

[7] (g) $1011010.1010_2 \rightarrow ?_{10}$

$$= 2^6 + 2^4 + 2^3 + 2^1 + 2^{-1} + 2^{-3}$$

$$= 64 + 16 + 8 + 2 + 0.5 + 0.125 = 90.625_{10}$$

Bin \rightarrow Dec
Sum of Weights

[8] (h) Highest possible decimal number that can be represented by n bits $\rightarrow 2^n - 1$

$n=9 \rightarrow$ highest possible decimal number $= 2^9 - 1 = 511$

[9] (g) # of bits needed to represent $132_{10} = ?$

With n -bits, we can represent decimal numbers in the range $0 : 2^n - 1$

So the question becomes: What is the value of n that guarantees that 132_{10} belongs to the range $0 : 2^n - 1$

$$\Rightarrow 132_{10} \leq 2^n - 1$$

$$\Rightarrow 133 \leq 2^n$$

$$\Rightarrow \log 133 \leq n$$

$$\Rightarrow \frac{\log 133}{\log 2} \leq n \Rightarrow n \geq 7.055 \Rightarrow n = 8$$

minimum value

10 (e) Generate the binary sequence for $64_{10} \rightarrow 75_{10}$

$64_{10} = 1000\ 000_2$

$65_{10} = 1000\ 001_2$

\vdots

$75_{10} = 1001\ 111_2$

11 (g) $125_{10} = ?_2$ using sum-of-weights

$$= 64 + 32 + 16 + 8 + 4 + 1$$
$$= 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 0 + 2^0$$
$$= \begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 1 & 1 & 1 & 1 & 1 & 0 & 1 \end{matrix}$$

12 (b) $0.246_{10} = ?_2$ using sum-of-weights

$$= 1 + 1 + 0.125 + 0.0625 + 0.03125 + 0.015625 + \dots$$

$$= 1.1875$$

13 (f) $59_{10} = ?_2$ using repeated division by 2

$59 \div 2 = 29$	1
$29 \div 2 = 14$	1
$14 \div 2 = 7$	0
$7 \div 2 = 3$	1
$3 \div 2 = 1$	1
$1 \div 2 = 0$	1

1 1 1 0 1 1₂

14 (b) $0.347 = ?_2$ using repeated multip. by 2

$0.347 * 2 = \underline{0.694}$	
$0.694 * 2 = \underline{1.388}$	
$0.388 * 2 = \underline{0.776}$	
$0.776 * 2 = \underline{1.552}$	
$0.552 * 2 = \underline{1.104}$	
$0.104 * 2 = \underline{0.208}$	
$0.208 * 2 = \underline{0.416}$	
$0.416 * 2 = \underline{0.832}$	
$0.832 * 2 = \underline{1.664}$	

0.10110001...

15 (e)

$$\begin{array}{r} 1001 \\ + 0101 \\ \hline 1110 \end{array}$$

16 (f)

$$\begin{array}{r} 11010 \\ - 10111 \\ \hline 00011 \end{array}$$

17 (d)

$$\begin{array}{r} 1001 \\ \times 110 \\ \hline 0000 \\ 1001 \\ 1001 \\ \hline 110110 \end{array}$$

18 (b)

$$\begin{array}{r} 11 \quad 0011 \\ \hline 11001 \\ \hline 11 \quad \downarrow \\ 11 \\ \hline 00 \end{array}$$

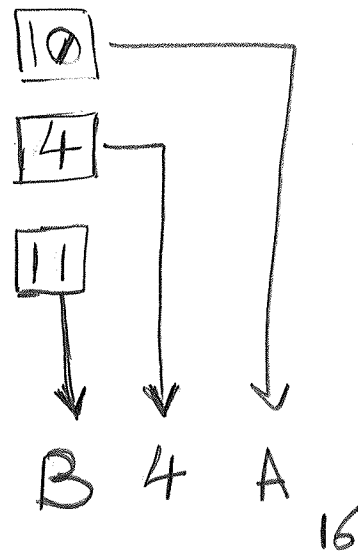
37 (d) $5C8_{16} = 010111001000_2$

40 (f) $2890_{10} = ?_{16}$

$$2890 \div 16 = 180$$

$$180 \div 16 = 11$$

$$11 \div 16 = 0$$



Repeated Division by 16

42 (b)

$$\begin{array}{r} C8_{16} = 20_{10} \\ - 3A_{16} = 10_{10} \\ \hline 8E_{16} = 14_{10} \end{array}$$

43 (g) $163_8 = ?_{10}$

$$= 1 \times 8^2 + 6 \times 8^1 + 3 \times 8^0 = 115_{10}$$

46 (h) $010110000011_2 = ?_8$

