

## JINJA JOINT EXAMINATIONS BOARD

## MOCK EXAMINATIONS 2023

## MATHEMATICS - 456/2

## MARKING GUIDE

| NO.   | SOLUTION                                         | MARK  | COMMENT            |
|-------|--------------------------------------------------|-------|--------------------|
| 1.    | 2                                                |       |                    |
|       | $x = \frac{\pi}{3} \text{ or } x = -4$           |       |                    |
|       | $x-\frac{2}{3}=0, x+4=0$                         | MI    |                    |
|       | 3x - 2 = 0, x + 4 = 0                            |       |                    |
|       | (3x - 2)(x + 4) = 0                              | MI    | For expanding and  |
|       | 3x(x+4) - 2(x+4) = 0                             | MI    | simplifying        |
|       | $3x^2 + 12x - 2x - 8 = 0$                        | Al    | 3,111,111,111,111  |
|       | $3x^2 + 10x - 8 = 0$                             | 5.5.5 |                    |
| 2.    | n(E)=70                                          |       |                    |
|       | n(B)=34 $n(L)=38$                                |       |                    |
|       |                                                  | Bi    | For correct        |
|       | 34-x (x)                                         | DI    | information in the |
| 1     | 38-x ) 38-x                                      |       | venn diagram       |
|       |                                                  |       |                    |
|       | 2                                                |       | 1 1 5 7 7 8 1      |
|       | 34 + 38 - x + 2 = 70                             |       |                    |
| 1 -1  | 74 - x = 70                                      | MI    |                    |
|       | -x = 70 - 74                                     |       |                    |
|       | -x = -4                                          | Al    |                    |
|       | x = 4                                            | Al    |                    |
|       | $\therefore n(B \cap L) = 4 \text{ farmers}$     | -     |                    |
| 3.    | $\binom{2}{3}m + \binom{3}{4}n = \binom{19}{27}$ |       |                    |
|       | 2m + 3n = 19                                     |       |                    |
|       | 3m + 4n = 27                                     |       |                    |
|       | 312m + 3n = 19                                   | MI    |                    |
|       | 2   3m + 4n = 27<br>6m + 9n = 57                 | 174.4 |                    |
| 11    | -6m + 9n = 57<br>-6m + 8n = 54                   |       |                    |
|       | n=3                                              |       |                    |
| 100   | 3m + 4(3) = 27                                   | Al    |                    |
|       | 3m = 27 - 12                                     | MI    | P 11 7 11 22 1     |
|       | 3m _ 15                                          |       |                    |
|       | 3 = 3                                            |       | - 1                |
|       | m=5                                              | Al    | Di Escher St       |
|       | $\therefore m = 5, n = 3$                        |       |                    |
| 4.    | VSF = volume of supper                           |       |                    |
| 217.0 | $VSF = \frac{volume of supper}{volume of min}$   |       |                    |
|       | volume of min<br>1800                            | B1    |                    |
|       | = 1200<br>1200<br>VSE - 15                       | 200   |                    |
| 25.5  | VSF = 1.5                                        |       |                    |
| 5.50  | $VSF = (LSF)^3$                                  |       |                    |
|       | $\sqrt[3]{1.5} = \sqrt[3]{(LSF)^3}$              | B1    |                    |
|       |                                                  |       |                    |
|       | lane 1 of 9                                      |       |                    |

| -      | 1.1447 = LSF                                                   |        |                      |
|--------|----------------------------------------------------------------|--------|----------------------|
|        | $LSF = \frac{Height \ of \ supper}{Height \ of \ supper}$      |        |                      |
|        | neight of min                                                  | MI     |                      |
|        | $1.1447 = \frac{H_S}{25}$                                      | IMI    |                      |
|        | $H_{\rm d} = 1.1447 \times 25$                                 | Al     |                      |
|        | = 28.6175                                                      | 100000 |                      |
|        | $\approx 28.6 (3.sf)$                                          |        |                      |
| -      |                                                                |        |                      |
| 5.     | f(x) = x + 7, g(x) = 3x - 5<br>gf(x) = 3(x + 7) - 5            |        |                      |
|        | = 3x + 21 - 5                                                  | MI     |                      |
|        | gf(x) = 3x + 16                                                | Al     |                      |
|        | 3x + 16 = x + 7                                                | MI     |                      |
| 1 10   | 3x - x = 7 - 16 $2x - 9$                                       |        |                      |
|        | $\frac{2}{2} = \frac{2}{2}$                                    |        |                      |
|        | x = -4.5                                                       | Al     |                      |
| 6.     | X                                                              |        |                      |
| Hara W |                                                                |        |                      |
|        | 1 34                                                           |        |                      |
|        |                                                                |        |                      |
|        |                                                                |        |                      |
|        | A ( ) B                                                        |        |                      |
|        |                                                                |        |                      |
|        | 32 cm                                                          |        |                      |
|        |                                                                |        |                      |
|        | Y                                                              |        |                      |
| 14 - 1 |                                                                |        |                      |
|        | 34cm                                                           |        |                      |
| 1 3    |                                                                |        |                      |
| H I    |                                                                |        |                      |
|        | о 1 в                                                          |        | 7                    |
|        | 12 . 422 . 042                                                 |        |                      |
|        | $h^2 + 16^2 = 34^2$ $h^2 = 34^2 - 16^2$                        |        |                      |
|        | $\sqrt{h^2} = \sqrt{1156 - 256}$                               | MI     |                      |
|        | $h = \sqrt{900}$                                               |        |                      |
|        | h = 30 cm                                                      | A1     |                      |
|        | $V = \frac{1}{3}\pi r^2 h$                                     |        |                      |
|        | 1 22                                                           | M1     |                      |
|        | $=\frac{1}{3} \times \frac{22}{7} \times 16^2 \times 30$       |        |                      |
|        | $ \begin{array}{l} 3 & 7 \\                                  $ | A1     |                      |
