QUIZ – ANSWER KEY

QUIZ NO: 125

TOPIC: ELECTRICAL ENGINEERING

DATE: 21/11/2022

1. Armature winding is mounted on a _____?

   [A] Stator

   [B] Rotor

   [C] Can be mounted anywhere on stator or rotor

   [D] Not required

   Answer: B
   Explanation: A DC machine is a heteropolar structure with stationary poles and the rotating armature. Field coil is mounted on stator. In an AC machine armature winding is located at rotor while field coil is located at stator. An 'armature' is a moving part as it a 'rotor'.

2. In a DC machine, how coil-side emf varies towards the outer side of poles?

   [A] Decreases

   [B] Remains same

   [C] Increases

   [D] First increases the decreases

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Answer: A

Explanation: Coil side current pattern is the same as the emf pattern. Only difference is that while the coil-side emf reduces towards the outer side of poles, the current remains the same in all the coil-sides except for alterations from pole to pole, while the coil side current reverses, the current exchanged with external circuit must be unidirectional.

3. Commutator performs rectification so that output of the machine is unidirectional ?

[A] True

[B] False

Answer: A
Explanation: Since it is a DC machine the generated output must be DC. Any electrical machine works on induced emf concept which is AC in nature. Commutator and brush assembly of the DC machine performs the mechanical rectification process so; induced AC is converted into DC(Unidirectional).

4. What is the difference of DC voltages in the adjoining Brushes ?

[A] Depends on the Shaft speed

[B] Zero

[C] Non-zero

[D] Depends on the various other parameters

Answer: B

Explanation: Brushes are located electrically in the magnetically neutral region. Due to their location adjoining brushes are at constant DC voltage and the coil in series between the constitute one parallel path.

5. What is the effect of armature coils at points where brushes are located ?

[A] Induces positive emf

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[B] Induces negative emf

[C] Induces zero emf

[D] Depends on the speed of rotor

Answer: C

Explanation: Brushes are at magnetically neutral region hence, induced emf due to armature coils at brushes will be equal to zero. As in the magnetically neutral region change in flux will be equal to the zero, emf will not be induced (Faraday's law).

6. As the armature rotates, the number of coils in series tapped by the brush pairs_____?

[A] Remains same

[B] Increases

[C] Decreases

[D] Depends on rotor speed and direction of torque

Answer: A

Explanation: Brushes are located electrically in magnetically neutral region. Adjoining brush pairs are at constant DC voltage and the number of coils tapped by brush pairs also remain constant. Their disposition relative to the poles is the same.

7. Coil span for 4-pole, 12-slot armature winding is____?

[A] 24

[B] 48

[C] 8

[D] 3

Answer: D

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Explanation: Coil span is defined as a ratio of number of slots in the armature winding which are also equal to the number of commutator segments to the number of poles. Here, Slots in the armature winding= 12, Number of poles= 4. Y_{CS}= 12/4= 3.

8. What is the nature of the coils when Y_{CS} value is non-integral?

[A] Long-pitched
[B] Medium-pitched
[C] Short-pitched
[D] Can't be determined by Y_{CS} value

Answer: C

Explanation: Coil-side voltages around the coil are additive most of the time (except when coil-sides lie near the magnetic neutral region). Thus Y_{CS}= Nearest lower integer, which means that for non-integral S/P, the coils are short-pitched.

9. For a 2-pole DC machine with coil span equal to 6, what are the number of commutator segments?

[A] 3
[B] 12
[C] 4
[D] 8

Answer: B

Explanation: Coil span is defined as a ratio of number of slots in the armature winding which are also equal to the number of commutator segments to the number of poles. Here, Number of poles= 2, Slots in the armature winding= S= P* Y_{CS}. Here, Y_{CS}= 6, P=2. Thus S=12. C=S=Number of commutator segments.

10. When coil sides are pole pitch apart, the DC armature winding is called as _____?

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[A] Multiplex

[B] Fractional-pitch

[C] Full-pitch

[D] Pole-pitch

Answer: C

Explanation: Pole pitch is called as center to center distance between two adjacent poles. When measured in electrical degrees one pole itch is equal to 1800. Coil span is simply a peripheral distance between two sides of a coil. If the coil span is equal to the pole pitch, then the armature winding is said to be full pitched coil.