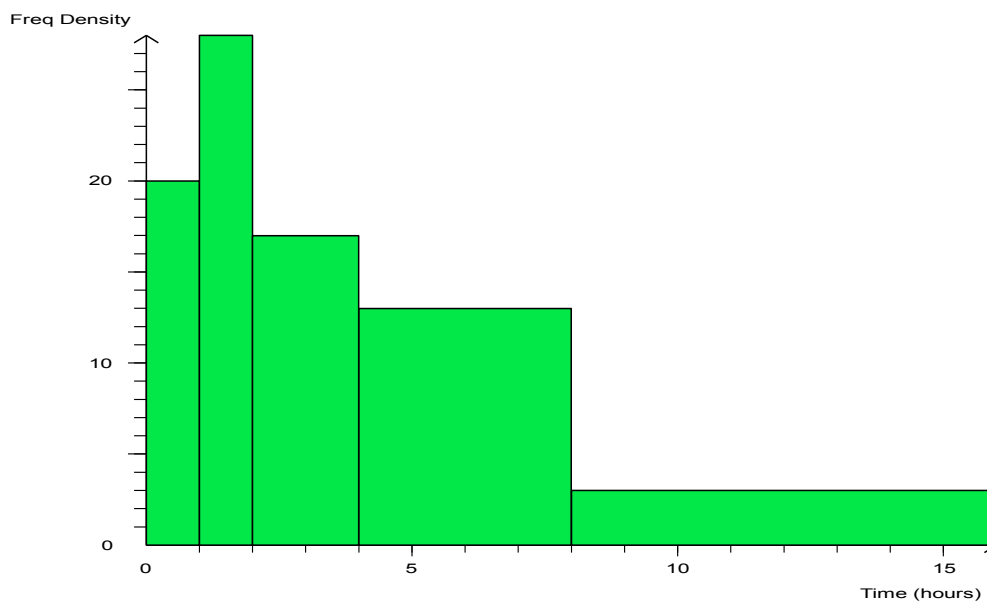


## Solutions to Past Paper Questions – Histograms

17) (a)

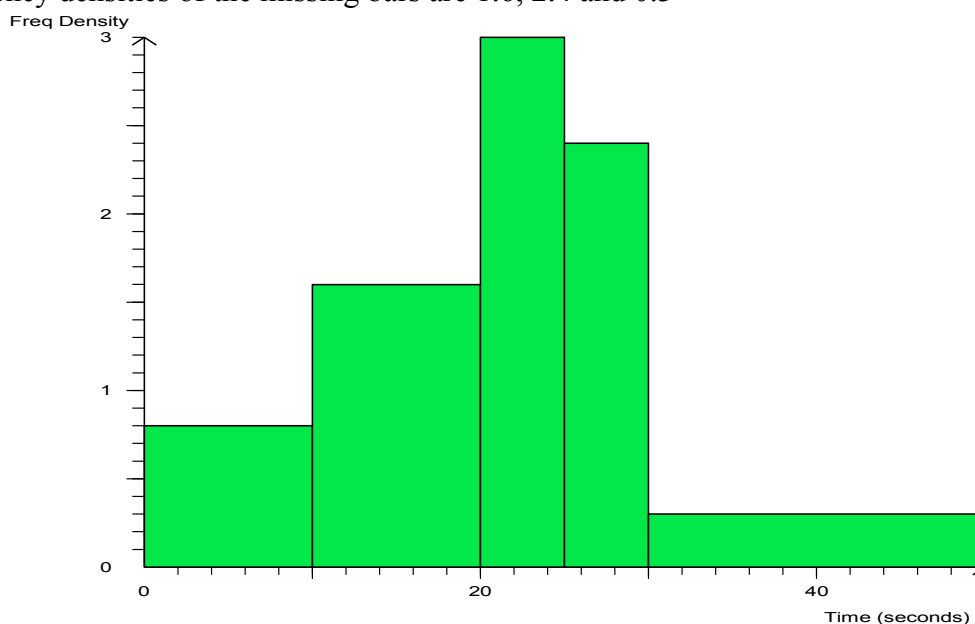
<i>Time (t hrs)</i>	<i>Class Width</i>	<i>Frequency</i>	<i>Frequency Density</i>
$0 < t \leq 1$	1	20	20
$1 < t \leq 2$	1	28	28
$2 < t \leq 4$	2	34	17
$4 < t \leq 8$	4	52	13
$8 < t \leq 16$	8		

Scale the vertical axis so that the height of the first bar is 20. Draw other bars to correct heights as given by the frequency density table above.



