

2020 FORM 4 TERM 1 ENTRY EXAMS

PP2 Marking Scheme

SECTION 1

1. No	log	Log	
4.4497	$\frac{1.5650}{2}$	0.6529+	m1
0.3673	$\frac{1.7825}{0.4354}$		
1-cos 81.53	$1 - 8527 \leftarrow$	$\frac{1.9308}{0.5046}$	m1
<u>3.196</u>			
$\frac{1.5650}{2} - 2 + \frac{1.5650}{2}$			m1 A1

2. $a + 4d + a + 5d = 30^0$	B1 simultaneous equation formed
$2a + 9d = 30^0$ (i)	
$a + 2d = 5$ (ii)	
$2a + 9d = 30$	
<u>$2a + 4d = 10$</u>	M1 attempt to solve
$5d = 20$	
$d = 4$	
$a + 2 \times 4 = 5$	
$a = 5 - 8 = -3$	A1

3. $t^2 = (2y + 1)^2$	
$2yk + k$	
$t^2(2ky + k) = (2y + 1)^2$	m1
$2ky + k = \frac{(2y + 1)^2}{t^2}$	m1
$k(2y + 1) = \frac{(2y + 1)^2}{t^2}$	
$k = \frac{2y + 1}{t^2}$	A1

4. let log x be a

$$2+a^2=3a \quad \text{m1}$$

$$a^2-3a+2=0$$

$$a^2-2a-a+2=0$$

$$a(a-2)-1(1-2)=0 \quad \text{m1}$$

$$a=1 \quad a=2.$$

$$\log x=1 \quad \log x=2$$

$$X=10 \quad x=100 \quad \text{A1}$$

$$5. \quad \text{A.E} = \frac{(4.5 + 6.25 + 9.505) - (3.5 + 6.15 + 9.495)}{2} \quad \text{m1}$$

$$= \frac{20.255 - 19.145}{2} = 1.11 \quad \text{m1}$$

$$= 0.555$$

$$\% \text{ error} = \frac{0.555}{19.7} \times 100$$

$$= 2.32\% \quad \text{A1}$$

$$6. \quad \underline{QR} = 8$$

$$\sin 100^\circ \sin 35^\circ$$

$$QR = 8 \sin 100^\circ = \frac{13.74 \text{cm}}{\sin 35^\circ} \quad \text{B1}$$

$$\text{Area} = \frac{1}{2} \times 13.74 \times 8 \sin 45^\circ \quad \text{m1}$$

$$= 38.86 \text{cm}^2 \quad \text{A1}$$

$$7. \quad \text{(a) } 1 + 6(2x)^1 + 15(2x)^2 + 20(2x)^3 \quad \text{m1}$$

$$1 + 12x + 60x^2 + 160x^3 \quad \text{A1}$$

$$\text{b) } 1 + 2x = 0.98$$

$$x = 0.01 \quad \text{m1}$$

$$1 + 12(0.01) + 60(0.01)^2 + 160(0.01)^3$$

$$1 + 0.12 + 0.006 + 0.00016$$

$$= 1.1262 \text{(4 d.p.)} \quad \text{A1}$$

$$8. \quad AP \times BP = CP \times DP$$

$$9 \times 3 = (8 + X)X$$

$$X^2 + 8X - 27 = 0$$

$$X = \frac{-8 \pm \sqrt{64 + 108}}{2}$$

$$= \frac{-8 \pm \sqrt{172}}{2}$$

$$= \frac{-8 \pm 13.11}{2}$$

=2.557

9. $(5-x)4 - 6x=0$ m1

$$20-4x - 6x =0$$

$$20-10x=10$$

$$20=10x$$

X=2 A1

10. $\frac{6\sqrt{7} + 6\sqrt{2}}{4\sqrt{2} + 2\sqrt{7}} = \frac{3\sqrt{7} + 3\sqrt{2}}{2\sqrt{2} + \sqrt{7}}$ $6\&7+6\&2=3\&7+3\&2$ m1

$$= \frac{3\sqrt{7} + 3\sqrt{2} (\sqrt{2} - \sqrt{7})}{2\sqrt{2} + \sqrt{7} (\sqrt{2} - \sqrt{7})}$$

