Extended Mathematics
Topic : Mensuration
Year : May 2013 -May 2023
Paper -2
Answers

Question 1

15.4 or 15.35 to 15.36	**4**	**M1** for $\frac{120}{360}\times\pi\times5^2$ oe **M1** for $\frac{1}{2}\times5^2\times\sin120$ oe **M1** for $\frac{120}{360}\times\pi\times5^2-\frac{1}{2}\times5^2\times\sin120$ oe

Question 2

260	**3**	**M2** for $[2\times](4\times10+18\times5)$ oe or **M1** for a correct area statement

Question 3

420	**5**	**M1** for $[CB=]\sqrt{4^2+(9-6)^2}$ **M1** for *their CB* from Pythagoras × 15 **M1** for $[2\times]\ \frac{1}{2}(6+9)\times4$ **M1** for 4 × 15, 9 × 15, 6 × 15 with intention to add

Question4

52.3 or 52.27 to 52.28	**3**	**SC2** for 28.3 or 28.7 to 28.8 If 0, **M2** for $\frac{135}{360}\times\pi\times24+2\times12$ or **M1** for $\frac{135}{360}\times\pi\times24$

Question 5

35.4 or 35.36 to 35.37	**3**	**M2** for $1000\div(\pi\times0.75^2\times16)$ oe or **M1** for $\pi\times0.75^2\times16$ oe or $1000\div(\pi\times0.75^2)$

Question 6

2.67 or 2.672 to 2.67301	**3**	**M2** for $\sqrt[3]{(80 \div \frac{4}{3}\pi)}$ oe or **M1** for $80 \div \left(\frac{4}{3}\pi\right)$ oe

Question 7

(a) 8.61 or 8.609 to 8.6102	**4**	**M1** for $\frac{1}{2} \times 3^2 \times \pi \times \sin 120$ **M1** for $\frac{30}{360} \times \pi \times 3^2 [\times 2]$ **M1** for area of triangle + 2 sectors
(b) 430 or 431 or 430.4 to 430.41	**1FT**	FT their **(a)** × 50

Question 8

3619 to 3620	**2**	**M1** for $\frac{1}{2} \times \frac{4}{3} \times \pi \times 12^3$ or better

Question 9

170	**2**	**M1** for $\frac{1}{2} \times (12 + 22) \times 10$ oe

Question 10

15.7 or 15.70 to 15.71	**2**	**M1** for $2 \times \pi \times 2.5$

Question 11

486 cao	**4**	**M1** for $\frac{1}{2} \times 4\pi r^2 + \pi r^2 = 243\pi$ or better **A1** for $[r =]\ 9$ **M1** for $\frac{1}{2} \times \frac{4}{3}[\pi](\text{their } r)^3$

Question 12

150	**3**	**M1** for m^3 to cm^3 or cm^3 to m^3

Question 13

62.3 or 62.26 to 62.272	**5**	**M1** for $\frac{2}{3} \times 2\pi \times 6$ and **M2** for $(\frac{2}{3} + \frac{1}{3}) \times 2\pi \times 4$ oe or **M1** for $\frac{2}{3} \times 2\pi \times 4$ or $\frac{1}{3} \times 2\pi \times 4$ and **M1** for $2 \times (2 + 4) + k\pi, k \neq 0$

Question 14

(a)	3	**4**	**B3** for 3.536 to 3.54 as an answer or **M2** for $2000 \div \frac{1}{3}\pi \times 6^2 \times 15$ or **M1** for $\frac{1}{3}\pi \times 6^2 \times 15$ and **SC1** for truncating *their* 3.54 to a whole number
(b)	303 to 304	**3**	**M2** for 2000 – *their* 3 × *their* volume or **M1** for *their* 3 × *their* volume

Question 15

572.4	**2**	**M1** for figs (120 × 90 × 53)

Question 16

912 or 912.2…	**5**	**M4** for $4 \times 0.5 \times 20 \times \sqrt{8^2 + 10^2} + 20 \times 20$ or better **or** **M3** for $4 \times 0.5 \times 20 \times \sqrt{8^2 + 10^2}$ or better **or** **M1** for $\sqrt{8^2 + 10^2}$ **and** **M1** for $0.5 \times 20 \times \sqrt{8^2 + 10^2}$ **and** **M1** for 20×20

Question 17

(a)	4.77 or 4.774 to 4.775	**2**	**M1** for $30 \div [2]\pi$
(b)	35.7 or 35.8 or 35.74 to 35.82	**2**	**M1** for $0.5 \times \pi \times$ (*their* **(a)**)^2 or $0.5 \times \pi \times (30 \div 2\pi)^2$

