Complex numbers Ex 13.1 Q2

$$1+i^{10}+i^{20}+i^{30} = 1+i^{4\times2}\times i^{2}+i^{4\times5}+i^{4\times7}\times i^{2}$$
$$= 1+1\times i^{2}+1+1\times i^{2}$$
$$= 1-1+1-1$$
$$= 0, \text{which is real number}$$

Complex numbers Ex 13.1 Q3(i)

$$i^{49}+i^{68}+i^{89}+i^{110} = i^{4\times12}\times+i^{1}+i^{4\times17}+i^{4\times22}\times i^{1}+i^{4\times27}\times i^{2}$$
$$= 1\times i+1+1\times i+1\times i^{2}$$
$$= i+1+i-1$$
$$= 2i$$

$$\therefore i^{49}+i^{68}+i^{89}+i^{110} = 2i$$

Complex numbers Ex 13.1 Q3(ii)

$$i^{30}+i^{80}+i^{120} = i^{4\times7}\times i^{2}+i^{4\times20}+i^{4\times30}$$
$$= 1\times i^{2}+1+1$$
$$= -1+1+1$$
$$= 1$$

$$\therefore i^{30}+i^{80}+i^{120} = 1$$

Complex numbers Ex 13.1 Q3(iii)

$$i+i^{2}+i^{3}+i^{4} = 1+(-1)+(-i)+1$$
$$= 0$$

$$\therefore i+i^{2}+i^{3}+i^{4} = 0$$

********** END **********