INSTRUCTIONS : Answer All Questions **TIME : 1Hr 30 Mins.**

1. All prime numbers less than ten are arranged in descending order to form a number.

   a) Write down the number formed (2Mks)

   7532

   b) What is the total value of the second digit? (1Mk)

   30

2. If x = -2 , y = -6 and z = 4 . Find the value of

   $\frac{12yz}{x}$ (3Mks)

   $\frac{12 \times (-6) \times 4}{-2} = \frac{-288}{-2}$ M_1

   $= 144$ M_1

3. Solve: (3Mks)

   $\frac{3}{x-4} = \frac{3}{6}$

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   $3(x-4) = 18$ M_1

   $x - 4 = 6 \Rightarrow x = 10$ M_1

   B_1

4. A number n is such that when it is divided by 27,30 and 45 the remainder is 3. Find the smallest value of n (3Mks).

L.C.M 3 27 30 45
2 9 10 15
3 9 5 15 M_1
3 3 5 5
5 1 5 5
1 1 1

$= 3^3 \times 10 = 270$ M_1

$270 + 3$

$= \underline{273}$ M_1

5. Koech spends a total of sh. 207 on buying 7 books and 5 pens. If he had bought 5 books and 5 pens he would have saved sh. 42. Find the cost of one book and one pen. (4Mks)

$207 - 42 = 165$ M_1

$7b + 5p = 207$

$-5b + 5p = 165$ M_1

$2b = 42$

$b = 21$

$p = \frac{207 - 7(21)}{5}$

$= \frac{207 - 147}{5}$ M_1

$p = 12$

1 book = Sh. 21 M_1

1 Pen = Sh. 12

6. A tourist arrived in Kenya with 105,000 Hong Kong dollars and changed the whole amount to Kenyan shillings. In Kenya she spent Ksh. 403,897 and changed the balance to South Africa rand. How much South Africa rand did she receive ?(4Mks)

	Buying (Ksh)	Selling (Ksh)
1 Hong Kong dollar	9.74	9.77
1 South Africa rand.	12.03	12.11

1 HKD → Sh. 9.74

105,000 HKD → ? x

$\frac{105,000 \times 9.74}{1}$

= Ksh. 1,022,700 M_1

1022700 − 403897

= Ksh. 618,803 M_1

1 SAR → Ksh. 12.11

? → Ksh. 618,803

$\frac{618,803 \times 1}{12.11}$ B_1

$= 51,098.5 \simeq$

51,099 South Africa Rand. M_1

7. The surface area of a sphere of radius r is given by the formula $A = 4\pi r^2$. What is the radius of a sphere whose surface area is 440cm2? (Correct to 3 decimal places)? ($\pi = \frac{22}{7}$) (3Mks)

$A = 4\pi r^2 = 440\ cm^2$

$r = ?$

$440 = 4 \times \frac{22}{7} \times r^2$ M_1

$\frac{440}{4} \times \frac{7}{22} = r^2$

$r^2 = 35$ M_1

$r = \sqrt{35}$

$= 5.91607$

$= \underline{5.916\ cm}$ (3 d.p) M_1

8. Three boys shared some money. The youngest got $\frac{1}{12}$ of it, the next got $\frac{1}{9}$ of the remainder and the eldest got the remainder. What fraction of the money did the eldest receive? If the eldest boy got Sh. 330, what was the original sum of the money? (4Mks)

Young $= \frac{1}{12}$

Second $= \frac{1}{9} \times \frac{11}{12} = \frac{11}{108}$ M_1

Eldest $= 1 - \left(\frac{1}{12} + \frac{11}{108}\right) = \frac{22}{27}$ M_1

$\frac{22}{27} \Rightarrow 330$

$\frac{1}{1} \Rightarrow ?$ M_1

$= 1 \times 330 \times \frac{27}{22}$

Sh. 405 M_1

9. a) Solve :. (3Mks)

$3x - \frac{1}{3}y = \frac{1}{2}$

$x + \frac{1}{3}y = \frac{5}{6}$

$x = 4y$

$\frac{x}{y} = \frac{4}{1} \Rightarrow x : y = 4 : 1$ M_1 M_1

$2y = 3z$ M_1

$\frac{y}{z} = \frac{3}{2} \Rightarrow y : z = 3 : 2$

$x : y = 4 : 1 \times 3$

$y : z = 3 : 2 \times 1$

$\therefore x : y = 12 : 3$ M_1

$y : z = 3 : 2$

$\Rightarrow x : y : z =$

$12 : 3 : 2$ M_1

10. Find the ratio x: y: z if : (4Mks)

x = 4y and 2y = 3z

$3x - \frac{1}{3}y = \frac{1}{2}$

$+ \quad x + \frac{1}{3}y = \frac{5}{6}$

$4x = \frac{4}{3} \Rightarrow x = \frac{1}{3}$ M_1

$3\left(\frac{1}{3}\right) - \frac{1}{3}y = \frac{1}{2}$ M_1

$-\frac{1}{3}y = -\frac{1}{2}$

$y = \frac{3}{2}$ M_1

11. A manufacturer sells goods to a shopkeeper at a profit of 15%. The shopkeeper sells them so as to make a profit of 25%. During a sale, the shopkeeper reduced his prices by 10%. Find, to the nearest shilling, the factory price of an article which sold at Sh. 450 during the sale (4Mks)

90% ⇒ 450
100% ⇒ ?

$= \frac{100}{90} \times 450 = \text{sh. } 500$ m_1

125% ⇒ 500
100% ⇒ ?

$= \frac{100}{125} \times 500$
$= \text{sh. } 400$ m_1

115% ⇒ 400
100% ⇒ ? m_1

$\frac{100}{115} \times 400$
$= \text{sh. } 347.83$
$= \underline{\text{sh. } 348}$ (nearest sh) m_1

12. The sum of interior angles of a polygon is 1980°, find:

a) the number of triangles the polygon can be divided into (2Mks)

$(n-2)180 = 1980$ m_1
$(n-2) = \frac{1980}{180} = 11$

11 triangles m_1

b) the number of sides the polygon has (2Mks)

$n-2 = 11$
$n = 11+2 = 13.$

13. Four interior angles of a hexagon are 100°, 140°, 125° and 105°. The fifth interior angle is four times the sixth. Find in degrees, the fifth interior angle (4Mks)

$(n-2)180$, $n=6$
$(6-2)180 = 720°$ m_1

$5^{th}+6^{th} = 720-(100+125+140+105)$
$= 250°$ m_1

$5^{th} \Rightarrow x$ $4^{th} \Rightarrow \frac{1}{4}x$
$x + \frac{1}{4}x = 250$ m_1
$\frac{5}{4}x = 250$ $x = 200°$
$5^{th} = \underline{200°}$ M

14. A sales woman was paid monthly salary of sh. 20,000 plus a commission on goods sold. In one month, she sold goods worth sh. 40,000. At the end of the month her total earnings were sh. 21,200. What percentage commission was she given (4Mks).

B.S ⇒ 20,000
N.S ⇒ 21,200
$C = 21,200 - 20,000$
$C = \underline{\text{sh. } 1,200}$ m_1

40,000 ⇒ 100%
1,200 ⇒ ? m_1

$\frac{1200 \times 100}{40000} = 3$ m_1

$C = \underline{3\%}$ m_1