**SET 5**

FORM THREE

MATHEMATICS 121/1

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Working** | **Marks** | **Remarks** |
| 1. | 8260439  Sum of all digits odd positions: 8 + 6 + 4 + 9 = 27  Even positions 2 + 0 + 3 = 5  Difference = 27 – 5 = 22  22 is a multiple of 11 hence divisible by 11 | M1  A1 | Finding the difference alternate digit. |
|  |  | 02 |  |
| 2. | No log  4.562 0.6592  0.038 5798 +  .2390 -  0.82 .9132  .3252  .3252 = + 2.3252  3 3  0.5958 ← = .7751  = 0.5996 | M1  M1  M1  A1 | √ All logs  **√** Addt & subtraction  **√** Attempt to divide by 3  C . A. O |
|  |  | 04 |  |
| 3. | Cross-sectional area =  = 14 + 38.5 = 52.5cm2  Volume of solid = 52.5 x 300 = 15, 750cm2  Mass in kg = = 139.7025kg | M1  M1  A1 | Volume  Mass |
|  | **A**  **Q**  **B**  **P**  **D**  **C**  **I**  **180**  **150**  **50**  **90**  **II**  **120**  **250**  **III 50**  **50**  **90**  **VI**  **V**  **IV** | 03 |  |
| 4. | (a)  (b)  Area of I =  II =  III =  IV =  V =  VI =    (b) Area in ha =  = 10.725 ha | B2  M1  A1 | Sketch  Area |
|  |  | 04 |  |
| 5. | For all taps working together fills  =  =  =    = | M1  M1 | Fraction of tank remaining to be filled  Time tank after C is turned off |
|  |  | 03 |  |
| 6. | *n = 4* | M1  A1 | Forming equation |
|  |  | 02 |  |
| 7. | = 12m/s | M1  A1 | Total dist |
|  |  | 02 |  |
| 8. |  | M1  A1 |  |
|  |  | 02 |  |
| 9. |  | M1  M1  A1 |  |
|  |  | 03 |  |
| 10. | (a) *Probability Space:*   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | 1 | 3 | 5 | 7 | 9 | |  |  | 13 | 15 | 17 | 19 | |  |  |  | 35 | 37 | 39 | |  |  |  |  | 57 | 59 | | 7 | 71 | 73 | 75 |  | 79 | | 9 | 91 | 93 | 95 | 97 |  |   13, 15, 17, 19  31 35 37 39  51 53 57 59  71 73 75 79  91 93 95 97  (b) *Prime numbers* 13, 17, 19, 31, 37, 53, 59, 71, 73, 79, 97  *P (Prime)* = | B2  M1  A1 | *5 rows x 4 columns*  *Prime numbers* |
|  |  | 04 |  |
| 11. |  | M1  M1  M1  A1 | For base 5.  Simplification |
|  |  | 04 |  |
| 12. | = | M1  M1  A1 | Both equations  For x and y. |
|  |  | 04 |  |
| 13. | A B R  = 3 AB    = | M1  M1  A1 |  |
|  |  | 03 |  |
| 14. | (a)  =  (b) | M1  A1  M1  A1 | Equating arc length AB with the circumference of circle radius r.  Alternate  = |
|  |  | 04 |  |
| 15. | Let the income be Ksh. X  Taxes = 0.28 x  Remeinder (deposable income) = 0.72x  Food =  Travelling =  =  Savings = 0.72x – (0.18x + 0.405x)  = 0.135x  0.28x – 0.13x = 9860  0.145x = 9860  x= 68, 000  Charles earnings : Sh. 68, 000 | M1  M1  A1 | Savings  Expression for the difference |
|  |  | 03 |  |
| 16. | 5 ≤ 3x + 2  3 ≤ 3x  1 ≤ x  3x – 14 < -2  3x < 12  x < 4  1 ≤ x < 4  Integral values of x  1, 2, 3 | M1  M1  A1 | Both solutions |
|  |  | 03 |  |
| 17. | **SECTION II (50 MARKS)**  (a) (21, 750 + 15, 000 + 8, 000)  = kshs 537, 000  (b) Tax slab Tax pa (Kshs)  1st 116, 160 x 10/100 11, 616  2nd 109, 440 x 15/100 16, 416  3rd 109, 440 x 20/100 21, 888  4th 109, 440 x 25/100 27, 360  Rem 92, 520 x 30/100 27, 756  Gross tax p.a 105.036  Less family relief pay - 12.672  Net tax p.a Ksh 92, 364  (c) Net income  = (21, 750 + 15, 000 + 8, 000) -  = 44, 750 – 12, 397  = 32, 353 | M1  A1  M1  M1  A1  M1  A1  M1  A1 |  |
