

**THE KAVERY ENGINEERING COLLEGE**  
**(An Autonomous Institution)**  
**B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025**

**Fourth Semester**

**Electrical and Electronics Engineering**

**EE3405 - Electrical Machines - II**

**Regulations - 2021**

**Duration : 3 Hrs**

**Maximum : 100 Marks**

**PART – A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)**

| <b>Q.No</b> | <b>Questions</b>                                                                            | <b>BLT</b> | <b>CO</b> | <b>Marks</b> |
|-------------|---------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 1.          | Define winding factor in synchronous machines.                                              | L1         | 1         | 2            |
| 2.          | Differentiate between salient pole and non-salient pole synchronous machines.               | L2         | 1         | 2            |
| 3.          | What is hunting in synchronous motors?                                                      | L1         | 2         | 2            |
| 4.          | Illustrate the role of damper windings in synchronous motors.                               | L2         | 2         | 2            |
| 5.          | Draw the torque-slip characteristic of a three-phase induction motor and label the regions. | L2         | 3         | 2            |
| 6.          | Sketch the equivalent circuit of a three-phase induction motor and identify its components. | L2         | 3         | 2            |
| 7.          | Justify how frequency control affects the speed of an induction motor.                      | L2         | 4         | 2            |
| 8.          | Why three phase induction motor is called as rotating transformer?                          | L1         | 4         | 2            |
| 9.          | What is the purpose of the auxiliary winding in a single-phase induction motor?             | L1         | 5         | 2            |
| 10.         | Define double field revolving theory in single-phase induction motors.                      | L1         | 5         | 2            |

**PART – B (ANSWER ALL QUESTIONS) (Marks 5\*16 = 80)**

| <b>Q.No</b> | <b>Questions</b>                                                                                                                                                                                             | <b>BLT</b> | <b>CO</b> | <b>Marks</b> |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11.         | a Derive the EMF equation of a synchronous generator. Also discuss the phasor diagram of a non-salient pole synchronous generator connected to an infinite bus under different power factor load conditions. | L4         | 1         | 16           |
|             | <b>Or</b>                                                                                                                                                                                                    |            |           |              |
|             | b Analyze and compare the voltage regulation of a synchronous generator using the EMF, MMF, ZPF, and ASA methods. Highlight the assumptions and accuracy of each method.                                     | L4         | 1         | 16           |
| 12.         | a Explain the principle of operation of a synchronous motor. Derive the torque equation and describe how torque is developed. Also, illustrate with the help of necessary diagrams.                          | L2         | 2         | 16           |
|             | <b>Or</b>                                                                                                                                                                                                    |            |           |              |
|             | b Draw and explain the V and inverted V curves of a synchronous motor. How do these curves help in understanding the motor's                                                                                 | L2         | 2         | 16           |

behavior under different excitation conditions?

- |           |   |                                                                                                                                                                                      |    |   |    |
|-----------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----|
| 13.       | a | Explain the construction and working principle of a three-phase induction motor.                                                                                                     | L2 | 3 | 16 |
| <b>Or</b> |   |                                                                                                                                                                                      |    |   |    |
|           | b | Describe the various types of losses in a three-phase induction motor. Explain how each type affects the efficiency of the motor and how the losses can be separated experimentally. | L2 | 3 | 16 |
| 14.       | a | Elaborate the various methods of speed control of a three-phase induction motor.                                                                                                     | L3 | 4 | 16 |
| <b>Or</b> |   |                                                                                                                                                                                      |    |   |    |
|           | b | With neat diagrams, explain the working of different types of starters used for three-phase induction motors.                                                                        | L3 | 4 | 16 |
| 15.       | a | Explain the construction, working, and characteristics of a capacitor-start capacitor-run single-phase induction motor with a neat diagram.                                          | L2 | 5 | 16 |
| <b>Or</b> |   |                                                                                                                                                                                      |    |   |    |
|           | b | Describe the no-load and blocked rotor tests on a single-phase induction motor. How are these tests used to evaluate the motor's performance?                                        | L2 | 5 | 16 |