**KENYA HIGH EXAMINTIONS 2021**

**121/1**

**MATHEMATICS PAPER 1**

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | $\frac{16+20}{-12-6}$$\frac{36}{-18}$-2 | M1A1 | ✔Min &deno |
| 2. | Food = $\frac{1}{2}$Trans = $\frac{1}{20}$Rem = $\frac{1}{4}$Fraction of saving= 1 – ($\frac{1}{2}$+ $\frac{1}{20}$ + $\frac{1}{4}$) = 1 - $\frac{16}{20}$ = $\frac{4}{20}$Salary = 3400 x $\frac{20}{4}$= KSh. 17000 | M1M1A1 | ✔ Fraction  |
| 3. | $\frac{\left(y-2x\right)(2y+x)}{\left(2y-x\right)(2y+x)}$$\frac{y-2x}{2y-x}$ | M1M1A1 | For denFor number  |
| 4. | $3^{2x+3}$+ 1 = 28$3^{2x+3}$ = 27$3^{2x}$ x $3^{3}$ = $3^{3}$27 x $3^{2x}$ = 27$3^{2x}$ = $1^{0}$2x = 0x = 0 | M1A1 |  |
| 5. | S = $\frac{5.7+4.2+6.3}{2}$ = 8.1= $\sqrt{8.1\left(8.1-5.7\right)\left(8.1-4.2\right)8.1-6.3}$= $\sqrt{8.1 x 2.4 x 3.9 x 1.8}$ = 11.68Shaded area = 18.05 – 11.68= $6.368cm^{2}$ | B1M1A1B1 | For 11.68 |
| 6. | $\frac{2.4}{100}$ x 100,000 = 2400$\frac{3.9}{100}$ x 180,000 = 7020= 9420 | M1M1A1 |  |
| 7. | (a) x(x + 4) = 96$x^{2}$ + 4x – 96 = 0 (x-8) (x + 12) = 0 x = 8 Length = 12 Width = 8(b) Perimeter = 2 (8 + 12) = 40m | M1A1 B1  | Both |
| 8. | Sin-1 0.5 = (90 – a)600 = 900 – a a = 300Cos 300Cos a = $\frac{\sqrt{3}}{2}$ | M1 for a = 300B1 for $\frac{\sqrt{3}}{2}$ CAO |  |
| 9. | (a) $\frac{CE}{BC}$ = $\frac{DE}{AB}$$\frac{x}{x+6}$ = $\frac{7.5}{15}$x = 6(b) $\sqrt{6^{2}-3.75^{2}-}$ = 4.684AB = 2 x 4.684 = 9.368A = $\frac{1}{2}$ x 15 x 9.368 - $\frac{1}{2}$ x 7.5 x 4.684= 52.698 | M1A1M1A1 |  |
| 10. | $\frac{22}{7}$ x $5^{2}$ (10 – 6) = 314.29cm3$\frac{4}{3}$ x $\frac{22}{7}r^{3}$ = 314.29r = 4.217 | M1M1A1 |  |
| 11. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\10.jpgAM = 4.2cm, AC = 5.6cm (± 0.1cm) | B1B1B1B1 | Construction of 450ΔABC⊥ Dropped from A to BCFor AM to AC |
| 12. | 50,48,46,……………$T\_{8}$ = 50 + 7x (-2)= 36$S\_{2}$ = $\frac{20}{2}$ (2 x 50 + (20 – 1) (x – 2) = 620 | M1A1M1A1 |  |
| 13. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\11.jpg Surface area of base = 6cm x 6cm = 36cm2Area of sides (flaps) = ( ½ x 6cm x 8cm)4 = 96cm2Total surface area = 36cm2 + 96cm2 = 132cm2 | B1M1A1 | Net |
| 14. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\12.jpg1. 3240
2. (7.2 x 5) km

