

COMBINED SCIENCE 2023 PAPER 2 MARKING GUIDE

- 1 (a)(i) transport (manufactured) food; AW [1]
(ii) provide cells for growth (of stem and roots)/ AW [1]
(b)
(c) (i) plasma [1]
(ii) transport medium; distribution of water; hormones; nutrients/AW max [1]
(d) homeostasis; defense/AW [1]
2. (a) (i) carbon dioxide [1]
(ii) bubble through limewater; turns limewater milky
OR use bicarbonate indicator; turns yellow max [2]
(b) (i) alveolus/ air sacs [1]
(ii) gaseous exchange/AW [1]
(iii) large surface area; thin layer of moisture; large network of blood capillaries;
thin walls max [2]
- 3 (a) (i) 12 [1]
(ii) 2.8.2 [1]
(iii) ionic [1]
(iv) high melting point/solid at room temperature; crystalline; high boiling point; hard
and brittle ;conduct electricity when molten or in dissolved in water max [1]
(b) moles=mass/Mr / 47/94 = ;2 (moles)
Concentration= moles/ volume / 2/0.5= ;4mol/dm³ (correct unit) max [3]
- 4 (a) (i) 1. electrolyte [1]
2. electrode/cathode [1]

- (ii) electric to; chemical [2]
- (b) (i) copper [1]
- (ii) iron (nail) [1]
5. (a) (i) 1. Ammeter [1]
2. voltmeter [1]
- (ii) $P=IV$ / $P=I^2R$ [1]
- (b) (i) negative [1]
- (ii) balloon gained electrons; wool lost electrons/AW [2]
6. (a) (i) 2 [1]
- (ii) $MA=Load/Effort$ / 160/80; 2 (no unit) Reject answer with unit. [2]
- (iii) Efficiency = $MA/VR \times 100$ / 2/2 $\times 100=$; 100% [2]
- (iv) friction; weight of (moving) parts [2]
- (b) inclined plane; lever system; gears; wheel barrow; pliers; accept any correct example
max [1]

SECTION B

7. (a) small intestine/ duodenum; accept liver max[1]
- (b) (i) contains enzyme(salivary amylase/lingual lipase; soften food/make food easy to swallow; [2]
- (ii) neutralize acid(from stomach); emulsification of fats/AW [2]
- (iii) neutralizing chime; contain enzymes [2]
- (c) prevent tooth decay; good health; prevent bad breath; prevent gum diseases
Max[3]

8. (a) (i) a disease that occurs more frequently in people with; weakened immune system/AW [2]
- (ii) TB; thrush/candidiasis; cryptosporidiosis; herpes simplex; accept any correct disease. [2]
- (b) (i) virus cross placenta; while foetus is inside womb;
Cervical secretions; during birth;
Through milk; during breastfeeding/AW max[4]
- (ii) taking HIV medicines during pregnancy; cesarean delivery; child taking HIV medicines after delivery; avoiding breastfeeding/AW max[2]
10. (a) acid/base indicator/ accept correct name of an acid base indicator; [1]
- (b) sodium sulphate/salt; water [2]
- (c) crystallization/evaporation [1]
- (d) 7/ neutral [1]
- (e) mole(NaOH)= $1 \times 0.05 = 1(\text{mol})$;
Moles(H_2SO_4)= $0.05/2 = 0.025(\text{mol})$;
 $C = \text{moles/volume} = 0.025/0.025 = 1\text{mol/dm}^3$ max[5]
11. (a) (i) air is cooled; allowed to expand; compression and expansion repeated until
Temperature reaches -200°C ; nitrogen and oxygen condense [4]
- (ii) carbon dioxide; water; rare gases max[1]
- (b) (i) fractional distillation [1]
- (ii) **oxygen** : medical uses; steel making; rocket propulsion; melting of metals;
accept any correct use max[1]
- nitrogen**: making ammonia; fire suppression systems; light bulb industry; accept
any correct use max[1]
- (c) introduce a glowing splint; splint relights [2]

12. (a) (i) A: propane
 B: propene [2]
- (ii) A has single (C-C) bonds only; B has double C-C bond. [2]
- (iii) carbon dioxide; water [2]
- (b) carbon hydrogen
 $86/12; 7.17$ $14/1; 14;$ max[2]
 $7/7= 1$; $14/7= 2;$ [2]
 OR CH_2

SECTION D

13. (a) (i) sun [1]
- (ii) radiation; conduction [2]
- (iii) is shiny/silvery; smooth; curved [3]
- (iv) heat from sun gets to curved surface; shiny surface reflects heat ; to a focal point; [3]
- (b) (heat) insulator [1]

14. (a) (i) intake stroke; because piston is moving downwards while; inlet/one valve is open [3]
- (ii) diesel engine [1]
- (iii) has a no spark plug [1]

(iv) Diesel engine ADVANTAGES : more fuel efficient; less polluting; more powerful max[1]

DISADVANTAGES: expensive; difficult to start in cold environments max[1]

Accept ADVANTAGES of Petrol engine if it's in (ii) : light weight; easier to start; less noise; Petrol is cheaper

DISADVANTAGES OF PETROL : need regular servicing; less efficient; more polluting

(ACCEPT ANY CORRECT ADVANTAGES AND DISADVANTAGES)

(b) when brake pedal is pressed; piston in master cylinder applies pressure on; brake fluid; Brake fluid transmits all applied pressure; to pistons that move outwards; pushing the brake shoe against brake drum max[3]

15. (a) (i) micrometer screw gauge [1]

(ii) tape measure; meter rule max[1]

(iii) kgm/s^2 [1]

(b) (i) Weight/force: $2600 \times 10 \neq 26000\text{N}$; [1]

Area : $2 \times 1 \neq 2\text{m}^2$; [1]

$P = F/A / 26000/2; = 13000\text{Pa}$ or Nm^2 (correct unit) [2]

(ii) pressure increases; because pressure is inversely proportional to area/ AW [2]