KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

MOI GIRLS – ELDORET HIGH SCHOOL

CHEMISTRY

PAPER 1

MARKING SCHEME

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MOI GIRLS – ELDORET KCSE TRIAL AND PRACTICE EXAM 2016
QUESTION PAPER 1
MARKING SCHEME

1. 65 x 0.31 √ ½ + 63 x 0.69 √ ½
   = 63.62 √1
2. Candle goes off √ ½
   Carbon (IV) oxide √ ½ produced turns lime water white √ // formation of a white precipitate due to the reaction √ between CO_2 and limewater.
3. (a) Extraction of salt √ ½ at L. Magadi by evaporating water till saturation √1 to form crystals √1 //
   Extraction of salt from sea water √
   (b) - Distillation of crude oil √ ½ based on boiling point // liquidification of liquid air to get nitrogen and oxygen.
4. (i) pH 7 √ ½ it is water that reacts with calcium to form calcium hydroxide and hydrogen √1 // Ca is above hydrogen in reactivity series.
   (ii) pH_2 √ ½ - It is acidic solution √ ½ from which hydrogen can be displaced by a more reactive metal Ca.
5. (a) K^+ has more energy levels than Na^+ √1

   (b) Both are in the same period √ ½
   Na^+ radius is larger than Mg^{2+} √ ½ because additional electrons in Mg^{2+} are added to same √ ½ energy level and there is increase in number of protons in the nucleus leading to more force √ ½ of attraction between the protons and electrons making Mg^{2+} smaller than Na^+.
6. (i) $2Al_{(s)} + {}^3/_2O_{2(g)} \longrightarrow Al_2O_3$ $\Delta H = -1673.6$ kJ mol

   (ii) $Fe_2O_{3(s)} \longrightarrow 2Fe_{(s)} + {}^3/_2O_{2(g)}$ $\Delta H = +836.8$kJ mol

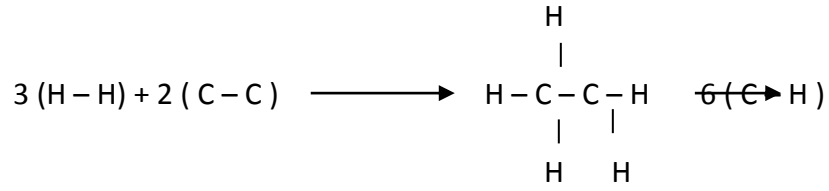
   $2Al_{(s)} + Fe_2O_{3(s)} \longrightarrow Al_2O_{3(s)} + 2Fe_{(s)}$ √

   $-1673.6 + 836.8 = -836.8$ kJmol^{-1} √

   ∴ $\Delta H_{Hn} = -836.8$ kJmol^{-1} √ Making points
   - Attempt to manipulate equation (i) and (ii) √1
   - Overal equation √ ½
   - Attempt to add ΔH values √ ½
   - Correct answer with negative sign √ ½
7. - Add distilled water to $ZnCl_2$ solid √ ½ and shake until all solid dissolves √ ½
   - Add $NaHCO_{3(aq)}$ √ ½ or Na_2CO_3 solution to form white √ ½ precipitate of $ZnCO_{3(s)}$
   - Filter √1 and wash the residue with a lot of water √ ½
8. (i) At 100^0C 100g water ⟶ 48g of y
   190g water ⟶ ?
   $\frac{190}{100} \times 48$ √ = 91.2 g of y √ ½

   (ii) In 150g of saturated solution at 100^0C mass of y = 50g
   At 60^0C – mass of y in solution = 40g √1
   ∴ Mass that crystallizes = 50 – 40 = 10g √ ½
   Attempt to subtract √1

9.



6 (C – H) - { 3(H – H) + 2 (C – C }

= (6 x 414 √ ½) – { (3 x 435 √ ½) + (2 x 343 √ ½) }
= -957 kJ √ ½
Attempt to subtract √ ½

10.

C	O
42.8	57.2
12	16
42.8 / 12	57.2 / 16 √ ½
3.567 / 3.567	3.575 / 3.575 √ ½
1	1.002

EF C O √ ½
$MF = (EF)_n$
$n \longrightarrow \frac{RMM}{REF} = \frac{28}{28}$

n = 1√
MF = CO √ ½

11. (i) Orange √ ½ potassium dichromate turns green √ ½ due reduction process √ ½ // SO_2 is a reducing agent where it reduces chromate (VI) ions to chromium (III) ions.

