2024 ASOC ANSWER BOOKLET-ONLINE

Name: _____ School: _____ Account Number: _____

Section A: Multiple choice questions. (30 marks)

Please record your answers from Q1 to Q15 in the exam system.

Section B: Short answer questions (90 marks)

Question 16

(a)

(b)

(c)

(d)

| \Box SnO ₂ | □ HC1 | □ SnO |
|----------------------------|-----------------------------|-------------------------|
| \Box Sn(OH) ₂ | \Box Sn(OCl) ₂ | \Box H ₂ |
| □ NaCl | \Box Cl ₂ | \Box H ₂ O |
| \Box Na ₂ O | | |

(e)

(f) Increases Stays the same Decreases

(g)

(h)

(i)

(j)

(k)

(l)

(m)

(n)

(0)

- D PbO
- □ Pb(OH)₃
- D Pb(OH)4
- \Box PbO₂
- \Box PbO(NO₃)
- \Box PbO(NO₃)₂
- \Box Pb(NO₃)₂
- D Pb(OH)₃NO₃

Question 17

(a)

(b)

(c)



(f)

(g)

(h)

(i)

7

(j)

(k)

(1)

(m)

(n)

(o)

(p)

Question 18

(a)

(b)

| (c) T | The red ca | has | bonding | domains a | nd has | ag | geometry. |
|-------|------------|-----|---------|-----------|--------|----|-----------|
|-------|------------|-----|---------|-----------|--------|----|-----------|

The red p... has _____ bonding domains and has a ______ geometry.

The red n... has _____ bonding domains and has a______ geometry.

(d)

(e)

(f)

| F | | |
|---|--|--|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| L | | |
| | | |

(g)

| Cell type | Size (Gbp) |
|-----------------|------------|
| X gamete | 3.131 |
| Y gamete | |
| XX somatic cell | |
| XY somatic cell | |

(h)

| 1 | : \ |
|---|-----|
| C | 1) |

| <pre>j) The repro is Its plois The num is (k) [</pre> | | | |
|--|---|------|--|
| The repro is Its plois The num is k) | (j) | | |
| k) | The repro is Its plois The num is | | |
| I) m) n) o) | (k) | | |
| l) m) n) | | | |
| m) | (1) | | |
| m)n) | | | |
| n) o) | (m) | | |
| n) | | | |
| o) | (n) | | |
| (o) | | | |
| | (0) | | |
| | | | |
| p) | (p) | | |

(q)

(r)



(s)

END OF THE ANSWER BOOKLET

DATA

| Avogadro constant (N) = 6.022×10^{23} mol ⁻¹ | Velocity of light (c) = $2.998 \times 10^8 \text{ m s}^{-1}$ | | | | | |
|--|--|--|--|--|--|--|
| 1 Faraday = 96 485 coulombs | Density of water at 25 °C = 0.9971 g cm^{-3} | | | | | |
| $1 \text{ A} = 1 \text{ C s}^{-1}$ | Acceleration due to gravity = 9.81 m s^{-2} | | | | | |
| Universal gas constant (R) | 1 newton (N) = 1 kg m s ^{-2} | | | | | |
| 8.314 J K ⁻¹ mol ⁻¹ | | | | | | |
| $8.206 \times 10^{-2} \text{ L atm K}^{-1} \text{ mol}^{-1}$ | | | | | | |
| Planck's constant (h) = 6.626×10^{-34} J s | $1 \text{ pascal (Pa)} = 1 \text{ N m}^{-2}$ | | | | | |
| Molar volume of ideal gas | $pH = -\log_{10}[H^+]$ | | | | | |
| • at 0 °C and 100 kPa = 22.71 L | $pH + pOH = 14.00 \text{ at } 25^{\circ}C$ | | | | | |
| • at 25 °C and 100 kPa = 24.79 L | $K_{\rm a} = \{ [{\rm H}^+] [{\rm A}^-] \} / [{\rm HA}] $ | | | | | |
| • at 0 °C and 101.3 kPa = 22.41 L | $pH = pK_a + \log_{10}\{[A^-] / [HA]\}$ | | | | | |
| • at 25 °C and 101.3 kPa = 24.47 L | PV = nRT | | | | | |
| | E = hv | | | | | |
| Surface area of sphere $A = 4\pi r^2$ | $c = v\lambda$ | | | | | |