|  |  | 10 |  |
| 18. | AC = 12cm  AB = 8cm  < BAC = 22.5o  Parallelogram √ draw and labeled   1. (i) Diagonal BD = 6.7 0.1   (ii) Angle ABC = 125o 1   1. Bisecting any two sides   Circles drawn through pts ABC   1. Radius =   Area = | B1  B1  B1  B1  B1  B1  B1  B1  M1  A1 |  |
| 19. | (a) < STQ = < PQS = 28o  Angles in alternate segment  (b) < TQU =  Base angles of an isosceles triangle  (c) < TQS = 63 – 28 =  < TUQ is alternate to < PQT = 63  (d) < UOQ = 54 x 2 = 108o  Angle subtended at centre is twice that circumference by same chord UQ.  Reflex < UOQ = 360 – 108o  = 252o  (e) < TQR = < TSQ  = 180 – (28 + 35)  = 117o  Angles in alternate segment are equal. | B1  B1  B1  B1  B1  B1  B1  B1  B1  B1 | Angle  Reason  Angle  Reason  Angle  Reason  Angle  Reason  Angle  Reason  Accept alternative reasons which are correct. |
| 20. | Area of ΔAXY = ½ x 42 x SIN 97.2  = 7.94  Area of sector AXY = π x 42 x  = 13.56  Area of shaded part = 7.62  Area of ΔBXY = ½ x 62 x sin 30o  Area of sector BXY = π x 62 x  Area of shaded part = 0.43  Total surface area = 7.62 + 0.43  = 8.05 | M1  A1  M1  M1  M1  A1  M1  A1  M1  A1 |  |
|  |  | 10 |  |
|  | **5/12**  **3/12**  **3/11**  **4/11**  **4/11**  **3/11**  **3/11**  **5/11**  **2/11**  **4/11**  **5/11**  **R RR**  **3B**  **4/12**  **W RW**  **5R**  **B RB**  **R WR**  **W WW**  **B WB**  **R BR**  **W BW**  **4W**  **B BB**   1. P(RR) OR (WR) OR (BR)   =    (c) P (RB) or (WB) or (BR) or (BW) or (BB)  ***+*** | B1  B2  M1  M1  A1  M1  M1  A1 | (Correct tree)  Full list B1 (for more than 5 probabilities) |
|  |  | 10 |  |
| 22. | (a)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 1 | 1.5 | 3 | 3.5 | 4 | | Y | -2 | -4.75 | -2 | 0.68 | 4 |  1. Scale   Plotting  Smooth curve   1. (i) 1.15 ≤ x 2.75   (ii)  y= x2 + 12 + 5x – 20  x  0 = x2 + 12 + 5x – 20  x  y = -5x + 5  Roots : 0.8 or 2 0.05 | B2  S1  P1  C1  B1  B1  B1  L1  B1 | All values √  √  Line y=-3  identified  Line y = -5x + 5  √ line draw |
|  |  |  |  |
|  | (a)   |  |  | | --- | --- | | Marks | f | | 5 – 10 | 24 | | 10 – 20 | 66 | | 20 – 40 | 42 | | 40 – 50 | 33 |   (b)   |  |  |  |  | | --- | --- | --- | --- | | x | f | xf | cd | | 7.5  15  30  45 | 24  66  42  33 | 180  990  1260  1485 | 24  90  132  165 | |  | 165 | 3915 |  |  1. Mean = 3915   165  = 23.72 (4sf)   1. 83rd position = 9.5 +   = 9.5 + 9.833  = 19.33 | B1  B1  B1  B1  B1  M1  A1  M1  A1 | √ mark intervals b/ any 3  √ frequencies  For x column  For xf column  For cf column |
|  |  | 10 |  |
| 24. | (b) (i)  ~  ~  ~  ~  ~  OQ = +  (ii) BP = b +  ~  (c) OT = K  ~  ~  =  (ii)  =  = ……………(ii)  =  =  =  ~  ~  Ratio = 15 : 8 | B1  B1  B1  B1  M1  A1  M1  A1  B1  B1 | √ sketch including  Simultaneous equation |
|  |  | 10 |  |
|  |  |  |  |
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|  |  |  |  |