QPC: RJ19BTECH127 AR 19 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fourth Semester – Regular) Examinations, June – 2021

BPCEL4010 / BPCEE4010 – Electrical Machines - II

(Common to EE & EEE)

Time: 2 hrs Maximum: 50 Marks

Answer ALL Questions

The figures in the right-hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q.1. Answer *ALL* questions		[CO#]	[PO#]
a.	The rotor of a salient pole alternator has 12 poles. The number of cycles of emf per revolution would be (i) 4 (ii)3 (iii) 6 (iv) 12	C01	PO1
b.	The frequency of voltage generated in an alternator depends on (i)Number of poles (ii)Speed of alternator (iii)Both (i) and (ii) (iv)Type of winding	C01	PO1
c.	The number of electrical degrees passed through in ouerevoltion of a four pole synchronous alternator is (i) 360° (ii)60° (iii) 180° (iv)90°	C02	PO1
d.	In a rotating electrical machine, the chording angle for eliminating fifth harmonic should be (i) 38° (ii) 36° (iii) 18° (iv) 19°	C02	PO1
e.	The synchronous motor can be made self-starting by providing (i) Damper winding on rotor poles (ii) Damper winding on stator (iii) (i) or (ii) (iv)None of the above	C03	PO1
f.	What happens if field winding of the synchronous motor is short circuited? (i)First, starts as induction motor then run as synchronous motor (ii)will not start (iii) motor will burn out (iv) runs as an induction motor	C03	PO1
g.	In an induction motor, no-load the slip is generally (i) less than 1% (ii)5% (iii) 2% (iv)4%	C04	PO1
h.	A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor current will be (i) 2 Hz (ii) 50 Hz (iii) 5 Hz (iv) 4 Hz	C04	PO1
i.	In a split-phase motor, the running winding should have (i) High resistance and low inductance (ii) High resistance and High inductance (iii) Low resistance and high inductance (iv) Low resistance and low inductance	C04	PO1
j.	The torque developed by a single-phase motor at starting is (i) less than the rated torque (ii) More than the rated torque (iii) zero (iv) None of the above	C04	PO1

PART – B: (Short Answer Questions) **(2 x 10=20 Marks)**

Q.2. Answer ***ALL*** questions	[CO#]	[PO#]
a. List the types of rotors of synchronous generator. State their features.	C01	PO1
b. State the conditions to be satisfied for parallel operation of alternators	C02	PO1
c. Why a 3-phase synchronous motor will always run at synchronous speed?	C03	PO1
d. While controlling the speed of an induction motor, how is super synchronous speed achieved?	C04	PO1
e. State the double revolving field theory of single phase machine	C04	PO1

PART – C: (Long Answer Questions) **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions

	Marks	[CO#]	[PO#]
3. Explain the procedure for determining Regulation of alternator using EMF Method	(6)	C01	PO1
4. A 3.3 kV Alternator gave the following test results:	(6)	C01	PO1

Field current (A)	16	25	37.5	50	70
OC voltage (kV)	1.55	2.45	3.3	3.75	4.15

A field current of 18 A is found to cause the full-load current to flow through the winding during the short-circuit test. Predetermine the full-load voltage regulation at (i) 0.8 lag pf and (ii) 0.8 lead pf by MMF method

5. Explain Two reaction theory of salient pole alternator and Illustrate a method for determining the direct and quadrate axis reactances of a salient pole synchronous generator	(6)	C02	PO1
6. Explain V-curves and inverted V-curves of a synchronous motor	(6)	C03	PO1
7. Draw the torque slip characteristics of a 3-phase squirrel cage induction motor andslip ring induction motor and explain	(6)	C04	PO1
8. Describe with a neat sketch the principle and working of a direct on line starter and Auto transformer starter of a 3-phase induction motor.	(6)	C04	PO1
9. Using double revolving field theory, explain why a single-phase induction motor is not self-starting.	(6)	C04	PO1
10. Develop the equivalent circuit of single-phase induction motor with necessary sketches and equations	(6)	C04	PO1

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