Assignment 9 : Solutions

Q.1 In axial mode, bandwidth remains almost constant. if diameter of helix wire decreased.

(c)

Q2. (b). if no. of turns ↑, Beamwidth ↓.

Q3. (a.) decrease.

Q4. (d.) All of these.

Q5. (C) both Linear and Circular.

Q6. (a) no. of turns and spacing both will increase.

Q7. Given $D = 15\,mm$, $S = 4mm$, $n = 4$

$\therefore$ Axial length, $= (A.L) = N.S = 4 \times 4 = \underline{16\,mm}$

Total wire length = N x wire length of one turn.

$= 4 \times \sqrt{C^2 + S^2}$

(d) Ans. $= 4 \times \sqrt{(\pi D)^2 + S^2} = \underline{189.2\,mm}$.

Q 8. For peripheral feed, $R \simeq \frac{150}{\sqrt{C_\lambda}}$

$C_\lambda = \frac{110}{\lambda}$, where $\lambda = \frac{3 \times 10^{11}}{3 \times 10^9} = 100\,mm$

$C_\lambda = 1.1$

so, $R \simeq \frac{150}{\sqrt{1.1}} = 143\,\Omega$. (b)

Q9.

For axial mode,

given $C_\lambda = 1$, $\alpha = 13^\circ$, $n = 20$

so, $S_\lambda = C_\lambda \tan\alpha = 1 . \tan 13$

$= 0.2309$

$\therefore$ HPBW $\simeq \frac{52}{C_\lambda \sqrt{n S_\lambda}} = \frac{52}{1 . \sqrt{20 \times 0.2309}}$

$= 24.2^\circ$

(b).

Q10.

Given $D = 0.009\lambda$, $N.S = 0.09\lambda$, $n = 6$

$\therefore S_\lambda = \frac{N.S_\lambda}{N} = \frac{0.09}{6} = 0.015$

$A.R = \frac{2 S_\lambda}{C_\lambda^2} = \frac{2 \times 0.015}{(\pi \times 0.09)^2} = 37.5$

$= 20 \log(37.5) = \underline{31.5}$ dB

(b)