| 7.     | $Gradient = \frac{y_2 - y_1}{2}$                               |        |                      |
|        | $-84$ $x_2 - x_1$                                              |        |                      |
|        | $={42}$                                                        |        |                      |
|        | =-4                                                            |        |                      |
|        | 6 -2                                                           | 20.0   |                      |
|        | = -                                                            | B1     | For correct gradient |
|        | $m \times m_1 = -1$                                            |        |                      |
|        | $m \times m_1 = -1$ $\frac{-2}{3} \times m_1 = -1$             |        |                      |
|        | 3                                                              |        |                      |

|                                                                                             |            | The state of the s |
|---------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3                                                                                           | B1         | For correct gradient                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| $m_1 = \frac{1}{2}$                                                                         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Mid point $AB = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$                      | -          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\left(\frac{-2+4}{2}, \frac{-4-8}{2}\right)$                                              | B1         | For correct mid point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| =(1,-6)                                                                                     |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| y = mx + c                                                                                  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $-6 = - \times 1 + c$                                                                       |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2 3                                                                                         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $-6 - \frac{7}{2} = c$                                                                      |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| -15                                                                                         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $-6 = \frac{3}{2} \times 1 + c$ $-6 - \frac{3}{2} = c$ $c = \frac{-15}{2}$                  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $c = -7\frac{1}{2}$ $\therefore y = \frac{3}{2}x - 7\frac{1}{2}$                            |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3 <sup>2</sup> 1                                                                            |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $\therefore y = \frac{1}{2}x - 7\frac{1}{2}$                                                | Bl         | For correct equations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 8. $Area = L \times W$                                                                      |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=(\sqrt{2}+\sqrt{3})(\sqrt{2}-2\sqrt{3})$                                                  | 20000      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\sqrt{2}(\sqrt{2}-2\sqrt{3})+\sqrt{3}(\sqrt{2}-2\sqrt{3})$                                | MI         | For expanding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| $= 2 - 2\sqrt{6} + \sqrt{6} - 2 \times 3$                                                   | MIMI       | For simplifying                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=(-4-\sqrt{6})cm^2$                                                                        | Al         | Tor simping ing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $\therefore Area = (-4 - \sqrt{6})cm^2.$                                                    |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 9. Hire purchase = Deposit + monthly installments                                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $= \frac{60}{100} \times 270,000 + 4 \times 50,000$                                         | MI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                             | M1M1       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| = 162,000 + 200,000<br>Hire purchase price = shs 362,000                                    | Al         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10. $A \propto BC^2$                                                                        | 74.1       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $A = kBC^2$                                                                                 | MI         | For correct                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| $80 = k \times 5 \times 2^2$                                                                |            | substitution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| $\frac{80}{20k} = \frac{20k}{20k}$                                                          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 20 20                                                                                       | A1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $k = 4$ $A = kBC^{2}$                                                                       |            | - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| $=4\times7\times1^2$                                                                        | MI         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| = 28                                                                                        | 1776       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $\therefore A = 28 \text{ when } B = 7 \text{ and } C = 1$                                  | A1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 11.(a) $\overrightarrow{AB} = \overrightarrow{OB} - \overrightarrow{OA}$                    |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\binom{5}{2}-\binom{2}{-3}$                                                               |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                             | В1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\binom{3}{5}$                                                                             | 100        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $\overrightarrow{BC} = \overrightarrow{OC} - \overrightarrow{OB}$                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\binom{7}{5}-\binom{5}{2}$                                                                |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                             | 12472      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\binom{2}{3}$                                                                             | Bl         | 2 - 5.7 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| $\overline{CD} = \overline{OD} - \overline{OC}$                                             |            | 스 프랑네 네트를                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| $=\binom{-4}{1}-\binom{7}{5}$                                                               |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\begin{pmatrix} 1/1 \\ -11 \end{pmatrix}$                                                 | 1 216      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                             | 200200     | Figure 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| $\overrightarrow{DA} = \overrightarrow{OA} - \overrightarrow{OD}$                           | B1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=$ $\begin{pmatrix} 2 \\ -3 \end{pmatrix} - \begin{pmatrix} -4 \\ 1 \end{pmatrix}$         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $=\begin{pmatrix} 6 \\ 1 \end{pmatrix}$                                                     |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                             | B1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD} + \overrightarrow{DA} = 0$ | I STATE OF |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|      |                                                                                                                                                                                                                                                                                        |    |   | 3 |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|---|
