K.C.S.E YEAR 2010 121/ 2 MARKING SCHEME

1. $\frac{(7.55 \times 5.25) - (7.45 \times 5.15) \times 100}{2 \times 7.5 \times 5.2}$

   $= 1.628\%$

2. $\frac{4}{\sqrt{5}+\sqrt{2}} - \frac{3}{\sqrt{5}-\sqrt{2}}$

   $= 4(\sqrt{5}+\sqrt{2})(\sqrt{5}-\sqrt{2})$

   $= \frac{4\sqrt{5} - 4\sqrt{2} - 3\sqrt{5} - 3\sqrt{2}}{5-2}$

   $= \frac{\sqrt{5} - 7\sqrt{2}}{3}$

3. $< OCT = 36^0$

   $< OCT = 36^0$

   $< OCT = 90 - 36^0 = 54^0$

   OR $= \frac{108^0}{2} = 54^0$

4. $68X + 53Y = 62$

   $X + Y$

   $6X = 9Y$

   $X : Y = 9:6$

   $= 3:2$

5. let length be X

   Length = $2x$

   Area = $(2x \ 2s = 60$

   $X - x - 30 = 0$

   $(x-6)(x+5) = 0$

   $X = 6$

6. One person can build 1/5 x 3 huts in 21 days

   10 people can build 6 huts in 21 days

   2 people could lid 6 lids in 15 days

   $X = 21 \times p \quad 6/3 \times 21/15 \times 5$

   = 14 people

7. $= \frac{4000 \times R \times}{}$

   $R = \frac{3800}{2000} = 1.9\%$

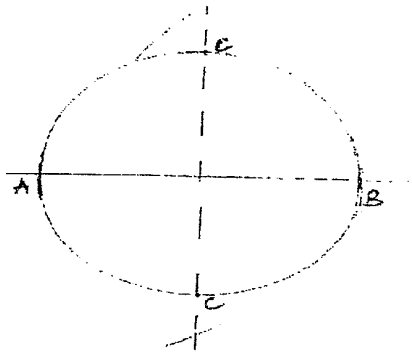
   $r = 1.9\%$

   $3420 = \frac{p \times 1.9 \times 7.5}{100}$

   $P = \frac{3420 \times 100}{1.9 \times 7.5}$

   $= 24000$

8. .
9. .
10. .
11. .
12. .
13.



(a) Locus of P Drawn. B1

(b) + bisector of AB Constructed B1

(c) Position of C indicated in places B1

3marks

14. $3y - y = \frac{p}{Q + {}^1/_x}$

    $2y(q + {}^1/_x) = p$

    $q + 1/x = {}^p/_{2y}$

    $1/x = {}^p/_{2y} - q$

    $X = 2y$

15. $\text{Log}(15 - 5x) = \log(3x - 2)$

    $\frac{15 - 5x}{10} = 3x - 2$

    $15 - 5x = 30x - 20$

    $X = 1$

16. (a) (i) Coordinates of centre (1,-1)

    (ii) radius ; $r^2 = 1^2 + 3^2 = 10$

    $= r\sqrt{3.162}$

    Or $= \sqrt{10}$

    Accept it

    (b) equation:

    $(x-1)^2 + y + 1)^2 = 10$

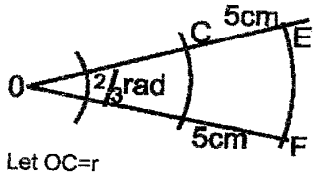
11. No of oranges for Friday
1948 – (750 + 750 + 240)
=208
No of oranges for Saturday
208 + 560 = 768
∴ Amount = sh.8 × 768
=sh.6144

12. $\frac{x^2+x-4xy-4y}{(x+1)(4y^2-xy)}=\frac{x(x+1)-4y(x+1)}{(x+1)(y)(4y-x)}$
$=\frac{(x-4y)(x+1)}{(x+1)(-y)(x-4y)}$
$=-\frac{1}{y}$

13. Sin 3θ = cos 2 θ
∴ sin 3θ = sin (90° - 2θ)
∴ 3θ=90° - 2θ
5 θ = 90
θ = 18°

14. $2\pi r^2+2\pi rh=154$
r = h
$2\pi r^2+2\pi r^2=154$
$4\pi r^2=154$
$r=\sqrt{\frac{154}{4\times3.142}}$
r=3.500
∴ diameter = 2r = 3.500 × 2
=7.00(2dp)

15.



