



GIET UNIVERSITY, GUNUPUR - 765022
M. Tech (First Semester) Examinations, January - 2024
MPCPE1020 - Modeling and Analysis of Electrical Machines
(Power Electronics)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)**

Q.1 Answer all questions	CO#	Blooms Level
a. How does an increase in excitation affect the operation of an alternator connected to infinite bus-bars?	CO1	K1
b. What steps should be taken before disconnecting an alternator from parallel operation?	CO1	K2
c. What is the necessity for predetermining voltage regulation?	CO1	K2
d. How does a change in excitation affect load sharing?	CO2	K1
e. What are the advantages and disadvantages of estimating the voltage regulation of an alternator by the EMF method?	CO3	K2
f. What is meant by infinite bus-bars?	CO2	K1
g. Why is the MMF method considered the optimistic method for estimating voltage regulation?	CO1	K3
h. What are the advantages of a cage motor?	CO4	K1
i. How is synchronous impedance calculated from open-circuit characteristics (OCC) and short-circuit characteristics (SCC)?	CO3	K3
j. What are the various methods for predetermining the voltage regulation of a 3-phase alternator?	CO1	K1

PART – B**(10 x 5=50 Marks)**Answer ANY FIVE questions

	Marks	CO#	Blooms Level
2. a. What are the measures taken to improve the efficiency of modern high-efficiency induction motors?	5	CO1	K2
b. Why does an alternator's voltage drop sharply when loaded with a lagging load?	5	CO1	K3
3.a. How is the terminal voltage of an induction generator operating alone controlled?	5	CO2	K2
b. What is the relationship between electrical frequency and magnetic field speed in an AC machine?	5	CO2	K4
4. a. What conditions are necessary for paralleling two synchronous generators?	5	CO3	K2

b.	Why does an alternator's voltage increase when loaded with a leading load?	5	CO3	K2
5.a.	What do starting code factors indicate about the starting current of an induction motor?	5	CO4	K1
b.	What are the advantages and disadvantages of brushless DC motors compared to conventional brushed DC motors?	5	CO4	K2
6. a.	Why does switching the current flows in any two phases reverse the rotation direction of a stator's magnetic field?	5	CO2	K3
b.	What is the equation for induced torque in an AC machine?	5	CO3	K2
7.a.	What limits the operating range of terminal voltage speed control?	5	CO2	K4
b.	Why is overheating a serious concern for generators?	5	CO2	K2
8. a.	What is the optimal phase spacing for a reluctance-type stepper motor?	5	CO1	K3
b.	Sketch the phasor diagrams and magnetic field relationships for a synchronous generator operating at unity, lagging, and leading power factors.	5	CO2	K2

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