MECS JOINT EXAMINATION

**MATHEMATICS**

**121/1**

**PAPER 1**

**END OF TERM 2 - SEPTEMBER, 2022**

Form 4

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1. | =  =  - =  = | M1  M1 A1 |  |
| 2. | 2.541x10-1 + (2x2.311)2  = 0.2541 + (4.622)2  = 0.2541 + 21.363  =21.62 | M1  M1  M1  A1 |  |
| 3. | log29 + log2  or | M1  M1  A1 |  |
| 4 | 840 =  G.C.D =  Area = 12 | M1  M1  A1 |  |
| 5 | |  |  | | --- | --- | | Mass(kg) | frequency | | 41-50 | 20 | | 51-55 | **25** | | 56-65 | 40 | | B1  B1  B1 | For frequency  For each bar |
| 6 | 2x – 2  -2 – 1  -3 B1 for -3  3x + 1 < x + 11  2x < 10  X<5 B1 for x < 5  -3  Integral values -3,-2, -1, 0, 1,2,3,4 B1 – All correct integral values | B1  B1  B1 |  |
| 7 | Sum of int. angles =  smallest angle | M1  M1  A1 |  |
| 8 | AC = = 40M  Area of quadrilateral A B C D  =  = 2492m2  In hectares; 2492 = 0.2492 ~ 0.25ha  10,000 | M1  M1  A1  B1 | Sum of both areas  For area  In hectares to 2 decimal places. |
| 9 | (i) In 1 hour:  11 x 3600 = 7920cm3  5  Capacity of water lost = 7.92 litres  (ii) Volume of tank = 3.142 x 302 x 30  = 84834cm3  = 84.834 litres  Time = 84.834  7.92  = 10.711 ~ 10.71 hours | M1  A1  M1  A1 |  |
| 10 | 3x + 21 = 6x  3x = 21  x = 7 | M1  M1  A1 |  |
|  |  | 03 |  |
| 11 | 1 + T = - 1  2 2    T = -1 - 1  2 2  = -2  0  x + - 2 = -3  y 0 -3  x = -3 - -2  y -3 0  = -1  -3  R(-1, -3) | B1  M1  A1 |  |
| 12 | No. of oranges sold on Monday;  6144 = 768  8  No. of oranges that remained on Sunday;  768 – 560 = 208  No. of oranges bought on Saturday.  208 + 750 + 750 + 240  = 1948 | M1  M1  M1  A1 | √ division  √ subtraction  √ Addition |
| 13 |  | M1  M1  A1 |  |
| 14 | Vol of water: ¾ x 2.5 = 1.875l  Vol of ethanol ¼ x2.5 = 0.625l  Mass of water 1875 x 1 = 1875g  Mass of ethanol 625 x 1.2 = 759g  Mass of mix= 1875 + 750=2625g | M1  M1  A1 |  |
| 15 | 9.74 x 105,000=Ksh.1,022,700  1,022,700-403897=Ksh.618,803  = 832,752.66 yen | M1  M1A1 |  |
| 16 | `1C:\Users\hp\Desktop\orthocentre.jpg | B1  B1  B1 | For √ const. of 600  For 2 correctly dropped perpendicular  For identifying point X. |
|  |  | 3 |  |
| 17 | At intercept;  At y intercept;   1. At point of intersection, y values are equal   Point of intersection (2, 5) | M 1  A 1  M 1  A 1  M 1  A 1  A 1  M 1  M 1  A 1 |  |
|  |  | 10 |  |
| 18 | (a) 108 x 22 x 20 x 20  36 7  377.14  (b) 3.77.14 = x r x 20    r = 377.14 x 7  22 x 20  r = 6.0  (c) h2 + 62 = 202  h =  h = 19.079  h = 19.1  (d) 19.08 = 6  12 r  r = 3.774  Volume of smaller cone = × (3.774)2 x 12  = 179.1  Volume of larger cone × (6)2 x 19.08  = 719.6  719.6 - 179.1  = 540.5 | M1  A1  M1  M1  A1  M1  A1  M1  M1  A1 | Expression for the 2 Volume  Subtraction |
|  |  | 10 |  |
| 19 | (a)  (b) (i) 9.6 km + 0.1  750 + 0.1  (ii) 5.8 km + 0.1  2460 + 0.1  (iii) Area = ½ x 7 x 5 sin 1050 – ½ x 4 x 5.8 sin 154  = 16.90370196 – 5.085105303  = 11.81859666  = 11.82 cm2 | B1  B1  B1  B1  B1  B1  B1  M1 M1  A1 | Location of point Q  Location of point R  Location of point S.  Distance of R from P  Bearing of R from P  Distance of P from S  Bearing of P from S  Follow through |
|  |  |  |  |
| 20 | =  Area = =  = 18  28 – - + 1 – 18 = 0  - - + 11 = 0  + 28 - 11 = 0  - 11 + 28 = 0  - 7 - 4 + 28 = 0  - 4 = 0  = 0  = 7 or = 4  Length = 7m  Area not previously covered = 28 – 18  = 10  Cost = 10 ×  = 10 × 350  = sh. 3500 | B1  B1  M1 M1  M1  M1  A1  M1  M1  A1 **10** | For 28  For  For and area  Accept alt |
| 21 |  | B1  B1  B1  B1  M1  M1  A1  M1  M1  A1 |  |
| 22 |  | M1  M1  M1  A1  M1  A1  M1  M1  M1  A1 |  |
| 23 | (a) 250 x 14 x 2 x 2 = 14000  Net profit = 14000 – 6000  = KSh. 8000  (b) 8000 x 25 = 200,000  = 190,000  (c) Saving: x 190,000  = 76000  Remaining profit = x 190,000  = 68,400  Muthoka’s share  + x 68,400  = 30,400  (d) 475,000 x 3 x 100  95  = 1,500,000 | M1 ✓Profit  A1  B1 ✓Profit  M1 ✓Equation for equal share  A1  M1 ✓Expression of Muthoka’s share  A1  M1M1  A1 |  |
|  |  | 10 |  |
| 24 | (a) Initial acceleration is at t = 0  = - 6 + 3t + 3  a = = -12t + 3  when t = 0, a =[ 0 + 3  ∴ a = 3m/s2  (b) (i) at rest V = 0  -6 + 3t + 3 = 0  (2t + 1) (t-1) = 0  t = - or t = 1 (t = - not applicable)  (ii) S = - + + 3t  When t =m 1, s = -2 + + 3 (1)  2.5M  (c) When velocity is maximum, a = 0  -12t + 3 = 0  t =  Max v = -6 + 3 + 3 = 3.375 m/s | M1  M1  A1  M1  M1  A1 for t = 1  M1 Substitution  A1  M1For substitution  A1 |  |
|  |  | 10 |  |