BIRLA INSTITUTE OF TECHNOLOGY
MESRA – 835215, RANCHI, INDIA

UG

Name: …… Roll No.: ……..

Branch: …… Signature of Invigilator: ……

Semester: VIth Date: 04/05/2022 (MORNING)

Subject with Code: **EE419 SPECIAL ELECTRICAL MACHINES**

	Section A (30)	Section B (20)	Total Marks (50)
Marks Obtained			

INSTRUCTION TO CANDIDATE

1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. **Candidates should write their roll no. in each page of the booklet.**
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to **submit the question paper cum answer sheets before leaving the examination hall**.

BIRLA INSTITUTE OF TECHNOLOGY MESRA

END SEMESTER EXAMINATION SP2022

EE419 SPECIAL ELECTRICAL MACHINES

	Section-A Multiple choice questions. All questions are mandatory.	[30]
1.	In BLDC motor field winding is kept on A. Stator B. Rotor C. Can be rotor and stator D. No field winding on the rotor or stator	[1.5]
2.	Which of the following is not an advantage of BLDC motor over conventional DC motor. A. Less maintenance B. Long life C. Low cost D. No risk of explosion or possibility of RF radiation	[1.5]
3.	Typical brushless motor doesn't have _____ A. Commutator B. Permanent magnet C. Electronic controller D. Fixed armature	[1.5]
4.	The advantages of BLDC motors are A. High Efficiency B. Compactness C. Low Maintenance D. All of the above	[1.5]
5.	The speed-torque characteristics of the BLDC motor are similar to that of A. DC Shunt Motor B. DC Series Motor C. Induction Motor D. Compound Motor	[1.5]
6.	The rotor and stator of BLDC motor rotate at A. Same frequency B. Different frequency C. Zero frequency D. No frequency	[1.5]
7.	The direction of rotation of BLDC motor can be reversed by A. Reversing supply terminal B. Reversing phase sequence C. Changing logic sequence D. Direction can't be changed	[1.5]
8.	PMSM stator construction is similar to A. synchronous motor B. Induction motor C. Compound motor D. All of the above	[1.5]
9.	The following are the permanent magnet material A. ALNICO B. CERAMIC C. SmCo D. ALL OF THE ABOVE	[1.5]
10.	synchronous motor.....not varied even applying any load A. Frequency B. Voltage C. Speed D. None of the above	[1.5]
11.	Rotor position sensor in PMSM employed for A. self control B. vector control C. both A and B D. none of the above	[1.5]
12.	In PMSM torque produced by two magnetic field one from PMs mounted in the rotor another one A. from coils of the stator B. from same in rotor C. from field coils D. none of the above	[1.5]

13.	The switched reluctance motor is a A. doubly salient, singly excited motor B. singly salient, singly excited motor C. doubly salient, doubly excited motor D. singly salient, doubly excited motor	[1.5]
14.	according to variable reluctance principle, when air gap min A. both reluctance and inductance min B. reluctance min, inductance max C. both reluctance and inductance max D. no change in reluctance and inductance	[1.5]
15.	In SRM the torque is produced due to A. variable reluctance principle B. mutual induction C. self-induction D. constant reluctance	[1.5]
16.	Increasing the stator poles _____ the speed of Reluctance motor. A. Decreases B. Increases C. Remains the same D. Negative	[1.5]
17.	Which of the following motor rotates in discrete angular steps? A. Servo motor B. DC motor C. Stepper motor D. Linear Induction Motor (LIM)	[1.5]
18.	The rotational speed of a given stepper motor depends on A. Magnitude of supply voltage. B. Polarity of stator current. C. Magnitude of stator current. D. Step pulse frequency.	[1.5]
19.	A hysteresis motor is a _____ with a uniform air gap and without DC excitation. A. DC Motor B. Synchronous motor C. Induction Motor D. AC motor	[1.5]
20.	The noise level of the hysteresis motor is very_____ A. High B. Medium C. Low D. No Noise	[1.5]
Section-B Short answer type questions. Answer any 5 questions		[20]
21.	Compare BLDC motor and small conventional motor.	[4]
22.	Explain the torque-speed characteristics of BLDC motor.	[4]
23.	What are the features of PMSM? Explain its advantages and disadvantages.	[4]
24.	What is meant by vector control? Describe a vector control scheme for PMSM.	[4]
25.	A four-phase eight-pole switched reluctance motor has six rotor teeth. Find the step angle and commutation frequency for a speed of 6000 rpm.	[4]
26.	Draw and explain the structure of multi-stack variable reluctance motor.	[4]
27.	Explain importance of isolation in gate driver circuit	[4]