Question 18

(a)	78	**3**	**M2** for $5 \times 12 + \frac{1}{2} \times 12 \times (8 - 5)$ **or** $\frac{1}{2} \times 6 \times (5 + 8) \times 2$ oe or **M1** for 5×12, $\frac{1}{2} \times 12 \times (8 - 5)$, $\frac{1}{2} \times 6 \times (5 + 8)$ or $12 \times 8 - (\ldots)$
(b)	1170	**1FT**	$15 \times$ *their* **(a)**

Question 19

684	**3**	**M2** for $0.95 \times 4 \times 3 \times 60$ or **M1** for 0.95×4 [$\times 3$] or $4 \times 3 \times 60$ or $0.95 \times 3 \times 60$ or $0.95 \times 4 \times 60$

Question 20

(a)	11	**1**	
(b)	8	**2FT**	**FT** $30 - 2 \times$ *their* **(a)** or **M1** for $4 \times 7 = 2(x - 1) + FG$ oe or $4(x - 4) = 2(x - 1) + FG$ oe or $2 \times 7 + 2(x - 4) = 2(x - 1) + FG$ oe Allow x to be *their* **(a)** in each

Question 21

285 cao	**4**	**M1** for $\frac{1}{3} \times \pi \times 4^2 \times 9$, 48π **M1** for $\frac{1}{2} \times \frac{4}{3} \times \pi \times 4^3$, $\frac{128\pi}{3}$ **A1** for 284.8 to 284.9, $\frac{272\pi}{3}$ If **A0** then **B1** for *their* final answer rounded correctly to nearest whole number from their more accurate answer dependent on at least **M1**

Question 22

262 or 261.7 to 261.83…	**2**	**M1** for $\frac{1}{2}\times\frac{4}{3}\pi\times 5^3$ If zero scored **SC1** for final answer 524 or 523.5 to 523.7

Question 23

Parallelogram	**1**	

Question 24

31.4 or 31.36 to 31.37	**3**	**M2** for $\left[\frac{2}{2}\times\right]6.1\times\pi+2\times 6.1$ oe or **B2** for 19.16 to 19.17 or 19.2 or **M1** for $6.1\times\pi$ or for $12.2\times\pi$

Question 25

310 or 310.2 to 310.3	**3**	**M2** for $7^3-\frac{1}{2}\times\frac{4}{3}\times\pi\times\left(\frac{5}{2}\right)^3$ or **M1** for $\frac{1}{2}\times\frac{4}{3}\times\pi\times\left(\frac{5}{2}\right)^3$ or **SC1** for $7^3-\frac{4}{3}\times\pi\times\left(\frac{5}{2}\right)^3$ soi

Question 26

10.3 oe	**2**	**M1** for $5x = 51.5$ oe

Question 27

69.3 or 69.28…	**4**	**M2** for height $=\sqrt{8^2-4^2}$ or **M1** for $4^2+h^2=8^2$ oe **and M1** for $\frac{1}{2}(8+12)\times$ *their* perp height oe

Question 28

(a)	30	**1**	
(b)	47.5	**2**	**M1** for 4.5 × 5 oe

Question 29

32.7 or 32.72 to 32.73	**2**	**M1** for $\left[\frac{1}{2}\times\right]\frac{4}{3}\times\pi\times\left(\frac{5}{2}\right)^3$

Question 30

58	**2**	**M1** for $\frac{(13+16)\times 4}{2}$ or $4\times 13+\frac{1}{2}\times 4\times 3$ oe

Question 31

68.6 or 68.62 to 68.64	**2**	**M1** for $\frac{1}{2}\times\frac{4}{3}\pi\times 3.2^3$ If zero scored, **SC1** for final answer 137 or 137.2 to 137.3

Question 32

62	**3**	**M1** for [height =] 21 ÷ 7 **M1** for 2(1 × *their*3 + *their*3 × 7 + 1 × 7) oe

Question 33

628 or 628.3 to 628.4	**3**	**B2** for 628 or 628.3 to 628.4 or **M1** for $5^2 \times 8 \times \pi$
cm^3		**B1** for cm^3

Question 34

81.7 or 81.71 to 81.72…	**2**	**M1** for $\pi\times 5.1^2$

Question 35

900	**3**	**M2** for $\frac{150\times 100\times 60}{1000}$ oe or **M1** for 150 × 100 × 60 or 1.5[× 1] × 0.6 or **B1** for figs 9

