

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S,FE) (FT/WP/S3PT) Examinations June 2026 (2019 Scheme)

Course Code: EET307

Course Name: SYNCHRONOUS AND INDUCTION MACHINES

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

Marks

- | | | |
|----|---|---|
| 1 | Compare Salient pole and cylindrical pole alternator. | 3 |
| 2 | What are the remedial measures to suppress harmonics in alternator. | 3 |
| 3 | Which method of finding voltage regulation of alternator is called optimistic method and why? | 3 |
| 4 | List the advantages of parallel operation of alternator. | 3 |
| 5 | Draw and explain V curve. | 3 |
| 6 | Draw Torque -Slip characteristics of induction motor. | 3 |
| 7 | What is cogging? | 3 |
| 8 | Write note on plugging. | 3 |
| 9 | What is double field revolving theory? | 3 |
| 10 | Compare Induction and Synchronous generator. | 3 |

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

- | | | |
|----|--|----|
| 11 | a) Explain the constructional features of Alternator with neat diagram. | 10 |
| | b) Derive EMF equation of alternator. | 4 |
| 12 | a) Explain armature reaction in alternator and its effects with the help of relevant sketches. | 10 |
| | b) Draw the phasor diagram of alternator at lagging and leading power factor. | 4 |

Module -2

- | | | |
|----|---|----|
| 13 | a) What are the methods of parallel operation in alternator? | 10 |
| | b) What is synchronizing current? | 4 |
| 14 | a) A 50 kVA 500V 50 Hz single phase ac generator gave the following test results.
Open circuit test : A field current of 12A produced an emf of 300V | 10 |

Short circuit test : A field current of 12A produced a current of 175 A to flow in short circuited armature. The effective armature resistance is 0.2Ω .

(i) Calculate synchronous impedance and synchronous reactance.

(ii) If ac generator is supplying full load current of 100A at 0.8 pf lagging, find voltage regulation using emf method for this load and power factor. Draw phasor diagram also.

b) What is Slip test?

4

Module -3

15 a) Why synchronous motors are not self-starting?

8

b) Draw the phasor diagram of synchronous motor under different load conditions.

6

16 a) What are the classifications of three phase induction motor based on rotor construction? Explain the working of induction motor. What is its resemblance with transformer?

8

b) Derive the expression for torque in three phase induction motor.

6

Module -4

17 a) A 3 phase 400V Induction motor gave the following test readings:

10

No load : 400V , 1250W, 9A

Short circuit : 150V, 4kW, 38A .Draw the circle diagram. If the normal rating is 14.9kW, find from the circle diagram the full load value of current , power factor, and slip. Use graph sheet.

b) Explain Double cage induction motor.

4

18 a) Explain different starting methods of three phase Induction motor.

10

b) Why cannot we use rotor resistance starter in wound rotor induction motor?

4

Module -5

19 a) Explain the working of Induction generator. What are the different modes of operation on Induction generator?

10

b) Draw the torque slip characteristics of induction generator.

4

20 a) Develop the equivalent circuit of single-phase induction motor.Explain one method of self-starting single-phase induction motor.What are the applications of single-phase induction motor?

10

b) With neat diagram explain the working of shaded pole induction motor

4