|      | $ \binom{3}{5} + \binom{2}{3} + \binom{-11}{-4} + \binom{6}{-4} $ $ \binom{3+2-11+6}{5+3-4-4} = \binom{0}{0} $ $ = 0 $                                                                                                                                                                 | MI |   | 3 |
|      | Hence proved                                                                                                                                                                                                                                                                           | AI |   |   |
|      | 2/ \                                                                                                                                                                                                                                                                                   |    |   | 0 |
|      |                                                                                                                                                                                                                                                                                        |    |   |   |
| (i)  | $\overrightarrow{PQ} = \overrightarrow{OQ} - \overrightarrow{OP}$ $= {15 \choose 20} - {9 \choose 12}$ $= {6 \choose 8}$                                                                                                                                                               |    |   |   |
|      | $\overrightarrow{OL} = \overrightarrow{OP} + \overrightarrow{PI}$                                                                                                                                                                                                                      | В1 |   |   |
| (ii) | $= {9 \choose 12} + \frac{1}{2} {6 \choose 8}$ $= {9 \choose 12} + {3 \choose 4}$ $\overrightarrow{OL} = {12 \choose 16}$ $\overrightarrow{KL} = \overrightarrow{KP} + \overrightarrow{PL}$                                                                                            |    |   |   |
|      | $ \overline{OL} = \begin{pmatrix} 12\\16 \end{pmatrix} \\ \overline{KL} = \overline{KP} + \overline{PL} \\ 2 \begin{pmatrix} 9 \\ 1 \end{pmatrix}  (3) $                                                                                                                               | Al |   |   |
|      | $= \frac{2}{3} {9 \choose 12} + {3 \choose 4}$ $= {2 \choose 3} \times 9 \choose 1 + {3 \choose 4}$                                                                                                                                                                                    |    |   |   |
|      | $= \begin{pmatrix} \frac{2}{3} \times 9 \\ \frac{2}{3} \times 12 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $= \begin{pmatrix} 6 \\ 8 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $= \begin{pmatrix} 9 \\ 12 \end{pmatrix}$ $ \overline{KL}  = \sqrt{9^2 + 12^2}$ | MI |   |   |
|      |                                                                                                                                                                                                                                                                                        | Al | * |   |
|      | $= \sqrt{61 + 144}$ $= \sqrt{225}$ $= 15$ $\therefore  \overrightarrow{KL}  = 15 \text{ units}$                                                                                                                                                                                        |    |   |   |
|      |                                                                                                                                                                                                                                                                                        | Bl |   |   |
| 12.  | 40 cm                                                                                                                                                                                                                                                                                  |    |   |   |
|      | 30cm                                                                                                                                                                                                                                                                                   |    |   |   |
|      |                                                                                                                                                                                                                                                                                        |    |   |   |
|      | 30                                                                                                                                                                                                                                                                                     |    |   |   |
|      | 30                                                                                                                                                                                                                                                                                     |    |   |   |

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| _       |                                                                                                                                                                                              |      |                   |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------|
|         | h+30_30                                                                                                                                                                                      |      |                   |
|         | $\frac{h}{h} = \frac{1}{20}$                                                                                                                                                                 | MI   |                   |
|         | 20(h+30) = 30h                                                                                                                                                                               |      |                   |
|         | 20h + 600 = 30h                                                                                                                                                                              |      |                   |
|         | 600 10h                                                                                                                                                                                      |      |                   |
| 1 7     | 10 = 10                                                                                                                                                                                      |      |                   |
|         | 60 = h                                                                                                                                                                                       | Al   |                   |
|         |                                                                                                                                                                                              |      |                   |
|         | Volume of original cone = $\frac{1}{3} \times \frac{22}{7} \times 30^2 \times 90$                                                                                                            | MI   |                   |
