WASSCE / WAEC MAY / JUNE 2013 CHEMISTRY PAPER 2 (OBJECTIVE TEST)

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S5052 WASSCE
May/June 2013
CHEMISTRY 2
Objective and Essay
3 hours

2

Name.....

Index Number.....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

May/June 2013 CHEMISTRY 2 3 hours

Do **not** *open this booklet until you are told to do so. While you are waiting, read and observe the following instructions carefully. Write your* **name** *and* **index number** *in the spaces provided above.*

This paper consists of **two** *parts,* A *and* B. *Answer Part* A *on your Objective Test answer sheet and Part* B *in your answer booklet. Part* A *will last* 1 *hour after which the answer sheet will be collected. Do* **not** *start Part* B *until you are told to do so. Part* B *will last* 2 *hours.*

PART A
OBJECTIVE TEST
[50 marks]

1. Use 2B pencil throughout.
2. On the pre-printed answer sheet, check that the following details are **correctly** printed:
   (*a*) In the space marked *Name*, check your **surname** followed by your **other names**.
   (*b*) In the spaces marked *Examination*, *Year, Subject* and *Paper*, check 'WASSCE May/June', '2013', 'CHEMISTRY', and '2' in that order.
   (*c*) In the box marked *Index Number,* your **index number** has been printed vertically in the spaces on the left-hand side, and each numbered space has been shaded in line with each digit. **Reshade** each of the shaded spaces.
   (*d*) In the box marked *Subject Code*, the digits 505213 are printed vertically in the spaces on the left-hand side. **Reshade** the corresponding numbered spaces as you did for your index number.
3. An example is given below. This is for a female candidate whose *name* is Nasadi Maku BOADI Her *index number* is 7102143958 and she is offering *Chemistry* 2.

THE WEST AFRICAN EXAMINATIONS COUNCIL

ANSWER SHEET

PRINTED IN BLOCK LETTERS

Name: BOADI NASADI MAKU | GHA

Examination: WASSCE May/June | Year: 2013

Subject: CHEMISTRY | Paper: 2

INSTRUCTIONS TO CANDIDATES
1. Use grade BB pencil throughout.
2. Answer each question by choosing one letter and shading it like this: ⊏A⊐ ⊏B⊐ ⊏C⊐ ⊏D⊐ ⊏E⊐
3. Erase completely any answer you wish to change.
4. Leave extra spaces blank if the answer spaces provided are more than you need.

INDEX NUMBER

	0	1	2	3	4	5	6	7	8	9
7								■		
1		■								
0	■									
2			■							
1		■								
4					■					
3				■						
9										■
5						■				
8								■		

SUBJECT CODE

	0	1	2	3	4	5	6	7	8	9
5						■				
0	■									
5						■				
2			■							
1		■								
3				■						

For Supervisors only
If candidate is absent shade this space

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Answer **all** *the questions.*

Each question is followed by four options lettered A *to* D. *Find the* **correct** *option for* **each** *question and shade in* **pencil** *on your answer sheet, the answer space which bears the same letter as the option you have chosen. Give only* **one** *answer to* **each** *question. An example is given below.*

Which of the following elements reacts with water?
A. Carbon
B. Iodine
C. Sulphur
D. Sodium

The correct answer is Sodium *which is lettered* D *and therefore answer space* D *would be shaded.*

⊏A⊐ ⊏B⊐ ⊏C⊐ ■D■ ⊏E⊐

Think carefully before you shade the spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. The atomic theory was put forward by
   A. Avogadro.
   B. Dalton.
   C. Gay Lussac.
   D. Rutherford.

2. A balanced equation is based on the law of
   A. chemical equilibrium.
   B. conservation of mass.
   C. definite proportion.
   D. multiple proportion.

3. The number of atoms in one mole of a substance is equal to the
   A. *atomic number.*
   B. *Avogadro's number.*
   C. *mass number.*
   D. *oxidation number.*

4. The noble gases are
   A. diatomic.
   B. monoatomic.
   C. polyatomic.
   D. triatomic.

5. An element $^{23}_{11}Q$ has a valency of
   A. 1.
   B. 2.
   C. 3.
   D. 4.

6. The classification of elements in the periodic table is based on
   A. mass number.
   B. number of neutrons.
   C. number of protons.
   D. relative atomic mass.

7. Which of the following statements about the periodic table is/ are **correct**?
   I. Atomic radius increases across the period
   II. Electron affinity decreases down the group
   III. Ionic character increases across the period
   IV. Ionization energy decreases down the group.

