**SET 5**

FORM THREE

MATHEMATICS 121/1

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Working** | **Marks** | **Remarks** |
| 1. | 8260439 Sum of all digits odd positions: 8 + 6 + 4 + 9 = 27Even positions 2 + 0 + 3 = 5Difference = 27 – 5 = 2222 is a multiple of 11 hence divisible by 11 | M1A1 | Finding the difference alternate digit. |
|  |  | 02 |  |
| 2.  | No log4.562 0.65920.038 5798 + .2390 - 0.82 .9132 .3252.3252 = + 2.3252 3 30.5958 ← = .7751= 0.5996 | M1M1M1A1 | √ All logs**√** Addt & subtraction**√** Attempt to divide by 3C . A. O |
|  |  | 04 |  |
| 3. | Cross-sectional area = = 14 + 38.5 = 52.5cm2Volume of solid = 52.5 x 300 = 15, 750cm2Mass in kg = = 139.7025kg | M1M1A1 | VolumeMass |
|  | **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 | B2M1A1 | SketchArea |
|  |  | 04 |  |
| 5. | For all taps working together fills= = =  =  | M1M1 | Fraction of tank remaining to be filledTime tank after C is turned off |
|  |  | 03 |  |
| 6. |      *n = 4* | M1A1 | Forming equation |
|  |  | 02 |  |
| 7. |    = 12m/s | M1A1 | Total dist |
|  |  | 02 |  |
| 8. |   | M1A1 |  |
|  |  | 02 |  |
| 9. |             | M1M1A1 |  |
|  |  | 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)* =  | B2M1A1 | *5 rows x 4 columns**Prime numbers* |
|  |  | 04 |  |
| 11. |        | M1M1M1A1 | For base 5.Simplification |
|  |  | 04 |  |
| 12. |      =    | M1M1A1 | Both equationsFor x and y. |
|  |  | 04 |  |
| 13. | A B R = 3 AB  =    | M1M1A1 |  |
|  |  | 03 |  |
| 14. | (a) = (b)   | M1A1M1A1 | Equating arc length AB with the circumference of circle radius r.Alternate=  |
|  |  | 04 |  |
| 15. | Let the income be Ksh. XTaxes = 0.28 xRemeinder (deposable income) = 0.72xFood = Travelling = = Savings = 0.72x – (0.18x + 0.405x)= 0.135x0.28x – 0.13x = 98600.145x = 9860x= 68, 000Charles earnings : Sh. 68, 000 | M1M1A1 | SavingsExpression for the difference |
|  |  | 03 |  |
| 16. | 5 ≤ 3x + 23 ≤ 3x1 ≤ x3x – 14 < -23x < 12x < 41 ≤ x < 4Integral values of x1, 2, 3 | M1M1A1 | 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 105.036Less family relief pay - 12.672Net tax p.a Ksh 92, 364(c) Net income = (21, 750 + 15, 000 + 8, 000) - = 44, 750 – 12, 397= 32, 353 | M1A1M1M1A1M1A1M1A1 |  |
|  |  | 10 |  |
| 18. | AC = 12cmAB = 8cm< BAC = 22.5oParallelogram √ draw and labeled 1. (i) Diagonal BD = 6.7 0.1

(ii) Angle ABC = 125o 11. Bisecting any two sides

Circles drawn through pts ABC1. Radius =

Area =  | B1B1B1B1B1B1B1B1M1A1 |  |
| 19. | (a) < STQ = < PQS = 28oAngles 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 = 108oAngle subtended at centre is twice that circumference by same chord UQ. Reflex < UOQ = 360 – 108o= 252o(e) < TQR = < TSQ  = 180 – (28 + 35)= 117oAngles in alternate segment are equal. | B1B1B1B1B1B1B1B1B1B1 | AngleReasonAngleReasonAngle ReasonAngle ReasonAngle Reason Accept alternative reasons which are correct. |
| 20. | Area of ΔAXY = ½ x 42 x SIN 97.2= 7.94Area of sector AXY = π x 42 x = 13.56Area of shaded part = 7.62Area of ΔBXY = ½ x 62 x sin 30oArea of sector BXY = π x 62 x Area of shaded part = 0.43Total surface area = 7.62 + 0.43= 8.05  | M1A1M1M1M1A1M1A1M1A1 |  |
|  |  | 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)***+***  | B1B2M1M1A1M1M1A1 | (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

PlottingSmooth curve1. (i) 1.15 ≤ x 2.75

(ii) y= x2 + 12 + 5x – 20 x0 = x2 + 12 + 5x – 20 xy = -5x + 5Roots : 0.8 or 2 0.05 | B2S1P1C1B1B1B1L1B1 | All values √√Line y=-3identifiedLine 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 |
| 7.5153045 | 24664233 | 18099012601485 | 2490132165 |
|  | 165 | 3915 |  |

1. Mean = 3915

 165= 23.72 (4sf)1. 83rd position = 9.5 +

= 9.5 + 9.833= 19.33 | B1B1B1B1B1M1A1M1A1 | √ mark intervals b/ any 3√ frequenciesFor x columnFor xf columnFor cf column |
|  |  | 10 |  |
| 24. | (b) (i) ~~~~~OQ = + (ii) BP = b + ~(c) OT = K~~= (ii) == ……………(ii)= = = ~~Ratio = 15 : 8 | B1B1B1B1M1A1M1A1B1B1 | √ sketch includingSimultaneous equation |
|  |  | 10 |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |