Reg No.:_____   Name:_____
1100EET307122103
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree Examination December 2021 (2019 scheme)

Course Code: EET307
Course Name: SYNCHRONOUS AND INDUCTION MACHINES
(GRAPH SHEET NEEDED)

Max. Marks: 100   Duration: 3 Hours

PART A
(Answer all questions; each question carries 3 marks)   Marks

1	Discuss about the different types of windings in alternator	3
2	What are the causes of harmonics in the induced voltage of an alternator and how its effects are minimised?	3
3	Draw and explain the phasor diagram of a salient pole alternator supplying to a lagging power factor load	3
4	Enumerate the requirement of proper parallel operation of alternators	3
5	Discuss about any two starting methods of synchronous motors	3
6	Derive expressions for starting torque in three phase induction motor	3
7	Explain about working of star delta starter for three phase induction Motor	3
8	Explain about V/f speed control method in three phase induction motors	3
9	Compare the operation of induction Generator in grid connected mode and self excited mode	3
10	Explain about working of split phase induction motor	3

PART B
(Answer one full question from each module, each question carries 14 marks)
Module -1

11	a)	List the advantages of using stationary armature in alternator	7
	b)	A 3 phase alternator,50 Hz,8 pole, has 180 conductors per phase ,flux/pole is .054wb,find the induced line emf (assume k_p=k_d=1)	7
12	a)	What is the significance of winding factor in the induced voltage of induction motor? Derive an expression for the same	7
	b)	Explain different types of alternators based on rotor construction	7

Module -2

13	a)	Find the full load regulation by MMF method of a 100 kVA , 2kV 3 phase 50 Hz star connected alternator at 0.8 power factor lag having the following test data, armature resistance= 0.2Ωper phase	14

If in A	10	20	25	30	40	50
Vt (line voltage)	800	1500	1760	2000	2350	2600
Isc in A	-	20	25	30	-	-

14 a) With circuit diagram explain about synchronisation of alternator using bright lamp method 7

b) Explain slip test and calculation of Xd and Xq 7

Module -3

15 a) A 75Kw,400V,4 pole ,3 phase star connected synchronous motor has (0.04+j0.4)/phase ,compute for full load 0.8pf lead, armature current and gross mechanical power developed assuming an efficiency of 92.5% 7

b) Draw & explain about the power- angle characteristics of synchronous motor 7

16 a) Discuss power stage diagram of induction motor 4

b) The power input of a 500V,50Hz, 6 pole, 3 phase induction motor running at 975 rpm is 40KW,the stator losses is 1 KW and friction and windage losses are 2KW.find slip,rotor copper losses,BHP and efficiency 10

Module -4

17 a) Draw the circle diagram of a 20 HP,400V,50Hz,3 phase star connected induction motor from the following test data (line values) 14

No load test :   400V 9A pf 0.2

Blocked rotor test : 200V 50A pf 0.4

from circle diagram find line current and power factor at full load and maximum power output

18 a) Explain about different braking methods of induction motor 7

b) Explain how high starting torque and good operating efficiency is achieved in double cage induction motor 7

Module -5

19 a) Explain why single phase induction motor is not self starting 7

b) Draw and discuss about speed - torque characteristics of induction generator 7

20 a) Explain about induction Generator 7

b) Explain capacitor start capacitor run single phase induction motors 7