Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name: Advance Electrical Machine

Subject Code: 4TE04AEM1 **Branch: B.Tech (EEE)**

Semester: 4 **Date: 18/05/2016** **Time: 02:30 To 05:30** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) A stepping motor is an ……. device.(Fill the blank)

b) Which is the usual cause of blow-outs in induction motors?

c) As compared to Δ - Δ bank, the capacity of the V-V bank of transformers is …….. percent.
(a) 57.7 (b) 66.7
(c) 50 (d) 86.6

d) A T − T transformer cannot be paralleled with ..... transformer.
(a) V − V (b) Y − Δ
(c) Y – Y (d) Δ − Δ

e) The efficiency and p.f. of a squirrel cage induction motor increases in proportion to its
(a) speed (b) voltage
(c) mechanical load (d) rotor torque

f) The power factor of a squirrel-cage induction motor is
(a) low at light loads only (b) low at heavy loads only
(c) low at light and heavy loads both (d) low at rated load only

g) The capacitor in a capacitor-start induction- run ac motor is connected in series with ..... winding.
(a) starting (b) running
(c) squirrel-cage (d) compensating.

h) Why are induction motors called asynchronous?

i) In the circle diagram for a 3-Φ induction motor, the diameter of the circle is determined by
(a) rotor current (b) exciting current
(c) total stator current (d) rotor current referred to stator

j) A repulsion motor is equipped with
(a) a commutator (b) slip-rings
(c) a repeller (d) neither (a) nor (b)

k) The winding of a 4-pole alternator having 36 slots and a coil span of 1 to 8 is short-pitched by ..... degrees.
(a) 140 (b) 80
(c) 20 (d) 40

l) The power factor of an alternator is determined by its
(a) speed (b) load
(c) excitation (d) prime mover

m) The V-curves of synchronous motor show relationship between
(a) Excitation current and back e.m.f.
(b) field current and p.f
(c) d.c. field current and a.c. armature current
(d) armature current and supply voltage

n) A stepper motor may be considered as a ……. Converter.
(a) dc to dc (b) ac to ac
(c) dc to ac (d) digital-to-analogue

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

(a) Explain the Open Delta connection of Three Phase Transformer. **(07)**

(b) Explain the starting of Induction motor with (i) Primary Resistors (ii) Star-delta starter (iii) Auto- transformer. **(07)**

Q-3 **Attempt all questions** **(14)**

(a) Explain the Speed Control of Squirrel Cage Induction Motor. **(07)**

(b) Draw the circle diagram from no-load and short-circuit test of a 3-phase, 14.92 kW, 400 V, 6-pole induction motor from following test results(line values) **(07)**
No-load : 400 V, 11 A, p.f.= 0.2
Short circuit : 100 V, 25 A, p.f.= 0.4
Rotor cu loss at standstill is same as stator cu loss. From the circle diagram, find
(i) Line current, slip, efficiency and p.f. at full load (ii) the maximum torque.

Q-4 **Attempt all questions** **(14)**

(a) Write a short note on Shaded pole induction motor. **(07)**

(b) Explain double field revolving theory for single phase induction motor. **(07)**

Q-5 **Attempt all questions** **(14)**

(a) Draw the Connection Three phase transformer (Dd0, Yy0, Dy1, Yd11, and Yy6). **(07)**

(b) A 415-V, 29.84 kW, 50 – Hz, delta connected motor gave the following test data: **(07)**
No-load test : 415 V, 21 A, 1250 W
Locked- rotor test : 100 V, 45 A, 2730 W
Construct the circle diagram and determine
(a) The line current and power factor for rated output (b) maximum torque.

Assume stator and rotor Cu losses equal at standstill.

Q-6		**Attempt all questions**	**(14)**
	(a)	Explain construction and working of Stepper motor.	**(07)**
	(b)	Explain construction and working of reluctance motor.	**(07)**
Q-7		**Attempt all questions**	**(14)**
	(a)	What are the differences methods to measure voltage regulation of an alternator? Explain any one method.	**(07)**
	(b)	Explain power developed by a synchronous motor with neat diagram.	**(07)**
Q-8		**Attempt all questions**	**(14)**
	(a)	Explain the construction & working of brushless DC motor.	**(07)**
	(b)	Give comparison between synchronous motor and inductance motor.	**(07)**