|         | $= 84857.14 cm^3$                                                                                                                                                                            |      |                   |
|         | Volume of cut off cone                                                                                                                                                                       | A1   |                   |
|         |                                                                                                                                                                                              |      |                   |
|         | $V = \frac{1}{3} \times \frac{22}{7} \times 20^2 \times 60$                                                                                                                                  | M1   |                   |
|         | $= 25142.86 \text{ cm}^3$                                                                                                                                                                    | A1   |                   |
|         |                                                                                                                                                                                              | MI   |                   |
|         | Volume of the bucket = 84857.14 - 25142.86                                                                                                                                                   |      |                   |
|         | $= 59714.28 cm^3$                                                                                                                                                                            | A1   |                   |
|         | Volume of the hemisphere = $\frac{2}{3}\pi r^3$                                                                                                                                              |      |                   |
|         | 2 22                                                                                                                                                                                         |      |                   |
| 1       | $=\frac{2}{3}\times\frac{22}{7}\times30^3$                                                                                                                                                   | M1   |                   |
|         |                                                                                                                                                                                              |      |                   |
| 100     | $= 56571.43 cm^3$                                                                                                                                                                            | AI   |                   |
|         | Volume of the whole solid = 59714.28 + 56571.43                                                                                                                                              | M1   |                   |
|         | $= 116285.71 cm^3$                                                                                                                                                                           | Al   |                   |
| 13.(a)  |                                                                                                                                                                                              |      |                   |
| 2557755 | $(8x^{\circ})^{3} \times (16x^{\circ})^{4}$                                                                                                                                                  |      |                   |
|         | $= \left( \left( \frac{1}{2x^2} \right)^3 \right)^{\frac{3}{3}} \times \left( \left( \frac{1}{2x} \right)^4 \right)^{\frac{1}{4}}$ $= \frac{1}{2x^2} \times \frac{1}{2x}$ $= \frac{1}{4x^3}$ | MI   |                   |
|         | $=\left(\begin{pmatrix} 1\\ -\end{pmatrix} \right)^{2} \times \left(\begin{pmatrix} 1\\ -\end{pmatrix} \right)^{2}$                                                                          | IVII |                   |
|         | $(2x^2)$ $(2x)$                                                                                                                                                                              |      |                   |
|         | 1 1                                                                                                                                                                                          | M1   |                   |
|         | $=\frac{1}{2x^2} \times \frac{1}{2x}$                                                                                                                                                        | IVII |                   |
|         |                                                                                                                                                                                              |      |                   |
|         | $=\frac{4x^3}{4}$                                                                                                                                                                            |      |                   |
| 26.5    |                                                                                                                                                                                              | A1   |                   |
| (b)     | 1cm = 2500 cm                                                                                                                                                                                |      |                   |
|         | $1cm^2 = (2500)^2 cm^2$                                                                                                                                                                      |      |                   |
|         | $20cm^2 = (20 \times 2500^2)cm^2$                                                                                                                                                            | MI   |                   |
|         | 20 × 2500 × 2500                                                                                                                                                                             |      |                   |
| 1       | Actual area =                                                                                                                                                                                | M1   | 1 To 2 2 2 1 To 1 |
|         | $= 20 \times 0.25^{2}$ $= 20 \times 0.25^{2}$                                                                                                                                                | MI   |                   |
|         |                                                                                                                                                                                              |      | THE VIEW          |
|         | $=1.25km^2$                                                                                                                                                                                  | A1   | -3-5-1-1          |
|         | ∴ Actual area of the school is 1.25km²                                                                                                                                                       |      | THE RESERVE       |
|         |                                                                                                                                                                                              |      |                   |
| (c)     | $h \propto d$                                                                                                                                                                                |      |                   |
|         | h = kd                                                                                                                                                                                       | MI   |                   |
