ ●