

$$(6) \frac{a_{11}}{a_{18}} = \frac{2}{3}$$

$$\Rightarrow \frac{a+10d}{a+17d} = \frac{2}{3}$$

$$\Rightarrow 3a+30d = 2a+34d$$

$$\Rightarrow a = 4d \dots (i)$$

$$\frac{a_5}{a_{21}} = \frac{a+4d}{a+20d}$$

$$= \frac{4d+4d}{4d+20d} \text{ [using (i)]}$$

$$= \frac{8d}{24d}$$

$$= \frac{1}{3}$$

$$\frac{S_5}{S_{21}} = \frac{\frac{5}{2} [2a+4d]}{\frac{21}{2} [2a+20d]}$$

$$= \frac{\frac{5}{2} \times 2 (a+2d)}{\frac{21}{2} \times 2 (a+10d)}$$

$$= \frac{5(4d+2d)}{21(4d+10d)}$$

$$\text{[using (i)]}$$

$$= \frac{5 \cdot 30d}{21 \cdot 4d}$$

$$= \frac{5}{49}$$

$$(7) \text{ first term } (a_1) = a$$

$$\text{second term } (a_2) = b$$

$$\text{last term } (a_n) = c$$

$$d = a_2 - a_1$$

$$d = b - a$$

$$a_n = a + (n-1)d$$

$$c = a + (n-1)(b-a)$$

$$\Rightarrow n-1 = \frac{c-a}{b-a}$$

$$\Rightarrow n = \frac{c-a}{b-a} + 1$$

$$= \frac{c-a+b-a}{b-a}$$

$$= \frac{b+c-2a}{b-a}$$

$$S_n = \frac{n}{2} (a+a_n)$$

$$= \frac{b+c-2a}{2(b-a)} (a+c)$$

$$= \frac{(a+c)(b+c-2a)}{2(b-a)}$$