1	Write the formula for slip in an induction motor and interpret each term.
2	State the conditions required for regenerative braking in induction motors.
3	State the need for starters in induction motors.
4	What is dynamic braking and how does it differ from regenerative braking in induction motors?
5	State double revolving field theory in single-phase induction motor.
6	List two differences between a BLDC motor and a stepper motor.
7	Mention any two advantages of using servo motors in automation systems.
8	Define the principle of operation of a Switched Reluctance Motor (SRM).
9	List two reasons why BLDC motors are preferred in electric vehicles.
10	What is the purpose of magnetic levitation systems**,** and where are they typically used?
	PART B & C
1	The ratio of maximum torque to full-load torque in a three phase squirrel cage induction is 2.2:1. Determine the ratio of actual starting torque of full load torque for direct starting, Star-Delta starting and auto transformer starting with tapping of 70%. The rotor resistance and standstill reactance per phase are 0.5 Ω and 5 Ω respectively.
2	Describe the various starters used for three phase induction motor. Analysis and compare them.
3	A 3-phase, 415 V, 4-pole, 50 Hz induction motor draws 5 times the rated current at rated voltage at starting. It is required to bring down the starting current from the supply to 2 times of the rated current using a 3-phase autotransformer. If the magnetizing impedance of the induction motor and no load current of the autotransformer is neglected, then find the transformation ratio of the autotransformer. (round off to two decimal places)
4	Compare the starting torque and efficiency of different single-phase motors: (i) Capacitor Start (ii) Capacitor Start-Capacitor Run (iii) Split Phase. Which one is best suited for an air compressor? Justify.
5	Describe three methods of braking in induction motors with comparison: Plugging, Dynamic, and Regenerative. Suggest a suitable braking method for an elevator motor system.
6	A three phase induction motor has a ratio of maximum torque to full load torque as 2.5:1. Find the ratio of starting torque to full load torque if star-delta starter is used. The resistance and standstill reactance per phase are 0.4 Ω and 4 Ω respectively.
7	Compare BLDC and AC Series Motors for handheld power tool applications in terms of efficiency, noise, and maintenance
8	What is an Induction Generator? Compare it with a synchronous generator. Highlight its usage in wind energy systems.
9	A linear induction motor (LIM) is used for a transportation system. The motor is rated for 10 kW and operates at a frequency of 50 Hz. (a) Calculate the synchronous speed of the LIM. (b) Discuss the principle of operation of a linear induction motor and its applications
10	A steeper motor has a step angle of 2.5°, determine (a) resolution (b) Number of steps per shaft to make 25 revolution (c) Shaft speed if starting stepping frequency is 3600 pulse/sec.
11	A BLDC motor operates in a closed-loop system with a controller providing feedback. Explain the working principle of a BLDC motor and how it differs from a traditional DC motor. Also discuss the advantages and disadvantages of using BLDC motors in industrial applications.
12	(i) A three-phase, three-stack, variable reluctance step motor has 20 poles on each rotor and stator stack. Find step angle of this step motor. (ii) Find the most suitable use of a hybrid stepper motor (a) A when step angles of 180°, 360° etc are required (b) When step angles of 90°, 270° etc are required (c) When step angles of 1.8°, 2.5° etc are required (d) When step angles of 18°, 25° etc are required. Give an detailed solutions for this.