Let OC=r
$\therefore CD=\frac{2}{3}r \text{ and } EF=\frac{2}{3}(r+5)$
$\frac{2}{3}r+\frac{2}{3}(r+5)+5+5=24$
$\frac{4}{3}r=10\frac{2}{3}$
r=8

16.
Total number of seedlings
(5×1)+(10×3) + (15×1)+(20×4)+(30×1)+(10×2)
=5+30+15+80+30+20 = 180
% of height (h) : 23 ≤ h < 27
$=\left(\frac{30+15}{180}\right)\times100$
=25%

17. (a) Total sales = sh.360 ×500
= sh.180,000
Commission = sh(180,000 – 100,000)×$^2/_3$
=sh.1600
Total earnings = sh.(12,000 + 1600)
=13600

(b) (i) New salary = sh.(12000 + 12000×$^{10}/_{100}$)
=sh. 13200
Commission paid = sh(17,600 – 13,200
=sh.4400
Commission is paid on sh.4400 × $^{100}/_2$
= 220,000
Total sales = sh.220,000 + 100,000
=320,000/=

(ii) $No\ of\ handbags\ sold=\frac{320,000}{500}$
=640

18. (a) (i) Internal volume of box=150×80×40cm^3
=480,000cm^3
External volume of bos = 152×82×42cm^3
=523488cm^3
∴ Volume of wood =(523488 – 480,000)cm^3
=43488cm^3

(ii) $Mass\ of\ box=\frac{43488\times0.6}{1000}$
=26092.8
=26.1kg

(b) (i) $No\ of\ tins=\frac{150}{10}\times\frac{80}{10}\times\frac{40}{10}$
=240

(ii) $Total\ mass=26.1+\left(\frac{240\times120}{1000}\right)$
=54.9kg

19. (a) Det I 45 – 42 I = 3

Inverse $A^{-1}=\frac{1}{3}\begin{pmatrix}9&-6\\-7&5\end{pmatrix}$

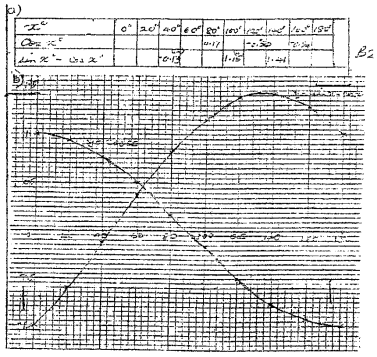
(b)
$\begin{pmatrix}5&6\\6&9\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}2440\\3560\end{pmatrix}$

(ii)
$\frac{1}{3}\begin{pmatrix}9&-6\\-7&5\end{pmatrix}\begin{pmatrix}5&6\\6&9\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}3&-2\\-\frac{7}{3}&\frac{5}{3}\end{pmatrix}\begin{pmatrix}2440\\3560\end{pmatrix}$

$X^2 - 2x + 1 + y^2 + 2y + 1 = 10$

$X^2 + y^2 - 2x + 2y = 8$

17.



(C) (i) $\sin X^0 - \cos x^0 = 1.2$

$X^0 = 103 +- 1^0 ; 167^0 +- 1$

(ii) $\cos X^0 = \frac{1}{2} \sin X^0$

$= \cos x^0 = \sin x^0 - \cos x^0$

$= 63^0 + 1^0$

(iii) $\cos 63^0 = 0.45 + - 0.01$

18. (a) OB = 3P + 3r

AJ = 2P – 2 R

(b) OX = m(0B) = m (3p+3r)

= 3mp2 +3mr

(ii) OX = 2r + p + n (2p-2r)

= (1 + 2n) p +(2-2nr +p +2np

3mp + 3mr = r(2-2n) + p (1+2n)

3m = 1 + 2n..... (i)

3m = 2-2n.....(ii)

1+2n = 2-2n

4n = 1 n= ¼

Subst for n = ¼ in (i)

3m = 1+ 2 x ¼

3 m = ½ = m = $\frac{3 = 1}{2 \times 3}$

The ratio in which x divides AJ

AX = n AJ = ¼ AJ

Ratio 1:3

19. (i) Angle subtended (longitude)