Periodic Table of Elements

| 1 | | | | | | | | | | | | | | | | | 18 |
|--|---|--|--|---|---|--|--|--|--|--|--|--|--|--|---|--|---|
| 1 H 1.008 | 2 | | ato S ato | omic num ymb omic weig | ber Ol ght | | | | | | | 13 | 14 | 15 | 16 | 17 | 2 He 4.003 |
| 3 | 4 | N 22 | | | | | | | | | | 5 | 6 | 7 | 8 | 9 | 10 |
| 6.94 | 9.01 | | | | | | | | | | | B 10.81 | 12.01 | N 14.01 | 16.00 | F 19.00 | 20.18 |
| 11 | 12 | | | - | 0 | - | 0 | 0 | 10 | | 10 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1Na 22.99 | 24.31 | 3 | 4 | 5 | 6 | 1 | 8 | 9 | 10 | 11 | 12 | AI 26.98 | SI 28.09 | P 30.97 | S 32.07 | 35.45 | Ar 39.95 |
| 19 | 20 | 21 | 22 | 00 | 04 | 25 | 00 | 07 | 00 | 00 | 00 | 0.4 | 0.0 | 00 | 0.4 | 05 | 00 |
| | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 21 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr |
| K 39.10 | Ca 40.08 | Sc 44.96 | 47.87 | V 50.94 | Cr 52.00 | 25 Mn 54.94 | Fe 55.85 | Co 58.93 | Ni 58.69 | Cu 63.55 | 2n 65.38 | Ga 69.72 | 32 Ge 72.63 | AS 74.92 | 34 Se 78.97 | Br 79.90 | 83.80 |
| K 39.10 37 Ph | Ca 40.08 38 Sr | Sc 44.96 39 | 47.87 | 23 V 50.94 41 | 24 Cr 52.00 42 | ²⁵ Mn ^{54.94} 43 | 26 Fe 55.85 44 | 27 CO 58.93 45 Ph | 28 Ni 58.69 46 | 29 Cu 63.55 47 | ³⁰ Zn 65.38 48 | 49 | 32 Ge 72.63 50 | 33 As 74.92 51 | 34 Se 78.97 52 | ³⁵ Br 79.90 53 | 36 Kr 83.80 54 |
| K 39.10 37 Rb 85.47 | Ca 40.08 38 Sr 87.62 | Sc 44.96 39 Y 88.91 | 40 91.22 | 23 V 50.94 41 Nb 92.91 | 24 Cr 52.00 42 Mo 95.95 | ²⁵ Mn 54.94 43 Tc | Fe 55.85 44 Ru 101.1 | 27 Co 58.93 45 Rh 102.9 | 28 Ni 58.69 46 Pd 106.4 | 29 Cu 63.55 47 Ag 107.9 | 30 Zn 65.38 48 Cd 112.4 | Ga 69.72 49 In 114.8 | 32 Ge 72.63 50 Sn 118.7 | 51 Sb 121.8 | 52 127.6 | 35 Br 79.90 53 I 126.9 | ³⁶ Kr 83.80 54 Xe 131.3 |
| K 39.10 37 Rb 85.47 55 | Ca 40.08 38 Sr 87.62 56 | Sc 44.96 39 Y 88.91 | 40 Zr 91.22 72 | 23 V 50.94 41 Nb 92.91 73 | 24 Cr 52.00 42 Mo 95.95 74 | 25 Mn 54.94 43 Tc - 75 | 26 Fe 55.85 44 Ru 101.1 76 | 27 Co 58.93 45 Rh 102.9 77 | 28 Ni 58.69 46 Pd 106.4 78 | 29 Cu 63.55 47 Ag 107.9 79 | 30 Zn 65.38 48 Cd 112.4 80 | 31 Ga 69.72 49 In 114.8 81 | 32 Ge 72.63 50 Sn 118.7 82 | 33 As 74.92 51 Sb 121.8 83 | 34 Se 78.97 52 Te 127.6 84 | 35 Br 79.90 53 I 126.9 85 | ³⁶ Kr 83.80 54 Xe 131.3 86 |
| K 39.10 37 Rb 85.47 55 Cs | Ca 40.08 38 Sr 87.62 56 Ba | SC 44.96 39 Y 88.91 57-71 | 22 Ti 47.87 40 Zr 91.22 72 Hf | 23 V 50.94 41 Nb 92.91 73 Ta | 24 Cr 52.00 42 Mo 95.95 74 W | 25 Mn 54.94 43 Tc - 75 Re | 26 Fe 55.85 44 Ru 101.1 76 Os | 27 Co 58.93 45 Rh 102.9 77 Ir | 28 Ni 58.69 46 Pd 106.4 78 Pt | 29 Cu 63.55 47 Ag 107.9 79 Au | 30 Zn 65.38 48 Cd 112.4 80 Hg | 31 Ga 69.72 49 In 114.8 81 TI | 32 Ge 72.63 50 Sn 118.7 82 Pb | ³³ As 74.92 51 Sb 121.8 83 Bi | ³⁴ Se _{78.97} 52 Te 127.6 84 Po | 35 Br 79.90 53 I 126.9 85 At | 36 Kr 83.80 54 Xe 131.3 86 Rn |
