Register Number:……..

KUMARAGURU
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B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEI4201**:** Induction and Synchronous Machines

COURSE OUTCOMES

CO1: Understand the construction and principle of operation of different types of induction motor and synchronous generator.
CO2: Describe the types of speed control, starting and performance characteristics of three phase and single-phase induction motors.
CO3: Determine the voltage regulation and analyze the performance characteristics of synchronous generator using different testing methods
CO4: Understand the starting methods and performance characteristics of synchronous motor.
CO5: Select induction and synchronous machines for various applications.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Infer the salient features of induction motor.	CO1	[K_2]
2.	A 3 Phase, 4 pole, 50 Hz induction motor is running at 1440 rpm. Determine the slip.	CO2	[K_2]
3.	Define Cogging and Crawling in induction motors.	CO2	[K_2]
4.	List the benefits of auto transformer starter over star-delta starter.	CO2	[K_2]
5.	Is single phase induction self-starting nature? Justify it.	CO1	[K_3]
6.	Summarize the applications of universal motor.	CO5	[K_2]
7.	Compare revolving armature and revolving field type alternators.	CO1	[K_3]
8.	How armature reaction occurs in alternators and list its drawbacks?	CO3	[K_2]
9.	What is Hunting in synchronous motor?	CO4	[K_2]
10.	Define Pull-in and pull-out torque in synchronous motors.	CO4	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Compare squirrel cage and slip-ring induction motor.	8	CO1	[K_3]
	b)	Draw the equivalent circuit of an induction motor and list the parameters be calculate from no-load and blocked rotor test.	8	CO2	[K_2]
12.	a)	With neat sketch explain the working of star-delta starter.	8	CO2	[K_2]
	b)	Describe Kramer system of speed control for 3 phase induction motor with a neat diagram.	8	CO2	[K_2]
13.	a)	Explain the construction, working principle and torque-speed characteristics of capacitor start induction motor.	10	CO2	[K_2]
	b)	Describe the working of repulsion motors.	6	CO2	[K_2]
14.	a)	Write the construction details of a 4-pole salient type alternator.	10	CO1	[K_2]
	b)	Compare salient pole and non-salient pole type alternators.	6	CO1	[K_3]
15.	a)	Discuss the various methods used to start the synchronous motor.	8	CO4	[K_2]
	b)	Describe the experimental method for determining "V" & "inverted-V" curves for a synchronous machine with circuit.	8	CO4	[K_3]
16.		A 10 kVA,440 V, 50 Hz, 3 phase star connected alternator has the open circuit characteristics as given below:	16	CO3	[K_3]

I_f Amp	1.5	3	5	8	11	15
(V_{oc}) Line volts	150	300	440	550	600	635

With full load zero p.f, the applied excitation required is 14 A to produce 500 V of terminal voltage. On short circuit, 4 A excitation is required to give full load current. Determine the voltage regulation for full load, 0.8 p.f. lagging and leading.

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