Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name: Electrical Machine-I

Subject Code: 4TE03EMC1 **Branch:** B.Tech (Electrical)

Semester: 3 **Date: 30/04/2016** **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) No-load test on transformer is carried out to determine (1)
(a) copper loss
(b) magnetising current
(c) magnetising current and loss
(d) efficiency of transformer

b) Buchholz relay is used in (1)
(a) motor protection
(b) line protection
(c) transformer protection
(d) none of the above

c) In D.C. machines the residual magnetism is of the order of (1)
(a) 2 to 3 percent
(b) 10 to 15 percent
(c) 20 to 25 percent
(d) 50 to 75 percent

d) The field coils of D.C. generator are usually made of (1)
(a) mica
(b) copper
(c) cast iron
(d) carbon

e) A D.C. generator works on the principle of (1)
(a) Lenz's law
(b) Ohm's law
(c) Faraday's law of electromagnetic induction
(d) none of the above

f) D.C. shunt motors are used for driving (1)
(a) trains

(b) cranes
(c) hoists
(d) machine tools

g) The efficiecny of transformer will be maximum when (1)
(a) copper losses = hysteresis losses
(b) hysteresis losees = eddy current losses
(c) eddy current losses = copper losses
(d) iron losses = copper losses

h) Hopkinson's test on D.C. machines is conducted at (1)
to determine
(a) no-load
(b) part load
(c) full-load
(d) overload

i) Power transformers are designed to have maximum efficiency at (1)
(a) nearly full load
(b) 70% full load
(c) 50% full load
(d) no load

j) Which of following is not a part of transformer installation? (1)
(a) conservator
(b) breather
(c) Buchholz relay
(d) exciter

k) Slip rings are usually made of (1)
(a) copper
(b) carbon
(c) phospor bronze
(d) aluminium

l) The starting torque of a squirrel-cage induction motor is (1)
(a) low
(b) negligible
(c) same as full-load torque
(d) slightly more than full-load torque

m) The frame of an induction motor is made of (1)
(a) carbon
(b) closed grained cast iron
(c) aluminium
(d) stainless steel

n) For generating large currents on D.C. generators which winding is generally preffered? (1)
(a) Progressive wave winding
(b) lap winding
(c) retrogressive wave winding
(d) current depends on design

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

Q-2		**Attempt all questions**	**(14)**
	a)	Explain the Construction Parts of D.C. Generator (1) Yoke (2) Pole Cores and Pole shoes (3) Commutator (4) Armature core (5) Brushes and bearing.	**(5)**
	b)	Explain the E.M.F. equation for Simplex lap and wave wound generator.	**(5)**
	c)	Explain the classification of DC machines.	**(4)**
Q-3		**Attempt all questions**	**(14)**
	a)	Derive the EMF equation for single phase transformer with help of sketch.	**(5)**
	b)	Explain the speed control of dc shunt motor.	**(5)**
	c)	What is necessity of starter? Explain the 3 Point Starter of D.C Shunt Motor with neat diagram.	**(4)**
Q-4		**Attempt all questions**	**(14)**
	a)	Explain conversion of 2 Winding transformer into Auto Transformer.	**(5)**
	b)	Describe the Brake test of D.C .Motor.	**(5)**
	c)	Write a short note on the Swinburne test of D.C .Motor.	**(4)**
Q-5		**Attempt all questions**	**(14)**
	a)	Explain and draw the Torque-slip characteristic of Poly-phase induction motor.	**(7)**
	b)	Explain cogging and crawling for three phase induction motor.	**(7)**
Q-6		**Attempt all questions**	**(14)**
	a)	Explain the Production of Rotating field of 3 Phase Supply for Induction Motor.	**(7)**
	b)	Discuss the speed control of polyphase induction motor with help of sketch.	**(7)**
Q-7		**Attempt all questions**	**(14)**
	a)	Explain with sketch Parallel operation of three phase transformers.	**(7)**
	b)	A long shunt compound –wound generator gives 240 volts at F.L. output of 100A. The resistance of various windings of the machine are : armature (including brush contact) 0.1 ohm, series field 0.02 ohm, interpole field 0.025 ohm, shunt field(including regulating resistance) 100 ohm. The iron loss at F.L. is 1000W; windage and friction losses total 500W. Calculate F.L. efficiency of the machine.	**(7)**
Q-8		**Attempt all questions**	**(14)**
	a)	Write the Equivalent circuit of a Poly phase Induction Machine with help of sketch.	**(7)**
	b)	A 100-kVA lighting transformers each has a full load loss of 2KW. The losses being equally divided between iron and copper. During a day, the transformer operates on full-load for 3 hours, one half load for 4 hours, and the output being negligible for the remainder of the day. Calculate the all-day efficiency.	**(7)**