   A. II and IV only
   B. I and III only
   C. II and III only
   D. I only

8. An element **M** forms a compound MCl_5. In which group of the periodic table is **M**?
   A. I
   B. III
   C. V
   D. VII

9. Which of the following instruments could be used to detect the presence of isotopes?
   A. Cathode ray tube
   B. Electron microscope
   C. Geiger Muller counter
   D. Mass spectrometer

10. Which of the following noble gases has electron structure similar to that of N in NH_3?
   A. $_{36}Kr$
   B. $_{18}Ar$
   C. $_{10}Ne$
   D. $_{2}He$

11. Which of the following electron configurations is the **most** stable?
   A. [Ar] $4s^1$ $3d^5$
   B. [Ar] $4s^2$ $3d^1$
   C. [Ar] $4s^2$ $3d^6$
   D. [Ar] $4s^2$ $3d^{10}$

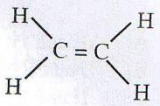
12. Which of the following statements about the 2*s* and 2*p* orbitals is **correct**?
   A. Electrons in the 2*p* are more strongly attracted to the nucleus.
   B. They have the same maximum number of electrons.
   C. They have the same maximum number of sub-orbitals
   D. The 2*s* has a lower energy than the 2*p*

13. Covalent bonding results in the formation of
   A. atoms.
   B. ions.
   C. molecules.
   D. salts.

14. The strength of metallic bonds depends on the
A. charge density of the atoms.
B. position of metals in the periodic table.
C. number of valence electrons.
D. total number of electrons in the atoms.

15. A compound is formed when $_3X$ combines with $_8Y$. Determine the formula of the compound.
A. X_8Y_3
B. X_2Y
C. X_3Y_8
D. XY_2

16. A hydrogen compound is represented by the following structure



Determine the total number of *shared pair* electrons in the compound.
A. 12
B. 10
C. 6
D. 5

17. Which of the following compounds has the **strongest** hydrogen bonding?
A. HF
B H_2S
C. H_2Te
D. CH_4

18. The polarizing power of a cation is enhanced by its
A. small nuclear charge and small size.
B. high nuclear charge and large size.
C. high ionization energy and low electron affinity.
D. high nuclear charge and small size.

19. A solution of NaOH with concentration 2.0 mol dm^{-3} is contained in 25 cm^3 of its volume. Determine the amount of NaOH in the solution.
A. 0.20 moles.
B. 0.13 moles.
C. 0.08 moles.
D. 0.05 moles.

20. Determine the volume of 0.10 mol dm^{-3} H_2SO_4 that could be used to neutralize 20.0 cm^3 of 0.25 mol dm^{-3} KOH.
A. 10.0 cm^3.
B. 12.5 cm^3.
C. 20.0 cm^3.
D. 25.0 cm^3.

21. A volume of 100 cm^3 Na_2CO_3 solution was prepared with concentration 0.30 mol dm^{-3}. Determine the mass of Na_2CO_3 that was used for the preparation.
[Na_2CO_3 = 106]
A. 0.318 g
B. 3.18 g
C. 31.8 g
D. 318 g

22. Which of the following statements about matter is **correct**?
A. Kinetic energy of particles decreases from gas to solid
B. Orderliness of particles decreases from gas to solid
C. Random motion of particles decreases from solid to gas
D. There is increased compressibility in solid

23. The movement of particles from a region of higher concentration to a region of lower concentration is
A. Brownian motion.
B. dialysis.
C. diffusion.
D. osmosis.

24. Which of the following gases has the **least** rate of diffusion under the same conditions?
[H = 1.0; C = 12.0; O = 16.0; N = 14.0; S = 32.0]
A. NO_2
B. CO_2
C. SO_2
D. H_2S

25. Fractional distillation is a technique generally used for the separation of
A. miscible liquids with close boiling points.
B. immiscible liquids.
C. two liquids with different densities.
D. two liquids with different molar masses.

26. Hess's law states that the total enthalpy change for a reaction is
A. independent of the path taken.
B. dependent on the path taken.
C. changed when the conditions are changed.
D. always constant.