| K 39.10 37 Rb 85.47 55 Cs 132.9 | Ca 40.08 38 Sr 87.62 56 Ba 137.3 | SC 44.96 39 Y 88.91 57-71 | 22 Ti 47.87 40 Zr 91.22 72 Hf 178.5 | 23 V 50.94 41 Nb 92.91 73 Ta 180.9 | 24 Cr 52.00 42 Mo 95.95 74 W 183.8 | 25 Mn 54.94 43 Tc - 75 Re 186.2 | 26 Fe 55.85 44 Ru 101.1 76 Os 190.2 | 27 Co 58.93 45 Rh 102.9 77 Ir 192.2 | 28 Ni 58.69 46 Pd 106.4 78 Pt 195.1 | 29 Cu 63.55 47 Ag 107.9 79 Au 197.0 | 30 Zn 65.38 48 Cd 112.4 80 Hg 200.6 | 31 Ga 69.72 49 In 114.8 81 TI 204.4 | 32 Ge 72.63 50 Sn 118.7 82 Pb 207.2 | 33 As 74.92 51 Sb 121.8 83 Bi 209.0 | ³⁴ Se _{78.97} 52 Te 127.6 ⁸⁴ Po | 35 Br 79.90 53 126.9 85 At | 36 Kr 83.80 54 Xe 131.3 86 Rn - |
| K 39.10 37 Rb 85.47 55 Cs 132.9 87 | Ca 40.08 38 Sr 87.62 56 Ba 137.3 88 | Sc 44.96 39 Y 88.91 57-71 | 22 Ti 47.87 40 Zr 91.22 72 Hf 178.5 104 | 23 V 50.94 41 Nb 92.91 73 Ta 180.9 105 | 24 Cr 52.00 42 Mo 95.95 74 W 183.8 106 | 25 Mn 54.94 43 Tc - 75 Re 186.2 107 | 26 Fe 55.85 44 Ru 101.1 76 Os 190.2 108 | 27 Co 58.93 45 Rh 102.9 77 Ir 192.2 109 | 28 Ni 58.69 46 Pd 106.4 78 Pt 195.1 110 | 29 Cu 63.55 47 Ag 107.9 79 Au 197.0 111 | 30 Zn 65.38 48 Cd 112.4 80 Hg 200.6 112 | 31 Ga 69.72 49 In 114.8 81 TI 204.4 113 | 32 Ge 72.63 50 Sn 118.7 82 Pb 207.2 114 | 33 As 74.92 51 Sb 121.8 83 Bi 209.0 115 | ³⁴ Se 78.97 52 Te 127.6 84 Po - | 35 Br 79.90 53 I 126.9 85 At - 117 | 36 Kr 83.80 54 Xe 131.3 86 Rn - 118 |
| K 39.10 37 Rb 85.47 55 Cs 132.9 87 Fr | Ca 40.08 38 Sr 87.62 56 Ba 137.3 88 Ra | Sc 44.96 39 Y 88.91 57-71 89-103 | 22 Ti 47.87 40 Zr 91.22 72 Hf 178.5 104 Rf | 23 V 50.94 41 Nb 92.91 73 Ta 180.9 105 Db | 24 Cr 52.00 42 Mo 95.95 74 W 183.8 106 Sg | 25 Mn 54.94 43 TC - 75 Re 186.2 107 Bh | 26 Fe 55.85 44 Ru 101.1 76 OS 190.2 108 HS | 27 Co 58.93 45 Rh 102.9 77 Ir 192.2 109 Mt | 28 Ni 58.69 46 Pd 106.4 78 Pt 195.1 110 Ds | 29 Cu 63.55 47 Ag 107.9 79 Au 197.0 111 Rg | 30 Zn 65.38 48 Cd 112.4 80 Hg 200.6 112 Cn | 31 Ga 69.72 49 In 114.8 81 TI 204.4 113 Nh | 32 Ge 72.63 50 Sn 118.7 82 Pb 207.2 114 FI | 33 As 74.92 51 Sb 121.8 83 Bi 209.0 115 Mc | 34 Se 78.97 52 Te 127.6 84 PO - 116 LV | ³⁵ Br 79.90 53 I 126.9 85 At - 117 Ts | ^{зб} Kr 83.80 54 Xe 131.3 86 Rn - 118 Og |

| 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
|-------|-------|-------|-------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| La | Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| 138.9 | 140.1 | 140.9 | 144.2 | - | 150.4 | 152.0 | 157.3 | 158.9 | 162.5 | 164.9 | 167.3 | 168.9 | 173.0 | 175.0 |
| 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 |
| Ac | Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr |
| - | 232.0 | 231.0 | 238.0 | - | | | | | - | 1.5 | - | 1.0 | - 1 | - |