Q1. Four candidates A, B, C, ZJhave applied for the assignment to coach a school cricket team. If A is twice as likely to be selected as B, and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D, what are the probabilities that
(a) C will be selected? (b) A will not be selected?
Sol: It is given that A is twice as likely to be selected as B.
P(A) = 2P(B)
B and C are given about the same chance of being selected.
P(B) = P(C)
C is twice as likely to be selected as D.
P(C) = 2 P(D)

$$\Rightarrow \qquad P(A) = 4P(D) \Rightarrow P(D) = \frac{P(A)}{4}$$

Now, sum of probability = 1

$$P(A) + P(B) + P(C) + P(D) = 1$$

$$\therefore \qquad P(A) + \frac{P(A)}{2} + \frac{P(A)}{2} + \frac{P(A)}{4} = 1$$

$$\Rightarrow \qquad \frac{4P(A) + 2P(A) + 2P(A) + P(A)}{4} = 1$$

$$\Rightarrow \qquad 9P(A) = 4 \Rightarrow P(A) = \frac{4}{9}$$

(a) $P(C \text{ will be selected}) = P(C) = P(B) = \frac{P(A)}{2} = \frac{4}{9 \times 2} = \frac{2}{9}$

(b) $P(A \text{ will not be selected}) = P(A') = 1 - P(A) = 1 - \frac{4}{9} = \frac{5}{9}$