27. The pH of waste water from a factory was found to be 3.2. Which of the following substances could be used to neutralize the water before it is released into the river?
A. Ammonium tetraoxosulphate (VI)
B. Lime
C. Sulphur (IV) oxide
D. Trioxonitrate (V) acid

28. The salt, $Mg(OH)NO_3$ is an example of a
A. normal salt.
B. double salt.
C. complex salt.
D. basic salt.

29. Which of the following oxides is neutral to moist litmus paper?
A. H_2O
B. CO_2
C. SO_3
D. NO_2

Turn over

30. Which of the following compounds has the **lowest** solubility in water at room temperature?
A. $KClO_3$
B. KNO_3
C. $Ca(OH)_2$
D. NaCl

31. Which of the following statements about the solution of HCl in CCl_4 is **correct**? It
A. gives effervescence with Na_2CO_3.
B. turns blue litmus red.
C. does not conduct electricity.
D. reacts with sodium to liberate hydrogen.

32. The rate equation of a reaction is $R = K[X]^2[Y]$. By what factor would the rate of the reaction increase if the concentrations of X and Y are both doubled?
A. 16
B. 8
C. 4
D. 2

33. Consider the reaction represented by the following equation $2KClO_3 \rightleftharpoons 2KCl + 3O_2$. Which of the following factors would increase the rate of the reaction?
A. Increasing the volume of oxygen
B. Decreasing the temperature
C. Decreasing the quantity of reactant
D. Addition of MnO_2

34. Which of the following half-cell reaction equations **correctly** represents the electrolysis of a copper solution?
A. $Cu(s) + 2e^- \rightarrow Cu^{2+}(aq)$
B. $Cu(s) - e^- \rightarrow Cu^+(aq)$
C. $Cu^+(aq) + e^- \rightarrow Cu(s)$
D. $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$

35. The following equation gives the half cell reaction for the electrolysis of dilute H_2SO_4:
$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$.
The equation represents
A. dehydration.
B. hydration.
C. oxidation.
D. reduction.

36. Electrical energy is produced by a simple cell as a result of
A. ionization of the electrolytes.
B. formation of negative ions from atoms.
C. transfer of electrons from reactive element to a less reactive element.
D. reaction of positive ions and negative ions.

37. Consider the following electrochemical cell notation: $Zn(s) / Zn^{2+}(aq) // Cu^{2+}(aq) / Cu(s)$.
The negative electrode is
A. zinc metal.
B. zinc ions.
C. copper metal.
D. copper ions.

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38. Complete hydrogenation of benzene produces
A. cyclohexane.
B. cyclohexene.
C. magarine.
D. oil.

39. Which reaction is represented by the following equation?
$C_2H_2 + Br_2 \rightarrow C_2H_2Br_2$
A. Addition
B. Condensation
C. Polymerization
D, Substitution

40. Which of the following statements about protein and carbohydrate is **correct**? They
A. are made by condensation polymerization.
B. contain same functional group.
C. hydrolyze to produce the same compounds.
D. are made from same monomer.

41. A compound with molecular formula CH_2O_2 is
A. a carbohydrate.
B. a carboxylic acid.
C. an ester.
D. an alkanol.

42. The reaction of an organic acid with an alkanol is known as
A. saponification.
B. neutralization.
C. hydrogenation.
D. esterification.

43. The IUPAC name of $C_2H_5COOC_2H_5$ is
A. ethylethanoate.
B. ethylpropanoate.
C. propylethanoate.
D. propylpropanoate.

44. The final product obtained when cellulose is hydrolysed using a dilute mineral acid is
A. fructose.
B. glucose.
C. maltose.
D. sucrose.

45. The products of fermentation of sugar ($C_6H_{12}O_6$) are
A. ethanol and water.
B. ethanal and carbon (IV) oxide.
C. ethanal and enzymes.
D. carbon (IV) oxide and water.

46. The **main** impurity in haematite is
A. $FeCO_3$.
B. SiO_2.
C. $CaCO_3$.
D. $CaSiO_3$.

Turn over

47. Iron is **better** protected from corrosion by plating it with
A. copper.
B. tin.
C. silver.
D. zinc.

48. Which of the following metals is stored in paraffin oil?
A. Al
B. Fe
C. Mg
D. Na

49. Steel is obtained from iron by
A. alloying.
B. electroplating.
C. galvanizing.
D. roasting.

50. Ammonia is manufactured industrially from its elements according to the equation

$$N_2(g) + 3H_2(g) \overset{W}{\rightleftharpoons} 2NH_3(g).$$

W represents
A. V_2O_5.
B. MnO_2.
C. Ni.
D. Fe.

END OF OBJECTIVE TEST