Printed Pages:02 **Sub Code:KEE-061**

Paper Id: 236900 **Roll No.** | | | | | | | | | | |

B. TECH
(SEM VI) THEORY EXAMINATION 2022-23
SPECIAL ELECTRICAL MACHINES

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. In which mode the induction machine runs faster than the synchronous speed and define the nature of slip in the same mode.

b. Write the applications of Induction generator, Linear Induction Motor and Servomotors.

c. Describe the differences between a Stepper motor and a Servo motor?

d. Define pull in torque and pull out torque in stepper motor

e. Differentiate between Switched Reluctance and stepper motor.

f. Draw the torque speed characteristics of Switched Reluctance Motor.

g. Differentiate between DC motors and PMDC motors.

h. Differentiate between DC motors and BLDC motors.

i. State the working principle of single phase ac synchronous motor.

j. Write four applications of single phase ac commutator motors.

SECTION B

2. Attempt any *three* of the following: 10x3=30

a. Illustrate the construction and working principle of two phase servomotor with the help of torque speed characteristics.

b. Explain the construction and working principle of multi stack Variable Reluctance Stepper motor with the help of neat sketches.

c. Explain the torque production and performance characteristics of switched reluctance motors (SRM).

d. Describe the working principle, important features and applications of sinusoidal permanent magnet AC motors (PMAC).

e. Differentiate between single phase induction motor and single phase synchronous motor and discuss the different challenges.

SECTION C

3. Attempt any *one* part of the following: 10x1=10

a. Illustrate the construction and working principle of Induction generator with the help of equivalent circuits and characteristics.

b. Classify the different types of Induction generator? Illustrate the construction and working principle of each.

4. Attempt any *one* part of the following: 10x1=10

a. Classify the different type of stepper motors? Illustrate the construction and working principle of each with the help of neat diagrams.

b. Illustrate open loop and closed loop control of stepper motors with the help of microprocessor control circuits, express the five applications of stepper motor.

5. Attempt any *one* part of the following: 10x1=10

a. Explain the construction and working principle of rotary and linear switched reluctance motor(SRM) .

b. Illustrate the performance characteristics and methods of rotor position sensing and sensor less operation of switched reluctance motor.

6. Attempt any *one* part of the following: 10x1=10

a. Describe the operating principle, equivalent circuit and characteristics of permanent magnet DC Motor.

b. Classify the different types of permanent magnet brushless DC motors? Explain the principle of operation with the help of e.m.f. and torque equation of permanent magnet brushless DC motors.

7. Attempt any *one* part of the following: 10x1=10

a. Identify the different types of single phase synchronous motors? Explain the construction, operating principle and characteristics.

b. Classify the different types of single phase commutator motors? Explain the construction, operating principle and characteristics of each type of single phase commutator motors.

s