Sample Paper 7: Paper 2

Question 7 (45 marks)

Question 7 (a)

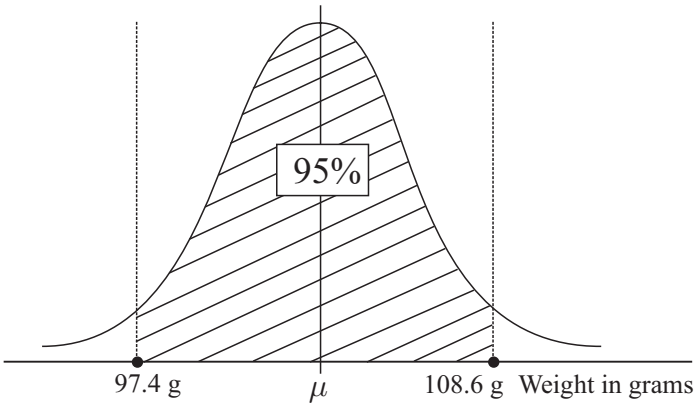
(i) The distribution is normal.

(ii) $\mu + 2\sigma = 108.6$

$\mu - 2\sigma = 97.4$

$2\mu \quad = 206 \Rightarrow \mu = 103 \text{ g}$

$103 + 2\sigma = 108.6 \Rightarrow \sigma = 2.8 \text{ g}$



Question 7 (b)

$\mu = 103 \text{ g}, \sigma = 2.8 \text{ g}$

$P(x < 100) = ?$

$x = 100 : z = \dfrac{x - \mu}{\sigma} = \dfrac{100 - 103}{2.8} = -1.07$

$P(x < 100) = P(z < -1.07)$

$= P(z > 1.07)$

$= 1 - P(z < 1.07)$

$= 1 - 0.8577$

$= 0.1423$

$= 14.23\%$

Question 7 (c)

$P(x < 100) = 0.001$

$P(x < -Z) = 0.001$

$P(z > Z) = 0.001$

$P(z < Z) = 0.999$

$\therefore z = 3.08 \Rightarrow -z = -30.8$

$-3.08 = \dfrac{100 - \bar{x}}{2.8}$

$\therefore \bar{x} = 108.624 \text{ g}$

Question 7 (d)

$P(\text{Less than advertised weight}) = 0.1423$

$P(\text{Not less than advertised weight}) = 0.8577$

$P(\text{At least one weighs less than advertised weight})$

$= P(\text{One or more weighs less than advertised weight})$

$= 1 - P(\text{None with less than advertised weight})$

$= 1 - {}^5C_0 (0.1423)^0 (0.8577)^5$

$= 0.536$

$= 53.6\%$