

Ordinary Level Chemistry

Sample Paper Number 1

Answers¹

Section A (100 marks)

Best **two** answers from this section

1 Diagram page 313 [2 labels] (*Fig. 21.19*)

- (i) X = water – H_2O / Y = calcium (di)carbide – CaC_2 2(4+3)
(ii) Page 312 (*Fig. 21.17*)

(6)

- (iii) Smoky luminous flame (6)
(iv) Turns bromine water / from yellow / to colourless 3(3)
(v) Safety glasses / gloves, etc. (3)
(vi) Has a double or triple bond (6)
(vii) Oxy-acetylene burner (6)

2 (i) Label axis / scale / points / line of best fit 4(3)

(ii) Diagram page 211 (*Fig. 16.3*)

¹ The answers given here are not exhaustive and there are many other possible correct answers.
All diagrams are taken from Chemistry Live! textbook.

- (8)
- (iii) Manganese dioxide or manganese(IV)oxide / oxygen 2(3)
- (iv) 73 cm^3 (6)
- (v) **Any two** Temperature / pressure / surface area / nature of reactants 2(3)
- (vi) Lead poisons catalyst (6)
- (vii) 155–160 s (6)
- 3** (a) (i) 600 ppm or 0.6 g dm^{-3} (ii) 800 ppm or 0.8 g dm^{-3} 2(9)
- (b) Oven / at 100°C 2(3)
- (c) Otherwise a combination of both suspended and dissolved solids would have been measured (6)
- (d) Chlorine – kill bacteria / Fluoride – prevent cavities in teeth (4+3)
- (e) Lead / mercury / fertilisers (4+3)
- (f) Flocculating agent (6)

Section B (300 marks)

Best **six** answers from this section

- 4** Best **ten** answers (10×5)
- (a) Ionic (5)
- (b) Full outer shell (5)
- (c) V-shaped with O at point (5)
- (d) Loss of electrons (5)
- (e) 2 (5)
- (f) CaI_2 (5)
- (g) 25 (5)
- (h) Exothermic (5)
- (i) Methane (5)
- (j) Methylpropane page 304 (*Fig. 21.4*) (5)

- (k) Bomb calorimeter (5)
(l) 10 (5)
(m) Contains a benzene ring (5)
(n) Colorimeter (5)
- 5** (a) (i) 11 protons / 12 neutrons 2(3)
(ii) 2,8,1 (6)
(iii) 1 electron in outer shell (6)
(iv) Alkali metals (4)
- (b) **Any two** Mendeleev – Periodic Table / Rutherford – nucleus or protons / Thompson – electron / Bohr – shells 2(6)
- (c) (i) Same atomic number / different mass number or different number of neutrons 2(3)
(ii) Carbon-12: 6 neutrons / not radioactive / carbon-14: 8 neutrons / radioactive 2(3)
(iii) Dating materials in archaeology (4)
- 6** (a) Measure of resistance to knocking (6)
(b) 2,2,4-trimethylpentane / diagram page 306 (*Fig. 21.7*)
- (3+6)
- (c) **Any two** Dehydrocyclisation / adding oxygenates / isomerisation / catalytic cracking 2(3)
(d) Fractional distillation / oil refinery (6+3)

(e) Diagram page 317 (*Fig.21.23*)

4(3)

(f) CO – poisonous / SO₂ and NO₂ – acid rain / CO₂ – greenhouse gas

(2+2+4)

- 7** (a) (a) Yellow (b) green (c) sulfuric acid (d) ethanal or ethanoic acid 4(3)
- (b) (i) Steam distillation (3)
- (ii) Highest concentration of oil (3)
- (iii) Suspension of oil in water (6)
- (iv) Dissolve in petroleum ether or dichloromethane (6)
- (c) (i) One that uses heat (3)
- (ii) Temperature drops (3)
- (iii) Sherbet with water (4+4)
- (iv) + (positive) (3)
- (v) Bomb calorimeter (3)
- 8** (a) Same general formula / same functional group / differ by CH₂ 2(4)
- (b) Ethene / diagram page 310 (*Fig. 21.13*)

Methanol / diagram page 343 (*Fig. 22.4*)

Methanal / diagram page 347 (Fig. 22.12)

6(3)

- (c) Aromatic – contains benzene ring (5)
 Hydrocarbon – contains hydrogen and carbon only (4)
 (d) Fermentation / (3)
 Yeast / produces enzyme zymase / turns sugar / into alcohol / and carbon dioxide 4(3)

- 9** (a) (i) $4.25 / 85 = 0.05$ (6)
 (ii) $0.025 \text{ of } 22.4 \text{ dm}^3 = 560 \text{ cm}^3$ (6)
 (iii) Re-lights a glowing splint (6)
 (iv) $0.25 \text{ of } 6 \times 10^{23} = 1.5 \times 10^{23}$ (6)

- (b) NH_3  HCl (4)
 Glass tube

- (ii) White fumes form (4)
 (iii) $\text{NH}_3 + \text{HCl} = \text{NH}_4\text{Cl}$ (6)

- (c) $\frac{P_1 V_1 T_2}{T_1 P_2} = \frac{80 \times 224 \times 273}{293 \times 100} = 167 \text{ cm}^3$ (12)

10 Any **two** answers of (a), (b) and (c)

- (a) (i) Polonium or radium (3)
 (ii) 2 protons + 2 neutrons (4)
 (iii) Americium 241 (6)
 (iv) Paper (6)
 (v) Smoke alarms / carbon dating / killing tumours / preserving food, etc. 2(3)

- (b) (i) If any of the factors influencing a chemical reaction is changed the system will react in such a way as to reduce the change (4)
 (ii) Haber process (3)
 (iii) Fe catalyst / 200 atm / 450°C 3(3)
 (iv) To increase the yield (6)
 (v) No [*just forms faster*] (3)

- (c) (i) Doesn't form a lather with soap (3)
 (ii) Can be removed by boiling (4)
 (iii) Calcium or magnesium hydrogencarbonate / furring pipes / scum with soap (6+3)
 (iv) Ion exchange (6)
 (v) No (3)

11 Best **two** answers of (a), (b) and (c)

- (a) (i) Gets less and then gets bigger (ii) gets bigger 2(3)
 (i) Reason – increasing nuclear charge in same sub-level then new sublevel (ii) Reason – new shell of principal energy level 2(6)
 Francium / fluorine / ionic (3+2+2)

- (b) Concentration known accurately (6)

Any seven points RMM $\text{Na}_2\text{S}_2\text{O}_3 = 158$ / 0.1 mole 15.8 g / $\frac{1}{4}$ of litre needed so $15.8/4 = 3.95$ / Transfer to beaker with washings / dissolve transfer to volumetric flask with washings / make up to mark / bottom of meniscus level with mark / use deionised water / shake several times / to make solution the same all over

5(3)+2(2)

- (c) Best answer of (A) or (B)

(A) Answers based on information gained in your industrial case study:

(i) Certain amount made at a time (4)

(ii) Raw materials un-purified / feedstock purified ready for use 2(3)

(iii) Transport / near raw materials / electricity / skilled labour, etc. 2(3)

(iv) Co-products – other substances made with the substance you want / Sold (6+3)

(B) (i) Ozone / O_3 2(3)

(ii) Stratosphere (6)

(iii) Stops ultraviolet radiation (6)

(iv) CFCs / fridges or fire extinguishers (4+3)