Question 36

917 or 918 or 917.4 to 917.6	**3**	**M2** for $\pi\times 2.6^2\times 12\times 60\times 60\div 1000$ or **M1** for $\pi \times 2.6^2$ isw or 12 × 60 × 60 ÷ 1000 isw If 0 scored **SC1** for figs 917 to 918

Question 37

4.21 or 4.212....	**3**	**M2** for $\sqrt{\frac{275\times 3}{14.8\times \pi}}$ oe or **M1** for $275=\frac{1}{3}\times\pi\times r^2\times 14.8$ oe

Question 38

375	**3**	**M2** for $2(12\times 5+12\times 7.5+5\times 7.5)$ oe or **M1** for 12×5 or 12×7.5 or 5×7.5

Question 39

5	**2**	**M1** for $180\div 6^2$ oe

Question 40

15.2	**5**	**M4** for $\left(\pi\times 5^2\times 12-\frac{1}{3}\times\pi\times 5^2\times 4.8\right)\div\left(\pi\times 5^2\right)$ or **M3** for $\pi\times 5^2\times 12-\frac{1}{3}\times\pi\times 5^2\times 4.8$ or **M1** for $\pi\times 5^2\times 12$ **M1** for $\frac{1}{3}\times\pi\times 5^2\times 4.8$

Question 41

298	**3**	**M2** for [2 ×] (5 × 7 + 5 × 9.5 + 7 × 9.5) oe or **M1** for one correct area, 5 × 7 or 5 × 9.5 or 7 × 9.5

Question 42

2592	**4**	**M3** for 1.2 × 100 × 60 × 60 × 6 ÷ 1000 oe or **M2** for 1.2 × 60 × 60 × 6 oe or **M1** for figs 12 × figs 6 or 60 × 60 or correct conversion e.g. their value in $cm^3\div 1000$ their value in $m^3\times 1000$ 1.2×100 $6\div 10\,000$

Question 43

141 or 141.3 to 141.4	**4**	**M1** for $[2\times]\ \pi\times 3^2$ **M2** for $2\times\pi\times 3\times 4.5$ or **M1** for $2\times\pi\times 3\ [\times 4.5]$

Question 44

208	**1**	

Question 45

45	**2**	**M1** for $\frac{11+7}{2}\times 5$ oe

Question 46

142 or 142.2 to 142.3	**3**	**M2** for $\frac{1}{2}\times 7.4\times 7.4\times\sin 60\times 6$ or $\tan 60\times\frac{7.4}{2}\times\frac{7.4}{2}\times 6$ or **M1** for $\frac{1}{2}\times 7.4\times 7.4\times\sin 60$ or $\tan 60\times\frac{7.4}{2}$

Question 47

86	**2**	**M1** for correct method to find the perimeter e.g. $(8+3)\times 2\times 5-3\times 8$ If 0 scored, **SC1** for answer 98

Question 48

205.8	**3**	**M2** for $38.4\times\left(\frac{7}{4}\right)^3$ oe or **M1** for $\left(\frac{7}{4}\right)^3$ or $\left(\frac{4}{7}\right)^3$ oe or $\frac{7}{4}=\sqrt[3]{\frac{v}{38.4}}$ oe

Question 49

60	**3**	**M2** for $4\times\sqrt[3]{\frac{40500}{12}}$ oe or **M1** for $\left(\frac{4}{l}\right)^3=\frac{12}{40500}$ oe or $\sqrt[3]{\frac{40500}{12}}$ oe or $\sqrt[3]{\frac{12}{40500}}$ oe

Question 50

60	**3**	**M2** for $12\times\sqrt{13^2-12^2}$ or **M1** for 13^2-12^2 or for $12\times$ *their* 5 from Pythagoras or trig

Question 51

9	**2**	**M1** for $\frac{1}{2}\times6\times h=27$ oe

Question 52

990 or 989.58 to 989.73	**4**	**M1** for $4\times\pi\times7^2$ [÷2] **M1** for $\pi\times7^2$ **M1** for $\pi\times7\times2\times12$

Question 53

34.6 or 34.63 to 34.64	**3**	**M2** for $\frac{1}{4}\times\pi\times5^2+\frac{1}{2}\times5\times6$ oe or **M1** for $\frac{1}{4}\times\pi\times5^2$ oe or $\frac{1}{2}\times5\times6$ oe