m1

$$= \frac{6\sqrt{14} - 2 + 12 - 3\sqrt{14}}{8 - 7}$$

$$= 3\sqrt{14} - 9$$

A1

11. $X^2 + y^2 - 4x + 6y - 3 = 0$

$$X^2 - 4x + 4 + y^2 + 6y + 9 = 3 + 4 + 9$$

m1

$$(x-2)^2 + (y+3)^2 = 16$$

m1

Centre (2,-3) radius=4 A1

12. $0.92x \times 0.88x = 121,440$ m1

$$X(0.92 \times 0.88) = \frac{121,440}{0.92 \times 0.88}$$

m1

X=sh.150,000 A1

13. $C=hA+KA^2$

$20=2h+4k$ m1

$21=3h+9k$

$K=-3$ $h=16$

$C=16a-3a^2$

$64-48$

$=16$ A1

14. $X+6 \frac{1}{2} X=180^\circ$ m1

$X + \frac{13}{2} X = 180^\circ$

$2X + 13X = 360^\circ$ m1

$X = 24^\circ$

$\frac{360}{24} = 15 \text{ Sides}$ A1

15. $X:y=2:3$

$(5x-2y):(x-y)$ m

$(5(2) - 2(3)):(2+3)$ m1

$(10-6):(5)$ m1

$4:5$ A1

SECTION II

16. Without profit

Cost = $\frac{150}{1.25}$ sh 120 m1

1.25

$112x + 132y = 120$

$X+y$

$112x + 132y = 120$

$X+y$

$112x + 132y = 120$ $x+120y$ m1

$12y = 8x$

$\frac{12}{8} = \frac{x}{y}$

$3 = \frac{x}{y}$

$x:y=3:2$ A1

17. a) $38300 + 1200 + 3600$ m1

$53900 \times 12 = \text{k£ } 32,340$ pa A1

20

b) 32,340

$$8800 \times 2 = 17600 \text{ m1}$$

$$8000 \times 3 = 24,000$$

$$8000 \times 5 = 40,000$$

$$6540 \times 7 = \underline{45,780} \text{ m1}$$

$$127,380 \text{ m1}$$

$$\text{Monthly} = \frac{127,380}{12} = 10,615 \text{ m1}$$

$$12$$

$$\text{Less } \underline{1172}$$

$$9443 \text{ m1}$$

$$c) \frac{3}{100} \times 4600 = 138 \text{ m1}$$

$$= 9,245$$

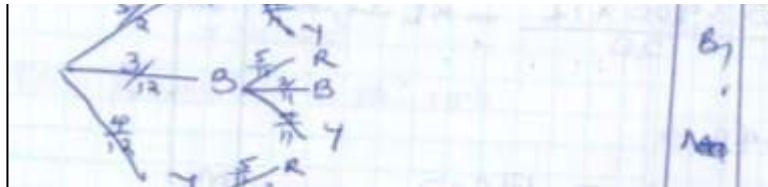
$$\text{Total deduction } (9245 + 776 + 4600 + 4200) \text{ m1}$$

$$\text{Sh.28,821}$$

$$\text{Net pay} = 53900 - 28821 \text{ m1}$$

$$= \text{sh.25079 A1}$$

18. (a)



$$(b)(i) P(\text{both red}) = \frac{5}{12} \times \frac{4}{11} = \frac{5}{33} \text{ M1 A1}$$

$$(ii) P(\text{same colour}) \text{ m1}$$

$$\frac{5}{12} \times \frac{4}{11} \text{ or } \frac{4}{12} \times \frac{3}{11} \text{ or } \frac{4}{12} \times \frac{3}{11} \text{ m1}$$

$$= \frac{19}{66} \text{ A1}$$

$$(iii) P(\text{no red})$$

$$\frac{3}{12} \times \frac{2}{11} \text{ or } \frac{3}{12} \times \frac{4}{11} \text{ or } \frac{4}{12} \times \frac{3}{11} \text{ or } \frac{4}{12} \times \frac{3}{11} \text{ m1}$$

$= \frac{7}{22}$ A1

19. (a)(i) $OS = \frac{2}{5}q$

(ii) $PQ = q - p$ B1

(iii) $OR = \frac{3}{4}p + \frac{1}{4}q$ B1

(b) $OT = h(\frac{3}{4}p + \frac{1}{4}q)$ B1

$OT = p + k(\frac{2}{5}q - p)$ B1

$\frac{3}{4}hp + \frac{1}{4}hq = \frac{1}{4}hq + p + \frac{2}{5}kq - kp$ B1

$\frac{3}{4}h = 1 - k$ $h/4 = \frac{2}{5}k$ B1

$\frac{3}{4}h(8k/5)(1-k)$

$6k/5 = 5 - 5k$ B1

$11k = 5$

$k = \frac{5}{11}$ B1

$11 = \frac{8}{11}$

$PT:T = \frac{5}{11} : \frac{6}{11}$

$5:6$ A1

20. (a)(i) $\angle ORS = 40^\circ$

(ii) $\angle USP = 80^\circ$ $(50 + 30)^\circ$

(iii) $\angle QRS = 180 - 50 = 130^\circ$

(b) $(ST)^2 = PT \cdot RT$

$(9)^2 = PT = 7cm$

$PT = \frac{81}{7} = 11.6(3s.f)$

$11.6 - 7 = 4.6$ A1

c) $4.6 = 2R$ m1
 $\sin 50^\circ$ m1
 $= 3.00$ A1

21. (a) $n^{\text{th}} = ar^{n-1}$
 $a \times ar \times ar^2 = 64$ m1
 $a^3 r^3 = 64$