|         | 150 20k                                                                                                                                                                                      | Al   |                   |
|         | $\frac{1}{20} = \frac{1}{20}$                                                                                                                                                                | AL   |                   |
|         | 7.5 = k                                                                                                                                                                                      | Dr.  |                   |
| 111     | $h = (3.6 \times 100)$                                                                                                                                                                       | BI   | 97 - F-F-1        |
| Ha F    | = 360 cm                                                                                                                                                                                     |      |                   |
|         | h = kd                                                                                                                                                                                       |      | S CHARLES IN SEC. |
|         | 360 7.5d                                                                                                                                                                                     | MI   |                   |
|         |                                                                                                                                                                                              |      |                   |
|         | 7.5 = 7.5                                                                                                                                                                                    | Al   |                   |
|         | 48 cm = d                                                                                                                                                                                    |      |                   |
|         | : Diameter of the foot prints will be 48 cm when the h                                                                                                                                       |      |                   |
|         | = 360 cm                                                                                                                                                                                     |      | DÉ RIE LE LE LE   |
|         |                                                                                                                                                                                              |      |                   |

| [4.(a)        |                                                                                                                                                                                                                              |            |                                             |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------|
|               | n(XI) = 26 $24x$ $x$ $x$ $x$ $x$ $x$ $x$ $x$ $x$ $x$                                                                                                                                                                         | В2         | For all correct entries in the venn diagram |
|               | n(I)=31                                                                                                                                                                                                                      |            | 0                                           |
|               | n(M)only = 26 - (11 - x + x + 13 - x) $= 26 - 24 + x$ $= 2 + x$ $n(R)only = 28 - (13 - x + x + 15 - x)$ $= 28 - (28 - x)$                                                                                                    | В1         |                                             |
|               | = 28 - 28 + x $= x$ $n(I)only = 31 - (11 - x + x + 15 - x)$ $= 31 - (26 - x)$ $= 31 - 26 + x$                                                                                                                                | В1         |                                             |
|               | = 5 + x $26 + x + 15 - x + 5 + x = 52$ $46 + x = 52$ $x = 52 - 46$ $x = 6$                                                                                                                                                   | B1<br>M1   |                                             |
| b(i)          | 6 students ate all the 3types of foods.                                                                                                                                                                                      | B1         |                                             |
| (ii)          | Atleast 2types = 5 + 7 + 6 + 9<br>= 27 students                                                                                                                                                                              | MI<br>Al   |                                             |
| (c)           | Atmost one type of $foods = 8 + 6 + 11$<br>= 25 students                                                                                                                                                                     | Ml         |                                             |
|               | $Probability = \frac{25}{52}$                                                                                                                                                                                                | A1         | *                                           |
| 15.(a)<br>(i) | $f(x) \text{ not defined}  x^2 + x - 6 = 0  x^2 - 2x + 3x - 6 = 0  x(x - 2) + 3(x - 2) = 0  (x - 2)(x + 3) = 0  x - 2 = 0,  x + 3 = 0  x = 2, x = -3  \therefore f(x) \text{ is not defined when } x = 2 \text{ or } x = -3$ | M1<br>A1A1 |                                             |
|               | $ \frac{2}{x-2} - \frac{10}{x^2 + x - 6} $ $ \frac{2(x+3) - 10}{(x+3)(x-2)} $ $ \frac{2x+6-10}{(x+3)(x-2)} $ $ = \frac{2x-4}{(x+3)(x-2)} $ $ = \frac{2(x-2)}{(x+3)(x-2)} $ $ = \frac{2}{x+3} $                               | MI<br>AI   |                                             |
| b(i)          |                                                                                                                                                                                                                              | MI         |                                             |

|            | $g(0) = \frac{10}{0^2 + 0 - 6}$                                                                                                                                            |      |             |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|
|            | $0^{2} + 0 - 6$                                                                                                                                                            |      |             |
|            | 10-10                                                                                                                                                                      |      |             |
|            | 6                                                                                                                                                                          | Al   |             |
|            | , 2                                                                                                                                                                        | (0.) |             |
| (ii)       | $=-1\frac{1}{3}$                                                                                                                                                           |      |             |
|            | F(-) 2                                                                                                                                                                     |      |             |
