

SHORT QUESTIONS AND ANSWERS**UNIT -4 -
PERMANENT MAGNETS AND BRUSHLESS DC MOTORS****1. what are the advantages of brushless dc motors drives?**

- ✓ Regenerative braking is possible
- ✓ Speed can be easily controllable

2. what are the disadvantages of brushless dc motors drives?

- ✓ It requires a rotor position sensor
- ✓ It requires a power semiconductor switching circuits.

3. Define mechanical commutators?

Its arrangement is located in the rotor
No of commutators segments are very high .

4. Define electronic commutators?

- ✓ Its arrangement is located in the stator
- ✓ No of switching devices limited to six

5. mention some applications of PMBL DC motor?

- ✓ Power alternators
- ✓ Automotive applications
- ✓ Computer and Robotics applications
- ✓ Textile and Glass industries

6. what are conventional Dc motor?

- ✓ Field magnets on the stator
- ✓ Maintenance is high

7. what are PMBL DC motor?

- ✓ Field magnets on the rotor
- ✓ Low maintenance

8. why is the PMBLDC motor called electronically commutated motor?

The PMBL DC motor is also called electronically commutated motor because the phase windings of PLMBL DC motor is energized by using power semiconductor switching circuits. here the power semiconductor switching circuits act as a commutator.

9. what are the classification of BLPM DC motor?

- ✓ BLPM square wave motor
- ✓ BLPM sine wave motor

10. what are the two types of BLPM SQW DC motor?

- ✓ 180° pole arc BLPM SQW motor
- ✓ 120° pole arc BLPM SQW motor

11. what are the two types of rotor position sensors?

- ✓ Optical position sensor
- ✓ Hall effect position sensor

12. what are the materials used for making Hall IC pallet?

- ✓ Indium-antimony
- ✓ Gallium-arsenide

14. what are the classification of BLPM dc motor?

- ✓ One phase winding and one pulse BLPM dc motor
- ✓ One phase winding and two pulse BLPM dc motor
- ✓ Two phase winding and two pulse BLPM dc motor
- ✓ Three phase winding and three pulse BLPM dc motor
- ✓ Three phase windings and six pulse circuits

15. what are the features of one phase winding and one pulse BLPM dc motor?

- ✓ Its inertia should be high, such that rotor rotates continuously
- ✓ Utilization of transistor and windings are less

16. what are the features of one phase winding and two pulse BLPM dc motor?

- ✓ In this case winding utilization is better, however transistor utilization is less.
- ✓ Torque developed is more uniform

17. what are the features of two phase winding and two pulse BLPM dc motor?

- ✓ Winding utilization is only 50% which is less
- ✓ It provides better torque waveforms
- ✓

18. what are the features of three phase windings and 6 pulse circuits?

- ✓ Utilization factor of winding will be better
- ✓ Torque pulse and ripple frequency components are less
- ✓

21. what is meant by self control?

Self control ensures that for all operating points the armature and rotor fields move exactly at the same speed.

22. what is meant by vector control?

PMSM are employed for variable speed applications. The process of controlling voltage and frequency to get the desired speed and torque is known as vector control of PMSM

PART – B

1. Sketch the structure of controller for PMBLDC motor and explain the functions of various blocks. (16)
2. Explain the closed loop control scheme of a permanent magnet brushless dc motor drive with a suitable schematic diagram. (16)
3. Derive the expressions for the emf and torque of a PMBLDC motor. (16)
4. Draw the diagram of electronic Commutator. Explain the operation of electronic Commutator. (16)
5. Discuss the use of Hall sensors for position sensing in PMBLDC motor. (16)
6. Sketch the torque-speed characteristics of a PMBLDC motor. (16)

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