**MID- TERM EXAM-2021**

**FORM 4 Marking scheme**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 1. | | | | | | |  |  |  | | --- | --- | --- | | NO. | STD FORM | LOG | | (0.07284)2  (0.06195) 1/3  0.01341 | (7.284 X 10-2) 2  (6.195 X 10‑2)1/3  1.341 X 10-2 | 2 | | | | | | | | M1🗸 all logs  M1🗸 multiplication by  28 1/3  M1🗸 add & Sub  A1 | | | | | | | |
| 2. | | | | | | | y = Cx2 + KX    30 = 9C + 3k  18 = 3c + 3k  30 = 9c + 3k  - 12 = -6c  C = 2  6 = C + K  6 = 2 + K  K = 4  y = 2 x2 + 4x  when x = -3  y = 2 ( -3)2 + 4 x -3  = 18 – 12  = 6 | M1🗸 equations  A1🗸 both  B1 | | | | | | | | | | |  | |
|  | | | | | | |  | 3 | | | | | | | | | | |  | |
| 3. | | | | OT = ½ AO + ½ OB        = 3 **i** + **j** + 2**k** | | | | | | | | | | | | | M1  A1  B1 | | |  |
|  | | | |  | | | | | | | | | | | | | 3 | | |  |
| 4. | | | | a) Co – ordinate of  A ()  A (  A ( 1,2)  b) r =  =  =5 units  ( x – 1)2 + ( y – 2) 2 = 52  x2 – 2x+ 1 + y2- 4y + 4 = 25  x2 + y2 – 2x - 4y + 5 = 25  x2  y2 – 2x – 4y – 20 = 0 | | | | | | | | | | | | | B1  Or equivalent  B1  B1 | | |  |
|  | | | |  | | | | | | | | | | | | | 3 | | |  |
| 5. | | | | | | Angle on straight line | | | | | | B2  B1 | | | | | | | |  |
|  | | | | | |  | | | | | | 3 | | | | | | | |  |
| 6. | | | | | | 4 Sin ( x + 300) = 2  Sin ( x + 30) =  x + 30 = 30  x1 = 30 -30  = 0  x+ 30 = 150  ½ = 150 – 30  = 1200 | | | | | | B1  B1  B1 | | | | | | | |  |
|  | | | | | |  | | | | | | 3 | | | | | | | |  |
| 7. | | | | | Fraction of water emptied per hour.  For A=  B=  C=  All working for 1 hour    =  All working for 30 minutes    Remaining fraction    B & C working for one hour    =  1h  ?    = | | | | | | B1  M1  A1 | | | | | | |  | | |
| 7. | | | 3x2-4xy+y2=3x2-3xy-xy+y2  =3x(x-y)-y(x-y)  =(3x-y)(x-y)  9x2-y2=(3x-y)(3x+y)    = | | | | | | | M1  M1  A1 | | | | | |  | | | | |
|  | | |  | | | | | | | 3 | | | | | |  | | | | |
| 8. | | | Distance =72+78  =150M  Relative speed =72+108  =180km/h  t=  =8.333×10-4  =2.999  3 seconds | | | | | | | B1  B1  M1  A1 | | | | | |  | | | | |
|  | | |  | | | | | | | 4 | | | | | |  | | | | |
| **9.** |  | | | | | | | | **M1**  **M1**  **A1** | | | | | **✓ Substitution**  **✓ operation**  **✓ answer** | | | | | | |
|  |  | | | | | | | | **3** | | | | |  | | | | | | |
| **10.** | | a)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | X | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | | Y | 2.00 | 1.96 | 1.83 | 1.60 | 1.2 | 0.00 |   b) | | | | | | | | **B1**  **M1**  **A1** | | | | | **✓ table values**  **✓ answers** | | | | | |
|  | |  | | | | | | | | **3** | | | | |  | | | | | |
| **11.** | |  | | | | | | | | **M1**  **M1**  **A1** | | | | | ✓ operation  ✓ simplification  ✓ answer | | | | | |
|  | |  | | | | | | | | **3** | | | | |  | | | | | |

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| 12. | Width = (3x + 1) - 3  = 3x – 2  (3x + 1) (3x – 2) → 9x2 – 3x – 2 = 28  → 9x2 – 3x – 30 = 0  → 3x2 – x – 10 = 0  x =  x =  = 2  Length = 3x + 1  = 3(2) + 1  = 7 | M1  M1  A1 |  |
|  |  | 03 |  |

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| 13 | y ≥ 0  x + y < 2 or y < -x + 2  y ≤ 2x + 2 | B1  B1  B1 |  |
|  |  | 03 |  |

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| --- | --- | --- | --- |
| 14 | y ≥ 0  x + y < 2 or y < -x + 2  y ≤ 2x + 2 | B1  B1  B1 |  |
|  |  | 03 |  |

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| 15 | Grad AB=  grad of AB=  coordinates of mid points=  =(5,0) | | | M1  B1  A1 | |  | | | |
|  |  | | | 3 | |  | | | |
| 16. | | R2 =  PR2 = 3TP – 3T2  PR2 – 3TP = -3T2  P(R2 – 3T) = -3T2  P = | | | | | | M1  A1 |  |
|  | |  | | | | | | 4 |  |
| 17. | | | a) i) x + y  ii) y  x  iii) x  200  b) on the graph  p = 900x + 700y  x = 250, y = 250  maximum profit = 250 x 900 + 250(700)  = 400,000 | | B1  B1  B1  L1  L1  B1  B1  M1  A1 | | For y = x and ✓shading  For x = 200 and shading  For x + y = 50 and ✓ shading | | |
|  | | |  | | 10 | |  | | |

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| 18. |  | B1  B1  B1  B1  B1  B1  B1  B1  B1  B1  10 | Sides of  Triangle seen  Bisecting QR  Locating X  Bisecting < PRO  Locating M  For PY = 6 cm  Shading QTTR  ” PT  6 cm  ” < PRT <QRT |

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| 23 | 1. i) ∠ORS = 40o   ii) ∠USP = 80  iii) ∠PQR = 130o   1. i) 4.57 (to 3 s.f)   ii) R = 2.98(3 s.f) | B1B1  B1  B1B1  B1B1  B1B1B1 |  |
|  |  | 10 |  |

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| 20.a)  b) | ii) |  |  |
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| 21. |  |  |  |
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|  |  |  |  |
|  | p |  |  |
| 22. | A: Taxable income = 25,000 + 10,480 M1  = 35,480/=  B: First 4350 x 2/20 = 435  Next 4350 x 3/20 = 682.50 B1  Next 4555 x 4/20 = 911  Next 4550 x 5/20 = 1137.50 B1  Remaining 17475 x 6/20 = 5242.50 B1  8408.50 M1  Less relief 800  Net tax 7608.50 A1  C) 140 x 35480 = 49672 M1  (31667 x 6) + 435 + 682.50 + 911 + 1137.50 = 12666.10  Less relief 800  11,866.10 M1  % increase = 11866.10 – 7608.50 x 100 = 55.96% A1  7608.50 |  |  |

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| 24. | a) 32+52  9+25=  =6cm | M1  A1 |  |
| b)tanβ=  β=59.040 | M1  A1 |  |
|  | c) 121=64+25-(2X5X8)cosα  α=113.580 | M1  A1 |  |
| d) bh+ abSinβ  =0.5x5x3+ 0.5x5x8Sin113.58  =7.5+18.33  =25.83cm2 | M1  M1  A1 |  |