(ii) Brown √ ½ iron (III) sulphate solution turns green √ ½ due to reduction √ ½ of $Fe^{3+}_{(aq)}$ to $Fe^{2+}_{(aq)}$

12. $\frac{55}{67} = \sqrt{\frac{MO_2}{71}}$ √ ½

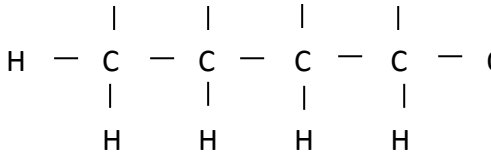
$0.8209 = \sqrt{\frac{MO_3}{71}}$ √ ½

$(0.8209)^2 = \frac{MO_3}{71}$ √

$MO_3 = 71 \times 0.6739$ √ ½
$= 47.85$ √ ½

13. (a) Pent-2-ene √1
(b) (i) Substitution √1
(ii) Addition √1

14. (a)



√1

Bonds should not be joined to symbols

(b) Alcohol √1 // Alkanols

(c) $C_4H_{10}O_{(l)} + K_{(s)} \longrightarrow C_4H_9OK_{(l)} + N_{2(g)}$ √1

15. (a) Yield decreases √ ½ reaction is exothermic √ ½ therefore it favoured by low temperatures √ ½

(b) Yield decreases √ ½ since the process is favoured by √ ½ high pressure due Boyle's law √ ½

16. (a) B √1 – Acid had higher concentration √1

(b) The reaction rate is initially high √1 because of high concentration but decreases steadily as concentration also decreases.

17. (a) $FeCl_2$ // Iron (II) chloride

(b) $HCl_{(g)}$ √ ½ reacted with $NaOH_{(aq)}$ to form $NaCl_{(aq)}$ and $H_{2(g)}$. The excess √ $HCl_{(g)}$ dissolved making the solution acidic.

18. (a) Ammonia dissolves √ ½ in water to form ammonia solution which is basic √ ½

(b) Increase surface area to avoid sucking back of the gas. √1

19. Equation for deposition of Cu

$Cu^{2+}_{(aq)} + 2e^- \longrightarrow Cu_{(s)}$

3.

63.5g of $Cu_{(s)}$ require (2 x 96500) C = 193000C √ ½

1.48g of Cu require ⟶ ?C

$\left(\frac{1.48}{63.5} \times 193000\right)$ C

= 4498.2C √1

Q = It

4498.2C = I x (150 x 60)S √ 12

4498.2C = 9000I

$\frac{4498.2}{9000}$ = I

= 0.4998 ampheres ≃ 0.5 amps √ ½

20. Atomic No. C = 6 ⟶ 2.4

O = 8 ⟶ 2.6

√2 C O

21. Anode equation

$2Cl^-_{(l)} \longrightarrow Cl_{2(g)} + 2e^-$ √1

Cathode equation

$2Na^+_{(l)} + 2e^- \longrightarrow 2Na_{(s)}$ √1

22. (a) ΔH_1 - Molar enthalpy of formation of iron (II) chloride √1

ΔH_3 – Molar enthalpy of formation of iron (III) chloride √1

(b) $\Delta H_3 = \Delta H_1 + \Delta H_2$ √

23. Paper Metal foil Thick block of lead

24. (a) $Fe_{(s)} + H_2O_{(g)} \longrightarrow FeO_{(s)} + H_{2(g)}$ √ Correct balanced eqn – ½ mark
State symbols – ½ mark

(b) Potassium is very reactive √ ½ , therefore its reaction with water is explosive √ ½

(c) To prevent reaction of iron with air which would result to iron oxide √
(1 mark)

25. (i) X – Diamond √ 1 mark
Y – Graphite √ 1 mark

(ii) Uses of X
- Drilling of metals
- Jewellery
(Any other correct)

(iii) Y √ ½ - Existence of delocalized electrons √ ½

26. (i) River water contains $Ca^{2+}_{(aq)}$ and / or $Mg^{2+}_{(aq)}$ √ ½ which react with soap to form s cum √ ½

(ii) <u>Advantage</u>
Forms lather quickly with water √ 1 mark

<u>Disadvantage</u>
It's non-biodegradable √ ½ therefore causes environmental pollution e.g froth in sewage plants. √ ½

27. (a) $E_{cell} = E_{red} - E_{oxidised}$
$= +1.36 - (-0.76)$ √ 1 mark
$= + 2.12V$ √ 1 mark
(Reject if sign is missing)

(b) $Zn_{(s)} + 2Cl^-_{(aq)} \longrightarrow Zn^{2+}_{(aq)} + Cl_{2(g)}$ √1

28. (a) In $1000cm^3$ ⟶ 2 moles of solute

$180cm^3$ ⟶ ? moles √ ½

$= \frac{180 \times 2}{1000}$ √ ½

$= 0.36$ moles √ ½

$12m^3 = 1000cm^3 = 1$ litre

∴ concentration of new solution = 0.36M √ ½

(b) Oil is less dense than water ; therefore would float on √ ½ the water and burning would continue √ ½

29. (a) $C_{(s)} + H_2O_{(g)} \longrightarrow CO_{(g)} + H_{2(g)}$
Correct balanced equation with state symbols (1 mark)

(b) Reducing property √ 1 mark