|            | $f(x) = \frac{1}{x-2}$                                                                                                                                                     | 0    | 0           |
|            | $f(x) = \frac{2}{x-2}$ $y = \frac{2}{x-2}$ $x = \frac{2}{y-2}$                                                                                                             |      |             |
|            | $y = \frac{1}{x-2}$                                                                                                                                                        |      |             |
|            | 2                                                                                                                                                                          |      |             |
|            | $x = \frac{1}{v-2}$                                                                                                                                                        | MI   |             |
|            | 2 = xy - 2x                                                                                                                                                                |      |             |
|            | 2x + 2 $xy$                                                                                                                                                                |      |             |
|            | = = = =                                                                                                                                                                    |      |             |
|            | $y - 2$ $2 = xy - 2x$ $\frac{2x + 2}{x} = \frac{xy}{x}$ $y = \frac{2x + 2}{x}$ $f^{-1}(x) = \frac{2x + 2}{x}$ $f^{-1}(2) = \frac{2 \times 2 + 2}{2}$ $= \frac{6}{2}$ $= 3$ |      |             |
|            | $y = \frac{1}{2}$                                                                                                                                                          | Al   |             |
|            | 2r+2                                                                                                                                                                       |      |             |
|            | $  : f^{-1}(x) = \frac{1}{x}$                                                                                                                                              | MI   |             |
|            | $2 \times \overset{\chi}{2} + 2$                                                                                                                                           |      |             |
|            | $f^{-1}(2) = \frac{1}{2}$                                                                                                                                                  |      |             |
|            | 6                                                                                                                                                                          |      |             |
|            | $=\frac{1}{2}$                                                                                                                                                             | A1   |             |
|            | = 3                                                                                                                                                                        |      |             |
|            | $f^{-1}(2) = 3$                                                                                                                                                            |      |             |
| 16.        | Taxi from town M                                                                                                                                                           |      |             |
|            | T(hrs) 7.20 9.00 9.20 0.20                                                                                                                                                 |      |             |
|            | D(km) 0 50 50 1.30                                                                                                                                                         | B2   |             |
|            | 130 210 201 370 350                                                                                                                                                        |      |             |
|            | Remaining distance = 400km                                                                                                                                                 |      |             |
|            | $T = \frac{400}{80}$                                                                                                                                                       |      |             |
|            | = 5hrs                                                                                                                                                                     |      |             |
|            |                                                                                                                                                                            |      |             |
|            | Subaru from town N T(hrs) 8:00 9:00 9:30 10:30 11:30 12:30 1:00                                                                                                            |      |             |
|            | Dat 12.30 12.30 13.00                                                                                                                                                      |      |             |
| The second | D(km) 0   100   100   200   300   400   450                                                                                                                                | B2   |             |
|            | Cellianning dictages 250km                                                                                                                                                 |      | 100         |
|            | $T = \frac{350}{100}$                                                                                                                                                      |      | - 1         |
| 1 7 - 7    | 100                                                                                                                                                                        |      |             |
|            | = 3.5 hrs                                                                                                                                                                  |      |             |
|            | D = (225 + 2.5) = 227.5 km from M                                                                                                                                          |      |             |
|            |                                                                                                                                                                            | BI   |             |
|            | D = (450 - 227.5)km                                                                                                                                                        |      |             |
|            | = 222.5  km                                                                                                                                                                |      |             |
|            | ≈ 223km from town N .                                                                                                                                                      |      | 1. 1 . 32 . |
|            | $Time = 10:30 \ am + 12 \ min$                                                                                                                                             |      |             |
| U TE       | = 10:42am                                                                                                                                                                  | B1   |             |
|            | ∴ They met at 10:42am after travelling 222.5 km from N                                                                                                                     | 21   |             |