$r^3 = 64/a^3$ m1
 $r = 4/a$ A1

(b) $a + ar + ar^2 = 14$ B1
 $a + a(4/a) + a(4/a)^2 = 14$ m1
 $a + 4 + 16/a = 14$

$a^2 + 4a + 16 = 14a$ $a = 2$ $r = 2$ B1
 $a^2 - 10a + 16 = 0$ $a = 8$ $r = 1/2$ B1
 $a^2 - 8a - 2a + 16 = 0$
 $a(a-8) - 2(a-8) = 0$
 $a = 2$ or 8
 $r = 4/8$ or $4/2$ $1/2$ or 2

$r = 1/2 = 8, 4, 2, 1$, or A1
 $r = 2 = 2, 4, 8, 16$

(c) $S_{50} = \frac{a(1-r^n)}{1-r}$ $r < 1$ m1
 $\frac{a(r^n-1)}{1-r}$ $r > 1$
 $\frac{2(s^5-1)}{2-1} = \frac{62}{1}$ A1

22. a) $150,000$ m1
 $\frac{120,000}{270,000 \text{ cm}^3/\text{min}}$ 270 c/min m1
 $= \underline{18,900}$ 70 min A1

270

b) (i) 270 l/min x 25

=6,750 litres by one m1

He opened to his custom m1

18,900- 6750 = 12,150 litres m1

Rate of filling = 270-20=250 m1

48³/₅min A1

ii) 542 x 25= 13,550 m1

+ 6300

19,850 A1

23. $P = \frac{kQ}{r^2}$ m1

$$9 = \frac{12k}{2^2} = 12k/2^2$$

$$k = \frac{9}{3} = 3 \quad \text{A1}$$

$$P = \frac{3(15)}{25} \quad \text{M1}$$

$$P = 1.8 \quad \text{A1}$$

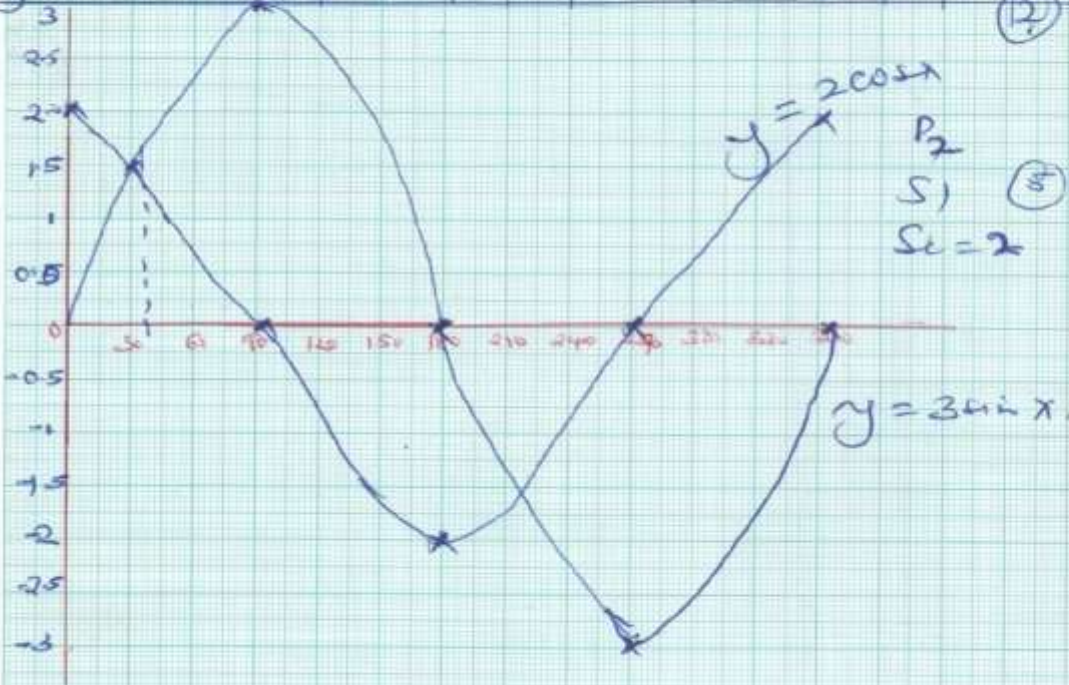
$$P = \frac{KQ}{r^2}$$

$$\frac{pr^2}{3} = q$$

New P = 1.2 p

24

x	0	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$y = 2 \cos x$	2	1.7	1	0	-1	-1.7	-2	-1.7	-1	0	1	1.7	2
$y = 3 \sin x$	0	1.5	2.6	3	2.6	1.5	0	-1.5	-2.6	-3	-2.6	-1.5	0



$x = 33^\circ$ or 213° ✓ (2)

$d = y = 1.65$ or $y = -1.65$ (1)