**CEKENA JOINT EVALUATION TEST-2021**

***Kenya Certificate of Secondary Education(K.C.S.E)***

121/2

**MATHEMATICS**

PAPER2

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Max vol = ×7.05×16=833.1086  Min vol = × 6.952 × 16= 809.6419  Actual vol =­×7.102 × 16 = 821.333  AE=  % = | M1  M1  A1 | Accept    =1.429% |
|  |  | 03 |  |
| 2. | Log3(2x+1)=2Log33 +Log3 (3x-11)ü  Log3 (2x+1) = Log39 + log3 (3x-11)  Log3(2x+1) = Log3 9(3x-11)  2x+1=27x-99  25x=100  x=4 | M1  M1  A1 | introducing Lo33 |
|  |  | 03 |  |
| 3. | Let the ratio of Brans A : brand B = X:Y | M1  M1  A1 | Formatting of the eq. with the selling price as 125% of the buying price  Attempt to solve the eq. by correcting the like terms together |
|  |  | 03 |  |
| 4. |  | M1  M1  A1 | Denominator  eliminated  Attempt to collect terms with a |
|  |  | 03 |  |
| 5. | Sin (x+20) = -0.7660  (x+20)=500  x+20 = 230,710,410  x=210,290,390  x=2100,2900 | M1  M1  A1 |  |
|  |  | 3 |  |
| 6. | 1(x)6 (-y)0 (x)5 (-y)+15(x)4 (-y)2 +20(x)3 (-y)3 +15(x)2 (-y)  +6(x)1 (-y)5 +1(x)0 (-y)6  = x6 -6x5y+15x4y2 -20x3y3 +15x2y4 -6xy5 +y6  (1.98)6 = (x-y)6 = (2-0.02)6  =26 -6(2)5(0.02)+15(2)4 (0.02)2 -20(2)3 (0.02)3  64-3.84+0.096-0.00128  =60.25472=60.25 | B1  M1  A1 |  |
|  |  | 03 |  |
| 7. |  | M1  M1  A1 |  |
|  |  | 3 |  |
| 8. |  | M1  M1  A1 |  |
|  |  | 03 |  |
| 9. | 60000  1.015n >  n log 1.015 > log  n >  Least number of years is 11 years | M1  M1  A1 |  |
|  |  | 03 |  |
| 10.(i) | Centre =  Radius =  (x-2)2 +(y-1)2 =32  x2 + 4x+4+y2 -2y+1=9  x2 +y2 -4x-2y-4=0 | B1  B1  B1  B1 |  |
|  |  | 04 |  |
| 11. |  | M1M1  M1  A1 |  |
|  |  | 04 |  |
| 12. |  | B1  B1  B1 | Construction of perpendicular bisector. Construction marks  Locating the locus of A by drawing circulating circle. |
|  |  | 03 |  |
| 13. | Average rate of decrease in temperature = 2.625 | M1  A1 |  |
|  |  | 02 |  |
| 14. | In 1 hr Tap A =  of the tank  Tap B =  of the tank  Tap P =  of the tank  In 1 hour tap A and P fill    For 5 hours = ×5 = of the tank  The empty fraction =1-  Taps A,B and P in 1 hour fills | M1  A1  M1  A1 |  |
|  |  | 4 |  |
| 15. | Determinant = (k-1)k +2k=k2 +k  Determinant =  K(k-1) =  4.5k2 -4.5k=54  4.5k2 -4.5k -54=0  45k2 -45k -540=0  K2 –K -12=0  K2 -4k+3k-12=0  K(k-4)+3(k-4)=0  (k-4)(k+3)=0  K= 4 or k=-3 | M1  M1  A1 |  |
|  |  | 3 |  |
| 16. | 170000+ (K-1) 15000  K=11 | B1  M1  A1 |  |
|  |  | 03 |  |
| 17.(a)(i) | θ1 = 0.84θ, K1 = 1.44R  P1 =    G=a+bS  A+2b=8  a+4b=12  -2b = -4  b= 2  a= 4  G = 4+2 (6) = 16 | B1  M1  A1  B1  M1  A1  B1  M1  A1  B1 |  |
|  |  | 10 |  |
| 18. (a) | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X0 | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | | y=3cos2x+2 | 5.0 | 3.5 | 0.5 | -1 | 0.5 | 3.5 | 5 | 3.5 | 0.5 | -1 | | y=sin2x | 0 | 0.87 | 0.87 | 0 | -0.87 | -0.87 | 0 | 0.87 | 0.87 | 0 |     55, 1060, 2350 =  B2  Amplitude 3 units  Period 1800 | | |
|  |  | 10 |  |
| 19. (a)  (b)  (c)  (d)  (e) | 60× θ =600  θ = 10  C (700N, 170 E)  60× 12 cos 60  =360 nm  = 3.2 hrs or 3hrs 12 min  Time difference = 12× 4 = 48min  9.20am + 48min + 3hrs 12 min  = 1.20Pm or 1320 h | M1  A1  M1  A1  M1A1  M1  A1  M1  A1 |  |
|  |  | 10 |  |
| 20. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | mass | f | cf | d | d=x-4.45 | d | fd | fd2 | | 1.0-1.9  2.0-2.9  3.0-3.9  4.0-4.9  5.0-5.9  6.0-6.9  7.0-7.9  8.0-8.9  9.0-9.9 | 2  4  5  7  10  6  3  2  1 | 2  6  11  18  28  34  37  39  40 | 1.45  2.45  3.45  4.45  5.45  6.45  7.45  8.45  9.45 | -3  -  -2  0  1  2  3  4  5 | -6  -8  -5  0  10  12  9  8  5 | 9  4  1  0  1  4  9  16  25 | 18  16  5  0  10  24  27  35  25 |   B1 for C.f  B1 for Fd  B1 for Fd2  Fd2 =157    B1 for Q1  B1 for Q3  M1  A1  M1  A1 | | |
|  |  | 10 |  |
| 21.(a)  (b) | Area of ABCD = 2 units × 3units  = 6 square units  Area of A1B1C1D1 = 4 units × 6 units  =24 square units | B1  B1  B1  B1  M1  M1  M1  A1 |  |
|  |  | 10 |  |
| 22. | k=27 | M1  A1  B1  M1  M1  A1  M1  M1  A1 |  |
|  |  | 10 |  |
| 23. (a)  (b)(i)  (ii)  (iii)  (iv) | Volume of the pyramid  ⅓Base area ×height  =(⅓ × (10× 10) 3.744)cm3  =124.8cm3 |  |  |
|  |  | 10 |  |
| 24. |  | | |
|  |  | 10 |  |