|            | Tweeting 222.5 km from N                                                                                                                                                   |      |             |

|                                               | - North                                | August Marie                                                           |                                                                                                                                                                                                                 | A HAR                          |          |  |
|-----------------------------------------------|----------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------|--|
| 70                                            | 413 50                                 | 40                                                                     | 10 Marie 144 W                                                                                                                                                                                                  |                                |          |  |
|                                               | 33                                     |                                                                        |                                                                                                                                                                                                                 | /                              |          |  |
|                                               | 90                                     | <b>+</b>                                                               |                                                                                                                                                                                                                 | X III                          |          |  |
|                                               |                                        |                                                                        | *                                                                                                                                                                                                               |                                |          |  |
|                                               | NA-                                    | *                                                                      |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        | 以实现 / / / / / / / / / / / / / / / / / / /                                                                                                                                                                       |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 | i i                            |          |  |
|                                               | - 8                                    |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
|                                               | 8 11                                   |                                                                        | LI V                                                                                                                                                                                                            |                                |          |  |
|                                               | 100                                    | K-L                                                                    |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                | 10) 2    |  |
|                                               |                                        | 549-                                                                   |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        | 68. T                                                                  |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        | 100 620                                                                | 50c his 17so 4.5                                                                                                                                                                                                | 0 110 450                      |          |  |
|                                               | T <sub>GMOT</sub> N                    | 130 635                                                                |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        | Time (045) 12                                                                                                                                                                                                   |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
| Lunch                                         |                                        | 720,000                                                                | 35,                                                                                                                                                                                                             | ,000                           | MI       |  |
| Transp                                        |                                        | 12                                                                     | 60,                                                                                                                                                                                                             |                                | MH       |  |
| Mariag                                        |                                        |                                                                        | 25,                                                                                                                                                                                                             | 000                            |          |  |
| Housin                                        | g = 3                                  | $\frac{1}{0}$ × 720,000                                                | 36,0                                                                                                                                                                                                            | 000                            |          |  |
| Childre                                       | n (6yrs                                | and 10 yrs) (                                                          | 2x5000) 10,0                                                                                                                                                                                                    | 000                            |          |  |
|                                               | 14 y                                   | rs                                                                     | 3,0                                                                                                                                                                                                             | 00                             | A1       |  |
|                                               |                                        | ices = shs197                                                          |                                                                                                                                                                                                                 |                                |          |  |
|                                               |                                        | man Canada in                                                          | come - Allowances                                                                                                                                                                                               |                                |          |  |
