

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

**Course Code: EE402**  
**Course Name: SPECIAL ELECTRIC MACHINES**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks.*

Marks

- |   |   |     |
|---|---|-----|
| 1 | Explain the constructional details and importance of Drag Cup Servomotor      | (5) |
| 2 | Explain the dynamic characteristics of stepper motor.                         | (5) |
| 3 | What are the advantages and limitations of Universal motor?                   | (5) |
| 4 | Draw and explain n+1 switches and diode configuration power converter for SRM | (5) |
| 5 | Compare Mechanical Commutation and Electronic Commutation?                    | (5) |
| 6 | Differentiate trapezoidal type BLDC motor and sinusoidal type PMBLDC motor    | (5) |
| 7 | Write short note on linear synchronous motor.                                 | (5) |
| 8 | List the application of linear motor  | (5) |

**PART B**

*Answer any two full questions, each carries 10 marks.*

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|----|--|------|
| 9  | a) List the applications of Servomotors  | (4)  |
|    | b) With relevant diagrams explain armature controlled DC Servomotors   | (6)  |
| 10 | a) With neat sketches, explain the constructional details and working principle of variable reluctance stepper motor. List any four applications of stepper motor. | (10) |
| 11 | a) Compare the performance of AC and DC servo motors   | (4)  |
|    | b) Discuss 2 phase ON mode excitation of three phase and four phase stepper motors   | (6)  |

**PART C**

*Answer any two full questions, each carries 10 marks.*

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|----|---|------|
| 12 | a) Why compensating winding is used in AC series motor? Draw series motor with different types of compensating windings | (5)  |
|    | b) Discuss the torque speed characteristics of hysteresis motor   | (5)  |
| 13 | a) With neat sketches explain the construction and operation of 8/6 SRM   | (10) |

- 14 a) Explain the torque-speed characteristics of SRM with necessary diagrams (6)  
b) What are the modifications to be made in DC series motor to operate it in AC supply? (4)

**PART D**

*Answer any two full questions, each carries 10 marks.*

- 15 a) Explain the principle of operation of PMSBLDC motor for  $180^\circ$  commutation with neat circuit diagram. (10)
- 16 a) With necessary diagrams explain Longitudinal flux linear switched reluctance motor and Transverse flux linear switched reluctance motor. (10)
- 17 a) Derive the torque equation of PM BLDC motor (6)  
b) Derive the expression for linear force. (4)

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