Question 54

(a)	2	**1**	
(b)	2 correct lines	**2**	**B1** for each

Question 55

29.5 or 29.53…	**2**	**M1** for $2\times\pi\times4.7$ oe

Question 56

166	**3**	**M2** for [2 ×] (7×4 + 4×5 + 5×7) or **M1** for 7×4 or 4×5 or 5×7

Question 57

90.2 or 90.18…	**4**	**B3** for 9.82[%] OR **M3** for $[100\times]\left(k^2-\frac{45}{360}\times\pi\times\left(\frac{k}{2}\right)^2\right)\div k^2$ oe or **M2** for $[100\times]\frac{45}{360}\times\pi\times\left(\frac{k}{2}\right)^2\div k^2$ oe or $k^2-\frac{45}{360}\times\pi\times\left(\frac{k}{2}\right)^2$ or $100\times(k^2-m\pi k^2)\div k^2$ or **M1** for $\frac{c}{360}\times\pi\times\left(\frac{k}{2}\right)^2$ oe or for $(k^2-m\pi k^2)\div k^2$ or for $100\times(k^2-mk^2)\div k^2$

Question 58

18.4 or 18.40…	**4**	**M3** for $\frac{600-\frac{1}{2}\times4\times\pi\times6.2^2}{6.2\times\pi}$ oe or **M2** for $\frac{1}{2}\times4\times\pi\times6.2^2+\pi\times6.2\times l=600$ oe or $\frac{600-4\times\pi\times6.2^2}{6.2\times\pi}$ or better or **M1** for $\left[\frac{1}{2}\right]\times4\times\pi\times6.2^2$ or $\pi\times6.2\times l$

Question 59

180	**3**	**M2** for $[2\times](8\times6+8\times3+3\times6)$ oe or **M1** for 8×6 or 8×3 or 3×6

Question 60

28	**3**	**M2** for $24^2 + 12^2 + 8^2$ or **M1** for $24^2 + 12^2$ or $24^2 + 8^2$ or $12^2 + 8^2$

Question 61

3.37 or 3.367 to 3.368	**3**	**M2** for isolating r^3, e.g. $r^3 = \frac{120}{\pi}$ or **M1** for $\frac{1}{2} \times \frac{4}{3} \times \pi r^3 = 80$ oe If 0 scored **SC1** for answer 2.67 or 2.672 to 2.673...

Question 62

16	**3**	**M2** for $12 \times \sqrt[3]{\frac{768}{324}}$ oe or **M1** for $\sqrt[3]{\frac{768}{324}}$ or $\sqrt[3]{\frac{324}{768}}$ or $\frac{h^3}{12^3} = \frac{768}{324}$

Question 63

45	**3**	**M2** for $\sqrt[3]{\frac{875}{56}} \times 18$ oe or **M1** for $\sqrt[3]{\frac{875}{56}}$ or $\sqrt[3]{\frac{56}{875}}$ oe or $\frac{18^3}{h^3} = \frac{56}{875}$ oe

Question 64

228 or 228.3 to 228.4	**4**	**M1** for $\frac{1}{3}\times\pi\times\left(\frac{9.2}{2}\right)^2\times 12.5$ oe **M1** for $\frac{9.2}{12.5}=\frac{diameter}{12.5-5.5}$ oe or better **M1** for $\frac{1}{3}\times\pi\times\left(\frac{their 5.152}{2}\right)^2\times(12.5-5.5)$ oe OR **M2** for $\frac{\pi}{3}\times\left(\frac{9.2}{2}\right)^2\times 12.5-\frac{\pi}{3}\times r^2\times(12.5-5.5)$ oe for any $r<4.6$ If 0 scored **SC1** for 913 or 913.3 to 913.5

Question 65

99	**3**	**M2** for $44\times\left(\frac{81}{24}\right)^{\frac{2}{3}}$ oe or **M1** for $\left(\frac{81}{24}\right)^{\frac{1}{3}}$ oe or $\left(\frac{24}{81}\right)^{\frac{1}{3}}$ oe or $\left(\frac{44}{Area}\right)^3=\left(\frac{24}{81}\right)^2$ oe

Question 66

9.45	**3**	**M2** for $\frac{2.7\times 7.5}{3}+2.7$ oe OR **B2** for 6.75 oe or **M1** for $\frac{3}{7.5}=\frac{2.7}{XC}$ oe If 0 scored **SC1** for answer 7.7

Question 67

7.00 or 6.998 to 7.002	**3**	**M2** for $[r^2\ ]=\dfrac{1970}{12.8\times\pi}$ oe or better or **M1** for $1970=\pi\times r^2\times 12.8$ or better

Question 68

158	**3**	**M2** for $[2](8\times 5+8\times 3+5\times 3)$ or **M1** for 8×5 or 8×3 or 5×3

Question 69

57.9 or 57.90 to 57.91...	**2**	**M1** for $\dfrac{4}{3}\times\pi\times\left(\dfrac{4.8}{2}\right)^3$