|                                               |                                        |                                                                        |                                                                                                                                                                                                                 |                                |          |  |
| = 720                                         | 000 - 1                                | 197,000                                                                |                                                                                                                                                                                                                 |                                | M1       |  |
| = 720<br>= shs                                | 000 – 1<br>23,000                      | 197,000                                                                |                                                                                                                                                                                                                 | Dit                            | M1<br>A1 |  |
| = 720<br>= shs                                | 000 - 1<br>23,000<br>Rate              | Amount to                                                              | Tax                                                                                                                                                                                                             | Balance to                     |          |  |
| = 720<br>= shs!<br>Slabs                      | 000 - 1<br>23,000<br>Rate<br>(%)       | Amount to tax                                                          | Tax                                                                                                                                                                                                             | be taxed                       |          |  |
| = 720<br>= shs                                | 000 - 1<br>23,000<br>Rate              | Amount to                                                              | Tax                                                                                                                                                                                                             |                                | A1       |  |
| = 720<br>= shs!<br>Slabs                      | 000 - 1<br>23,000<br>Rate<br>(%)       | Amount to tax                                                          | $\frac{5}{100} \times 120,000$                                                                                                                                                                                  | be taxed                       |          |  |
| = 720<br>= shs!<br>Slabs                      | 000 - 1<br>523,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000                                                  | $\frac{5}{100} \times 120,000$ = $shs6000$                                                                                                                                                                      | be taxed<br>403,000            | A1       |  |
| = 720<br>= shs!<br>Slabs                      | 000 - 1<br>23,000<br>Rate<br>(%)       | Amount to tax                                                          | $\frac{5}{100} \times 120,000$ = $shs6000$                                                                                                                                                                      | be taxed                       | A1<br>B1 |  |
| = 720<br>= shs!<br>Slabs                      | 000 - 1<br>523,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000                                                  |                                                                                                                                                                                                                 | be taxed<br>403,000            | A1       |  |
| = 720<br>= shs!<br>Slabs                      | 000 – 1<br>623,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000                                                  |                                                                                                                                                                                                                 | be taxed<br>403,000<br>283,000 | A1<br>B1 |  |
| = 720<br>= shs!<br>Slabs                      | 000 - 1<br>523,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000                                                  |                                                                                                                                                                                                                 | be taxed<br>403,000            | B1       |  |
| = 720<br>= shs!<br>Slabs                      | 000 – 1<br>623,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000                                                  | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$                                                                                  | be taxed<br>403,000<br>283,000 | A1<br>B1 |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000 120,000 160,000                                  | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$                                                                      | be taxed<br>403,000<br>283,000 | B1       |  |
| = 720<br>= shs!<br>Slabs                      | 000 – 1<br>623,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000                                                  | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$                                                                      | be taxed<br>403,000<br>283,000 | B1       |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | Amount to tax 120,000 120,000 160,000                                  | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$                                      | be taxed<br>403,000<br>283,000 | B1       |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | 197,000  Amount to tax 120,000  120,000  160,000                       | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$ $shs18450$                           | be taxed<br>403,000<br>283,000 | B1<br>B1 |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | 197,000  Amount to tax 120,000  120,000  160,000  Total                | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$ $shs18450$ $Total tax$               | be taxed<br>403,000<br>283,000 | B1<br>B1 |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | 197,000  Amount to tax 120,000  120,000  160,000  Total taxable        | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$ $shs18450$                           | be taxed<br>403,000<br>283,000 | B1<br>B1 |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | 197,000  Amount to tax 120,000  120,000  160,000  Total taxable income | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$ $shs18450$ $Total tax$               | be taxed<br>403,000<br>283,000 | B1<br>B1 |  |
| = 720<br>= shs!<br>Slabs<br>1st<br>2nd        | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | 197,000  Amount to tax 120,000  120,000  160,000  Total taxable        | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$ $shs18450$ $Total tax$               | be taxed<br>403,000<br>283,000 | B1 B1 B1 |  |
| = 720<br>= shs:<br>Slabs<br>1st<br>2nd<br>3rd | 000 - 1<br>623,000<br>Rate<br>(%)<br>5 | 197,000  Amount to tax 120,000  120,000  160,000  Total taxable income | $Tax$ $\frac{5}{100} \times 120,000$ $= shs6000$ $\frac{10}{100} \times 120,000$ $= shs12,000$ $\frac{12}{100} \times 160,000$ $shs19,200$ $\frac{15}{100} \times 123,000$ $shs18450$ $Total tax$ $= shs55,650$ | be taxed<br>403,000<br>283,000 | B1<br>B1 |  |

|     | = 720,000 - 55650<br>= shs664,350             | MI       |
|-----|-----------------------------------------------|----------|
| (c) | $\frac{664350}{720,000} \times 100 = 92.27\%$ | A)<br>B) |
|     |                                               |          |
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|     |                                               |          |
|     | END                                           |          |