72 slot, 6-pole, 3 phase machine

Slots per pole per phase:

Electrical angle between coils:

a)

Full pitch winding diagram



11/12 short-pitched winding diagram



b)

distribution factor:

Pitch factor of full pitch winding:

Pitch factor of 11/12 short-pitched winding:

Winding factor of full pitch winding:

Winding factor of 11/12 short-pitched winding:

c)

Q2)

A three-phase permanent magnet synchronous machine which has 20 poles is investigated in this part. Firstly, slot number is chosen as 24. For this configuration, phase angles of induced voltage in each slot are given in Table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1st | 0° | 7th | 180° | 13th | 0° | 19th | 180° |
| 2nd | 150° | 8th | 330° | 14th | 150° | 20th | 330° |
| 3rd | 300° | 9th | 120° | 15th | 300° | 21st | 120° |
| 4th | 90° | 10th | 270° | 16th | 90° | 22nd | 270° |
| 5th | 240° | 11th | 60° | 17th | 240° | 23rd | 60° |
| 6th | 30° | 12th | 210° | 18th | 30° | 24th | 210° |

The phasor diagram of Phase-A is given in below Figure.



Now the same machine is analyzed for 21 slots. The phase angles of induced voltage in each slot are given in Table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1st | 0° | 8th | 120° | 15th | 240° |
| 2nd | 171.43° | 9th | 291.43° | 16th | 51.43° |
| 3rd | 342.86° | 10th | 102.86° | 17th | 222.86° |
| 4th | 154.28° | 11th | 274.28° | 18th | 34.28° |
| 5th | 325.71° | 12th | 85.71° | 19th | 205.71° |
| 6th | 137.14° | 13th | 257.14° | 20th | 17.14° |
| 7th | 308.57° | 14th | 68.57° | 21st | 188.57° |