**ASUMBI GIRLS HIGH SCHOOL**

**TERM 2– DECEMBER 2021**

**FORM 4 – MATHEMATICS PAPER 2**

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
|  | WORKING | MARKS | COMMENTS |
| 1 | |  |  | | --- | --- | | No. | Log | | 1.000------  0.03506---  28.5 -------  +  90.35  118.87------  4.917×100  4.917 | 0.0000  2.5448  1.4552  2.0751÷3  0.6917 | | | | | | | M1  M1  M1  A1 | For + and –  For +  For ÷ |
| 2. | +  =  =  = | M1  M1  A1 |  |
| 3 | (p-3q)5 = p5+5p4(-3q)-10p3(-3q)2+10p2(-3q)3  = p5 +-15p4q +90p3q2 -270p2q3   1. Coefficient =-15 2. 4th term =-270p2q3 |  |  |
| 4 | b=  =  c=  c= = - | M1  A1 |  |
| 5 | D = 3x -6=0  =6-6x-6x+6=0  =6-12x+6=0  =6-6x-6x+6 =0  6x- 6=0  (6x-6)=0  X=1 | M1  M1  A1  3 |  |
| 6 | Error = × 100  = × 100  = 13 | M1M1  A1  **3** |  |
| 8 | Log28(2+3x) = log24(2x+6)  16 +24x = 8x + 24  16x = 8  X= ½ | M1  M1  A1  3 |  |
| 9 | 5.2(RT) = 3.2x4.7  RT =  = 2.59  RS = 5.2 + 2.89  = 8.09 |  |  |
|  |  | B1  B1  B1  B1 | For perpendicular bisector  Circle centre A  Semicircle  Shaded region |
| 11 | 3X2 + 3Y2 – 18X + 12Y – 9 =0  X2 + Y2 -6X +4Y =0  X2 - 6X + 9 + Y2 +4Y + 4 = 3+ 9+4  (X - 3)2 + (Y + 2)2 = 16  Centre (3,-2)  Radius = 4 | B1  B1  B1  3 | For factorized  For centre  For radius |
| 12 | 147 105  Cp = x 147 = sh 140  Let the ratio b 1 n  = 140  100 +105n = 140 + 140n  10n = 40  n =4  ratio | M1  M1  B1  3 |  |
| 13 | Total tax= 3038+1162= 4200  Tax calc  x2 = 840  x3 = 1440  x 4 = 1920  total = 4200  x= = 9600  Income = (18000+9600) x  = sh 24000 | M1  M1  M1  A1  4 |  |
| 14 | x (x+3) -12=0  x2 + 3x-12 = 0  x2+ 4x-x -12 =0  x(x+4)-1(x+4)=0  (x-1)(x+4)= 0  X=1 x=-4 | M1  M1  A1  3 | For determinant equated to 0  Factors |
| 15 | .  b = x sin105  327.8461 | B1  M1  A1  3 |  |
| 16 |  |  |  |
|  | **SECTION II** |  |  |
| 17 | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | -2 | -1.5 | -1 | 0 | 1 | 2 | 3 | 4 | 5 | | y | -23 | -8.625 | 1 | 9 | 7 | 1 | -3 | 1 | 19 | |  |  |
| 18 i  Ii  iii | Y = nX +  Y = nX +  135 = 2n +  140 = 3n +  4m + n = 270  9m + n = 420  5m = 150  M = 30  n = 270-120 =150  y= 30x +  y = 30x10 +  = 315  30x + = 180  30 x2 +150 =180x  30 x2 – 180x +150 = 0  (x-5)(x-1)= 0  X=5 or x=1 | M1  M1  A1  B1  B1  M1  A1  M1  M1  A1  10 | For both equations  Elimination of one unknown |
| 19a  b ( i)  ii  iii | a a+3d a+ 12d  a+ 2d + a+ 10d =30  2a + 12a =30  =  (a+3d )2 = a2 + 12ad  9d2 -6ad + 9d2 = a2 +12ad  9d2 – 6ad =0  9d2- 90d(15-6d) = 0  9d2 -90d +36d2 = 0  45 d2 + 90d = 0  9d (5d - 10)= 0  d = 0 or d= 2  a = 15-6d  = 15-12  = 3  r = =  = 3  S10 = 3(310 -1) / 2 = 888572 | B1  M1  M1  M1  A1  A1  M1  A1  M1A1  10 |  |
| 20a  b | Dist AB = x 2 R Cos  3000 = x 2 R Cos  Α = 31.150  60α cos = 5x600  α = 50/cos60  = 1000  K = 100 – 45  = 550  Long diff = 450 + 550 =900  Time diff = 100 x4 / 60  = 6hrs 40mins  Time at Q = 10.45am + 6hrs 40 mins  17 25 HRS  Time when the plane reached 17 25hrs + 5 hrs  22 25 HRS | M1  A1 |  |
| 21 i  ii  iii  iv | P(wakes up early) = p(BE’ or B’ E’)  = x + x  =  P(wakes up early but late for class)= P(BEC’ or B’ EC’)  = x x + x x  =  P(bed late but early for class)= P(B’EC or B’ E’C)  = x x + x x  = 25/294  P(late) = P(BEC ‘or B E’C’ or B’EC’ or B’E’C’)  = x x + x x + x x + x x  = | M1  A1  M1  A1  M1  A1  M1  A1  10 |  |
| 22 | 1. 1 k 3 = 5   0 1 1 1  3 + k = 5  K = 2  1 2   1. 1 2. a b 1 -2 = 2 -3   c d 3 3 4 -1    a + 3b = 2  -2a + 3b = -3  3a = 5 a = 5/3  3b = 2 – 5/3  3b = 1/3 b= 1/9    c + 3d = 4  -2c + 3d = -1  3c = 5 c = 5/3  d = (4 – 5/3)/ 3 d= 7/9  5/3 1/9  5/3 7/9   1. 2 1 3 0 3   0 2 1 3 -2  7 3 3 = 15  2 6 -2 -6  (15,-6) | M1  A1  B1  M1  M1  M1  A1  M1  A1  B1 |  |
| 23 | 1. 52x + 32y ≥ 500   13x + 8y ≥ 125………………………………………1  200x + 300y ≥ 3500  2x + 3y ≥ 35…………………………………………..2  x + y ≤ 15 ………………………………………………3  x ≥ 0 , y ≥ 0 |  |  |
| 24 | a.  [t3/3 – t2 + 4t] 3  2  (27/3 – 9+12) – (8/3 -4 +8)  12 – 4 - 8/3  8 – 8/3  (24-8)/3  16/3 or 5 1/3  b. t2 – 4t + 4 = 0  t = 4 ± √(16-4(4)  2  4 ± 0 = 2  2  c.  a = dv/dt  = 2t – t (at t = 2)  a= 2(2) – 2  a= 2 m/s2 | M 1  M1  M1  A1  M1  M1 A1  M1  M1  A1 |  |