Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY
Winter Examination-2015

Subject Name: Electrical Machine-1

Subject Code: 4TE03EMC1 **Branch: B.Tech (EEE,EE)**

Semester: 3 **Date: 10/12/2015** **Time: 2:30 To 5:30** **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) The sole purpose of a commutator in a d.c generator is to **(01)**
- (1) Increase output voltage
- (2) Reduce sparking at brushes
- (3) Provide smoother output
- (4) Convert the induced a.c. into d.c.

b) The commercial efficiency of a shunt generator is maximum when its variable losses equal……...losses. **(01)**
- (1) Constant
- (2) Stray
- (3) Iron
- (4) Friction and windage

c) The critical resistance of the d.c.generator is resistance of **(01)**
- (1) Armature
- (2) Field
- (3) Load
- (4) brushes

d) In a d. c. generator, the generated e.m.f is directly proportional to the **(01)**
- (1) Field current
- (2) Pole flux
- (3) Number of armature parallel paths
- (4) Number of dummy coil

e) Lap winding is suitable for ……. Current ,…….voltage d.c.generators. **(01)**
- (1) High, low
- (2) Low, high
- (3) Low, low
- (4) High, high

f) In a d.c. generators, armature reaction is produced actually by **(01)**
- (1) Its field current
- (2) Armature conductors

(3) Field pole winding
(4) Load current in armature

g) In a d.c.generator, the effect of armature reaction on the main pole flux is to **(01)**
(1) Reduce it
(2) Distort it
(3) Reverse it
(4) Both (a) and (b)

h) As load is increased, the speed of a d.c. shunt motor **(01)**
(1) Increases proportionately
(2) Remains constant
(3) Increases slightly
(4) Reduces slightly

i) Induced e.m.f in the armature conductors of a d.c.motor is **(01)**
(1) Sinusoidal
(2) Trapezoidal
(3) Rectangular
(4) Alternating

j) A transformer transforms **(01)**
(1) Frequency
(2) Voltage
(3) Current
(4) Voltage and current

k) A Step up transformer increase **(01)**
(1) Voltage
(2) Current
(3) Power
(4) Frequency

l) No load test on a transformer is carried out to determine **(01)**
(1) Copper loss
(2) Magnetizing current
(3) Magnetizing current and no load loss
(4) Efficiency of the transformer

m) The principle of operation of a 3 phase induction motor is most similar to that of **(01)**
(1) Synchronous motor
(2) Repulsion-start induction motor
(3) Transformer with a shorted secondary
(4) Capacitor start, induction run motor

n) In a 3 phase induction motor, the rotor field rotates at synchronous speed with respect to **(01)**
(1) Stator
(2) Rotor
(3) Stator flux
(4) None of above

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

Q-2		**Attempt all questions**	**(14)**
	(a)	State and explain various losses which occur in a d. c generator.	**(07)**
	(b)	Explain in detail armature reaction.	**(07)**
Q-3		**Attempt all questions**	**(14)**
	(a)	A long shunt compound generator delivers a load current of 50A at 500V and has Armature ,series field and shunt field resistances of 0.05 ohm,0.03 ohm,250 ohm respectively. calculate the generated voltage and armature current.	**(07)**
	(b)	Derive the expression for the torque developed in d.c. motor.	**(07)**
Q-4		**Attempt all questions**	**(14)**
	(a)	Explain the construction and working of three point starter.	**(07)**
	(b)	Explain Swinburne's test to find the efficiency of a d. c. motor.	**(07)**
Q-5		**Attempt all questions**	**(14)**
	(a)	Explain the the operation of transformer on load and no load with vector diagram.	**(08)**
	(b)	Explain the core and shell type of transformer.	**(06)**
Q-6		**Attempt all questions**	**(14)**
	(a)	Explain the Speed control methods of d.c shunt motor.	**(06)**
	(b)	Explain open and short circuit test for single phase transformer. while making short circuit test, low voltage winding is always short circuited. why?	**(08)**
Q-7		**Attempt all questions**	**(14)**
	(a)	Explain the principle of induction motor. Discuss the construction of three phase induction motor.	**(07)**
	(b)	Draw and Explain the equivalent circuit of single phase transformer.	**(07)**
Q-8		**Attempt all questions**	**(14)**
	(a)	Define the term "slip" of induction motor. Draw and Explain the torque-slip characteristics of a three phase induction motor.	**(07)**
	(b)	Define "All day efficiency" of transformer. Explain the construction and working principle of auto transformer.	**(07)**