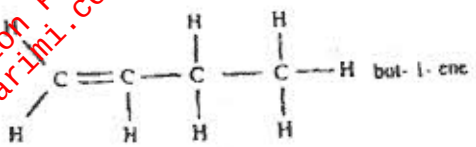
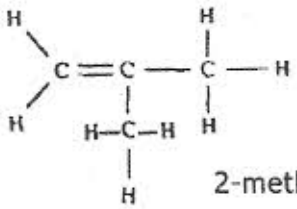
K.C.S.E. 2006 CHEMISTRY PAPER 233/1 MARKING SCHE

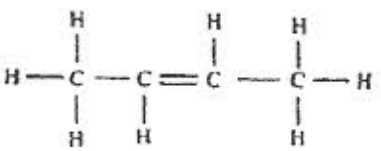
1. (a) Compounds with the same molecular formula but different structural form (1 ma

(b)



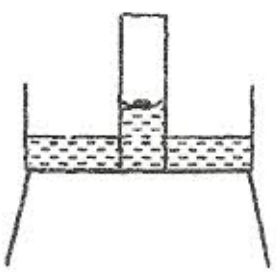


2-methy 1 prop-1-ene



(2marks)

2. (a)



(1 mark)

(b) Calibrate the gas jar before the start of experiment. (1 mark)

3. $$\frac{\text{Time for } SO_2}{\text{Time for } 0_2}$$

$$= \sqrt{\frac{R.M.M.SO_2}{R.M.M.O_2}}$$

R.M.M. of SO_2 = 64
R.M.M of O_2 = 32

$$\frac{\text{Time for } SO_2}{50}$$

$$= \sqrt{\frac{64}{32}}$$

Time for SO_2 = 70.7 seconds (3marks)

4. (a) $37 + 0 \longrightarrow 37$
$18^A \ -1^e \qquad 17^B$ (1 mark)

(b) (i) - Studing rate of absorption of phosphorus from a fertilizer (1 mark)

(ii) - May result to babies with deformities
- May cause cancer (1 mark)

5. (a) In solid state - Does not conduct
Ions are fixed (1½ marks)

(b) Aqueous solution - Conducts
Ions are mobile (1½ marks)

6. (a) $C_{(S)} + 2H_2SO_{4(1)} \longrightarrow CO_{2(g)} + 2H_2O_{(1)} + 2SO_{2(g)}$ (1 mark)

(b) Carbon changes from 0 to + 4 ∴ oxidation has taken place
Sulphur changes from + 6 to + 4 ∴ Reduction has occurred (2marks)

7. (a) Refrigeration. (1 mark)

(b) - They deplete the ozone layer.
- They cause green house effect. (2marks)

8. Mass of water 94.5 - 51.3 = 43.2
R.M.M. of $Ba(OH)_2$ = 171
R.M.M. of H_2O = 18

$$\frac{51.3}{171} \qquad \frac{43.2}{18}$$

$$\frac{0.3}{0.3} = 1 \qquad \frac{2.4}{0.3} = 8$$

E.F. = $Ba(OH)_2.8H_2O$ (3marks)

9. (a) - Pale yellow intensifies.
- Forward reaction is exothermic.
- Lowering temperature shifts the equilibrium to the right. (1½ marks)

(b) - Pale yellow intensifies.
- Reducing the volume of syringe
- Increases the pressure.
- The equilibrium shifts to the right. (1½ marks)

10. (a) Sublimation (1 mark)
(b) Bleaching (1 mark)
(c) Polymerisation (1 mark)

11. (a)
- Acidify water with nitric acid.
- Add aqueous lead nitrate
- Formation of white PPt shows presence of Cl^- (2marks)

(b) Provides essential minerals e.g. Ca^{2+} (1 mark)

12. $$\frac{62.93 \times 69.09 \times 64.93 \times 30.91}{100}$$

= 43.4783 + 20.0698
= 63.548 (3marks)

13. (a) It is a drying agent. (1 mark)

(b) $Fe_{(s)} + 2HCl_{(g)} \longrightarrow FeCl_{2(s)} + H_{2(g)}$ (1 mark)

(c) Pickling of metals. (1 mark)

14. (a) N_2O (1 mark)

(b) K_2O (1 mark)

(c) Al_2O_3 (1 mark)

15. (a) N (1 mark)

(b) E^{θ} = 0.80 + 0.76
= 1.56 volts (1 mark)

16. (a) The solution changed from brown/yellow to light/pale green. (1 mark)

(b) $2FeCl_{3(aq)} + H_2S_{(g)} \longrightarrow 2FeCl_{2(aq)} + 2HCl_{(aq)} + S_{(s)}$ (1 mark)

(c) Oxidation (1 mark)

17. (a) Platinum
Platinum - Rhodium (1 mark)

(b) $4NH_{3(g)} + 5O_{2(g)} \longrightarrow 4NO_{(g)} + 6H_2O_{(l)}$ (1 mark)

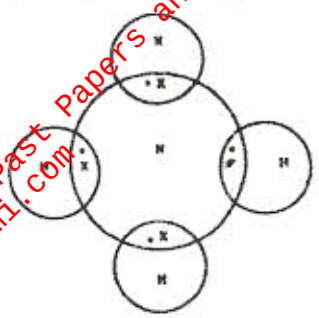
(c) - Fertilizers
- Explosives (1 mark)

18. Add anhydrous copper (II) Sulphate to substance S. It changes from white to blue.
OR
Dip cobalt chloride paper into substance S. It changes from blue to pink.(2marks)

19. (a) To MgO add excess HNO_3 HCL or H_2SO_4. Add NaOH or KOH to the mixture. Filter and dry the residue. (2marks)
(b) Anti-acid. (Treatment of acid indigestion). (1 mark)

20. (a) Covalent bond is formed by equal contribution of the shared electrons by the atoms. Co-ordinate bond is where the shared electrons are contributed by one of the atoms. (2marks)

(b)



(1 mark)

21. (a) They have delocalised valency electrons. (1 mark)
(b) Aluminium has three delocalised electrons. (2marks)
It is resistant to corrosion.

22. (a) Oxalic acid and Conc. H_2SO_4 (1 mark)
(b) $2KOH_{(aq)} + CO_{2(g)} \longrightarrow K_2CO_{3(aq)} + H_2O_{(1)}$ (1 mark)
(c) - CO is odourless.
- CO is colourless. (1 mark)

23. In addition to van der waals forces, strong hydrogen bonds exist in ethanol.
These bonds require more energy to break. (2marks)

24. (a)

Acidic	Basic
Orange	Pink

(1 mark)

(b) The pH of 0.1M KOH is higher than that 0.1M aqueous ammonia.
KOH is strongly dissociated in solution. (2marks)

25. (a) V_1 and V_3. (1 mark)
(b) Add petrol to the mixture. Filter. V_2 is the residue. Filtrate is V_4.
Distil the filtrate. (2marks)

26. (a) They gain energy and move faster. The intermolecular distance increases. (1 mark)
(b) XY (1 mark)
(c) The energy supplied changes molecules of water from liquid to Gaseous state. (1 mark)

27. (a) Conc. H_2SO_4 (1 mark)
(b) Heat the solution to concentrate it. Allow for crystal to form. Filter. (1 mark)
(c) Anhydrous copper (II) sulphate. (1 mark)

28. (a) ΔH_1 = Lattice energy
ΔH_2 = Hydration energy (2marks)

(b) $\Delta H_3 = \Delta H_1 + \Delta H_2$ (1 mark)