$= 16 + 24 = 40^0$

AVC AB = 60 X 40 X Cos 34^0

= ≈ 1989.69 1990nm

(ii) Arc AC : latitude difference

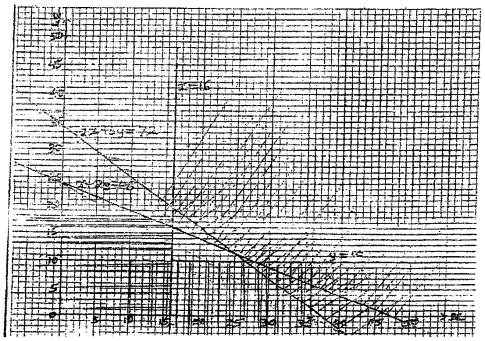
$= 26 + 34 = 60^0$

. . Arc AC = 60 X 60 NM

= 3600

(b) (I) treal tiem at B

1330 + 40 H



15

1330 + 2 h 40 min

= 1610h

(ii) Time taken to travel from

A to B

= $\frac{1990}{40}$

= 49 H 45 min

Time of arrival

Wednesday at 1610 + 1 h 45 min

= Wed at 1755h

20. (a) $4x + 6y \geq 144$

$100x + 200y \geq 4800$

$X \geq 16$

$Y > 10$

b)

$2x + 3y \geq 72$ drawn & shaded

$X + 2y \geq 48$ drawn & shaded

$X \geq 16$

$Y > 10$

At least 2 visible points inspected or search the drawn substituting in equation

21. (a) 1ct number of rows be and number of persons per row be p

$Pr = 600$

$(r+ 5)(p- 6) = 600$

$(r + 5)(600 - 6) = 600$

$(r+ 5)\left(\frac{600}{r} - 6\right) = 600$

$(r + 5)(600 - 6r) = 600r$

$600r - 6r^2 + 3000 - 30r = 600r$

$r^2 + 5r - 500 = 0$

$(r + 25)(r-20) = 0$

$r = 20$

(b) No of rows in new arrangement

$20 + 5 = 25$

No. of empty spaces per row with 450 people sealed

$600 - 450$

$= \frac{150}{25}$

$= 6$

22. (a) $T6 = p + 5c$

$T5 = P + 4d$

$P + 4d = p + 5c$

$4d = 5c$

$d = 5/4c$

(b) $P + 3d - (p + 3c) = 1^1/_2$

$3d - 3c = 1^1/_2$

$15c - 3c = 1^1/_2$

$¾ c = {}^3/_2 \quad C = 2$

$d = 2^1/_2$

(c) $S_2 = ½ n(2p + 10) = 2.5(2p + 10)$

$= 5p + 25$

$(6p + 30) - (5p + 25) = 10$

$P + 5 = 10$

$P = 5$

23. (a) $S = at + b t2$

$80 = 2a + 4b$.....(i)

$135 = 3a + 9b$.....(ii)

(ii) x 2 $\Longrightarrow$ $270 = 6a + 18b$

X 3 $\Longrightarrow$ $240 = 6a + 12b$

$30 = 6b \quad b = 5$

Substitute for b = 5 in (i)

$80 = 2b + 4 \times 5$

$60 = 2a = a = 30$

Expression : $5 = 30t + 5t^2$

(b) (i) Distance when t = 5 seconds

$S = 30 \times 5 + 5 \times 25$

$= 275m$

(ii) $560 = 30t + 5t^2$

$5t^2 + 30t - 560 = 0$

$T + 6t - 112 = 0$

$(t + 14)(t- 8) = 0$

Time taken, t = 8 seconds

24.

(a) (i/) < OSR = $90 - 50 = 40$

(ii) $\therefore$ < USP = 30^0

$+ 50^0 = 80^0$

(iii) < PSR = 50^0

(iv) < PQR = $180^0 - 50^0 = 130^0$

(b) (i) PT X TR = TS^2

$(7 + X)(7) = 9^2$

$7X = 81 - 49 = 32$

$X = \frac{32}{7} = 4.57$

(ii) $\frac{4.57}{\sin^0} = 25$

$r = \frac{4.57}{2 \sin^0}$