

Topic 14 Statistics 2 (Pre-TT) [45] MARKSCHEME

1.

(a)	24 48 71	1 1 A02.3b	
(b)		2 2 A02.3b	B1FT for at least 5 points plotted correctly If 0 scored, SC1 for translation of correct curve
(c)	States correct with comparison showing approximately 18 employees over 55 and one quarter of 80 = 20	2 1 A02.1b 1 A02.5a	FT reading from <i>their</i> cumulative frequency curve at 55 B1 for one quarter of employees = 20 or for approximately 18 employees over 55 FT <i>their</i> curve

2.

Alternative method 1		
25 × 11 or 275	M1	
their 275 ÷ 22 or 12.5	M1dep	
15 × 30 ÷ their 12.5	M1	
36	A1	
Alternative method 2		
25 × 11 or 275	M1	
15 × 30 ÷ their 275 or [1.6, 1.64]	M1dep	
their [1.6, 1.64] × 22	M1	
36	A1	

Alternative method 3		
11 squares or 275 squares	M1	
$22 \div 11$ or 2 or $22 \div 275$ or 0.08	M1dep	
their 2×18 or their 0.08×450	M1	
36	A1	
Alternative method 4		
$\frac{15}{25}$ or $\frac{30}{11}$	M1	
$\frac{15}{25} \times \frac{30}{11}$ or $\frac{18}{11}$	M1dep	oe fraction
their $\frac{18}{11} \times 22$	M1	
36	A1	
Alternative method 5		
$25 \times h = 22$ or $\frac{22}{25}$ or 0.88	M1	oe
$0.88 \div 11$ or 0.08	M1dep	oe eg frequency density axis labelled with correct scale
their $0.08 \times 30 \times 15$	M1	
36	A1	

3.

- (a) Median plotted correctly B1
 Quartiles plotted correctly and box B1
 Extremes plotted correctly and whiskers B1
Consistent scale misread: penalise once
- (b) 120 B1
- (c) (i) 0 B1
 (ii) 20 B1
- (d) 5 correct plots M1 A1 cao
3 or 4 correct ⇒ M1 A0 or ft boxplot
 Their 5 increasing points joined by a curve A1 ft
Accept straight line segments, ignore tails

[9]

4.

- (a) Using $fd = \text{freq} \div \text{width}$ correctly M1
 5, 5, 3, 2 A1
At least two correct or method seen
Or in these ratios
- Correct heights plotted correctly B1
For their vertical scale ($\pm \frac{1}{2} sq$)
- Widths plotted correctly ($\pm \frac{1}{2} sq$) B1
- (b) (10×3) or $(90 \div 3)$ or 30 seen M1
Or equivalent eg counting squares from a "correct" histogram
- $30 + 120$ M1 dep
 $= 150$ A1
M1 M0 if histogram incorrect

[7]

5.

(a)		0.43	M1 for use of graph at 240 minutes A1 for 0.42 – 0.44 oe
(b)		comparison	B1 for at least one median (249 – 252 or 273 – 276) B1 for least one interquartile range (69 – 73 or 67 – 71) C1 for comment comparing average times eg females take longer than males oe C1 for comment comparing spreads of times from IQRs, eg the spread of times is about the same (NB – at least one of the comments must be in context)

6.

84	M1 for correct interpretation of given information leading to a method to find fd, eg. $20 \div 100$ (thousand) P1 for start of process to find required frequency, eg. $0.8 \times 50 (= 40)$ or $0.6 \times 50 (= 30)$ or $0.14 \times 100 (= 14)$ A1 for 84 cao
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7.

(a)		11A	<p>M1 For a cumulative frequency diagram with at least 5 points plotted correctly at the ends of the intervals</p> <p>C1 For correct graph with points joined by curve or straight line segments</p> <p>[SC B1 if the shape of the graph is correct and 5 points of their points are not at the ends but consistently within each interval and joined.]</p>
(b)		26.5	B1 25 – 28
(c)	$80 \div 4 \times 3 = 60$ Draw line parallel to mark axis from CF = 50	36.5	<p>P1 For process to find number who failed eg $80 \div 4 \times 3 = 60$</p> <p>P1 Draw line parallel to mark axis from CF = "60" and read off</p> <p>A1 For 35 - 38</p>

8.

(a)		histogram	<p>C1 for 2 correct bars of different widths or at least 3 correct frequency densities</p> <p>C1 all bars in correct proportions or 4 correct bars with axes scaled and labelled</p> <p>C1 fully correct histogram with axes scaled and labelled</p>
(b)	$81 \div 2 = 40.5$ 90 to 105 is 29	108.2	<p>C1 for $81 \div 2 = 40.5$ and $11.5 \div 18 \times 5 (= 3.19..)$</p> <p>C1 For answer in range 108 to 109</p>