(b) Height of the “8-16” bar is 3, so frequency = area of bar =  $3 \times 8 = 24$

- 13) (a) From the table, the frequency density for the “ $20 < t \leq 25$ ” class is  $15 \div 5 = 3$   
 So the height of this bar on the histogram is 3, which enables you to scale the vertical axis.  
 The frequency densities of the missing bars are 1.6, 2.4 and 0.3



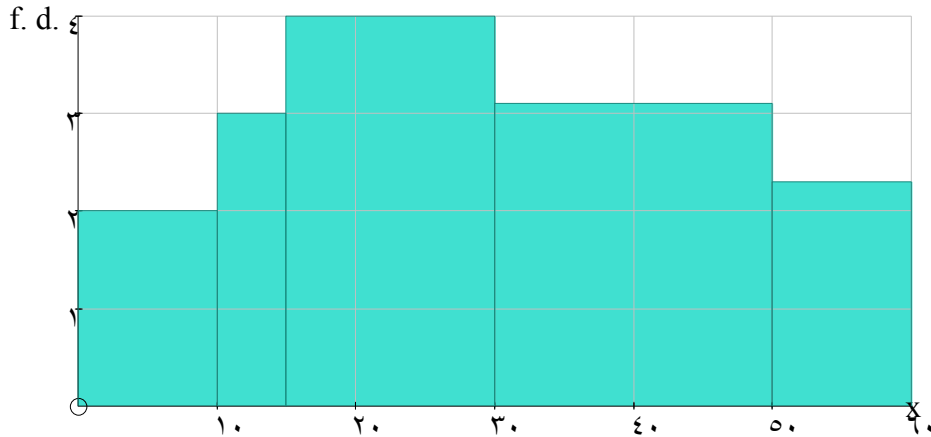
- (b) From the table, the frequency density for the first class is  $10 \div 10 = 1$   
 So the height of this bar on the histogram is 1, which enables you to scale the vertical axis.  
 The frequencies (areas) of the other bars are  $10 \times 1.8 = 18$ ,  $5 \times 2.8 = 14$ ,  $5 \times 2 = 10$  and  $20 \times 0.4 = 8$

15) (a) From the table, the frequency density for the first class is  $20 \div 10 = 2$   
 So the height of this bar on the histogram is 2, which enables you to scale the vertical axis.  
 The frequencies (areas) of the other bars given are:

10-15:  $3 \times 5 = 15$  students  
 15-30:  $4 \times 15 = 60$  students

(b) The frequency densities of the missing bars are:

30-50:  $62 \div 20 = 3.1$   
 50-60:  $23 \div 10 = 2.3$



11) (a) Comparing first bar of histogram with first entry in table, height of first bar = freq density =  $15 \div 10 = 1.5$   
 So each small mark on vertical axis is 0.1.  
 Second bar (150-160) =  $10 \times 3.5 = 35$   
 Fourth bar (165-170) =  $5 \times 3.6 = 18$   
 Fifth bar (170-180) =  $10 \times 2.2 = 22$   
 Seventh bar (190-210) =  $20 \times 0.6 = 12$

(b) Height of third bar =  $20 \div 5 = 4$   
 Height of sixth bar =  $12 \div 10 = 1.2$

14) For the “ $20 < t \leq 35$ ” class, the frequency density is  $225 \div 15 = 15$ .  
 So the scale on the vertical axis is 10 small divisions to 5 units.

(a) For “ $10 < t \leq 20$ ”, frequency =  $45 \times 10 = 450$   
 For “ $35 < t \leq 60$ ”, frequency =  $7 \times 25 = 175$   
 For “ $60 < t \leq 90$ ”, frequency =  $3 \times 30 = 90$   
 (b) For “ $0 < t \leq 5$ ”, frequency density =  $40 \div 5 = 8$   
 For “ $5 < t \leq 10$ ”, frequency density =  $150 \div 5 = 30$   
 For “ $90 < t \leq 150$ ”, frequency density =  $60 \div 60 = 1$