= 36km | B1B1B1B1 | Z accurately located wrt YX accurately located wrt YBearing of X from ZDistance of X from Z |
| 15. | $2^{2x}$ - 18 x $2^{x}$ - 40 = 0$2^{\left(x\right)2}$ - 18 x $2^{x}$-40 = 0Let $2^{x}$ be tt2 – 18t – 40 = 0t(t – 20) + 2(t – 20) = 0(t + 2)(t-20) = 0Either t – 20 = 0 t = 20or t + 2 = 0 t = -2but t = 2xfor 2x = -2 there are no real valuesbut for 2x = 20$\frac{xlog2}{log}$ = $\frac{loglog 20 }{loglog 2 }$x = 4.32 (2 dps) | M1A1B1 | eqn in tboth  |
| 16. | $\frac{90}{100}$x = 180,000x = $\frac{180000}{90}$ x 100= 200000$\frac{120}{100}$y = 200000BP ⇒$\frac{200000}{120}$ x 100 = 166,666.66 | M1M1A1 |  |
| 17. | = $\frac{7}{3}$ x 90 = 210kmRemaining distance = 360 – 210 = 150kmAs = 90 + 110 = 200kmTime for meeting = $\frac{150km}{200km/hr}$ = 0.75 hrs= 45 minsMeeting time = 10.35 + .45 11.20 a.m(ii) Distance from A 210 + (0.75 x 90) = 210 + 67.5 = 277.5 km(b) Time minibus arrived at B Time = $\frac{D}{S}$ = $\frac{360}{90}$ = 4 hrs= 8.15 + 4 hrs = 12.15 p.mTime taken by the tourist to arriveB = 12.15 pm – 10.30 a.m = 1 hr 45 min = 1$\frac{45}{60}$ x 100= 175km∴ Home to B = 175kmHome to A = 360 – 175= 185km | B1B1M1A1M1A1M1M1A1B1 | ✔ Distance covered by minibus for  2$\frac{1}{3}$ hrs✔Ans✔ CAO |
| 18. | Cosθ = $\frac{250^{2}+320^{2}-440^{2}}{2 x 250 x 320}$θ = 100.330A = $\frac{1}{2}$x 250 x 320 Sin 100.33$\frac{39351.65}{10000}$= 3.9352 ha2R = $\frac{440}{Sin 100.33}$R = 223.6A = $\frac{22}{7}$ x 223.62 – 39351.65= 117,781.7m2 | M1A1M1M1A1 M1A1M1M1A1 | Area of circleDifference |
| 19. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\13.jpg(ii) 4.4 x 50 = 220km± 5(iii) 8.5 x 50 = 425±5(iv) 2000 | B1B1B1B1 B1B1B1B1B1B1  | Pst of LPst of NPst of MConstruction of bisectorMeasurement LengthMeasurementLength Measurement Angle  |
| 20. | (a) $\frac{1200}{x}$(b) $\frac{120}{x}$ + 10$\frac{1400}{x-5}$1. $\frac{1400}{x-5}$ = $\frac{1200}{x}$ = 10

$\frac{1400x-1200(x-5)}{x(x-5)}$= 10$\frac{1400x-1200(x-5)}{x(x-5)}$ = 10 200x + 6000 = 10x2 – 50x 20x + 600 = x2 – 5x x2 + 15x – 40x – 600 = 0 x(x + 15) – 40(x + 15) = 0 (x-40)(x+15) = 0 x = 40 people 40 – 5 = 351. = $\frac{1400}{35}$

= KSh. 40 |  | B1B1B1M1M1M1A1B1M1A1 |
| 21. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\14.jpg(b) (i) Length of ON = 3.9cm±0.1 (ii) Area = 6 x 3.9 = 23.4cm2  | B1B1B1B1B1B1B1 | Both 900& 600 at A750 at A900& 600 at B750 drawn at point BBoth AB = 6cm and BC = 4cmParrallegram completed⊥ Drawn |
| 22. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\15.jpg Areas.A = $\frac{1}{2}$ x 60 x 60 = 1800m2B = $\frac{(60+100)}{2}$x 200 = 16000m2C = $\frac{(100+120)}{2}$ x 60 = 6600m2D = $\frac{1}{2}$ x 120 x 80 = 4800m2E = $\frac{1}{2}$ x 160 x 220 = 17600m2F = $\frac{(160+100)}{2}$ x 20 = 2600m2G = $\frac{(100+120)}{2}$ x 60 = 6600m2H = $\frac{1}{2}$ x 120 x 100 = 6000m2Total area = 62000m2 = $\frac{62000}{10000}$ = 6.2ha1ha = 80,0006.2ha = 8000 x $\frac{6.2}{1}$= KSh. 496,000.00 | B3M1M1M1M1M1A1 | 3 for at least 6, 2 for at least 4, 1 for at least 2 |
| 23. | (a) 6 + 14 + 24 + x + 10 + 6 + 4 = 100 x = 100 – 78 = 22(b) Modal class 35 – 44(c) median = 44.4 + $\frac{6}{14}$ x 10= 48.79(d)

|  |  |  |
| --- | --- | --- |
| Midpoint | f | xf |
| 19.5 | 6 | 117 |
| 29.5 | 14 | 413 |
| 39.5 | 24 | 948 |
| 49.5 | 14 | 693 |
| 59.5 | 22 | 1309 |
| 69.5 | 10 | 695 |
| 79.5 | 6 | 477 |
| 89.5 | 4 | 358 |

 | M1A1B1M1A1B1B1 | Mid pointsx column |
|  | Σf = 100 Σxf = 5010Mean = $\frac{xf}{f}$= $\frac{5010}{100}$= 50.10 | B1M1A1 | ✔Σf, Σxf |
| 24. | (a)C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\16.jpgTriangle ABC $b^{2}$+$h^{2}$=$hy^{2}$A$B^{2}$ + B$C^{2}$= A$C^{2}$$7^{2}$ + $24^{2}$ = $25^{2}$49 + 576 = 625625 = 625(b) BAD = 2BACSin θ = $\frac{24}{25}$θ = 73.740BAD = 73.74 x 2 = 147.480(c) Area of kite = $\frac{1}{2}$ x 7 x 24 x 2Area of sector ABD = $\frac{147}{360}$ x 3.14 x $7^{2}$= 62.87cm2Area shaded = 168 – 62.87= 105.13cm2 |  | M1A1B1B1M1A1M1A1A1A1 |