Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Electrical Machine – I

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

Semester: 3 **Date: 02/04/2018** **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) The sole purpose of a commutator in a d.c generator is to
(A) Increase output voltage
(B) Reduce sparking at brushes
(C) Provide smoother output
(D) Convert the induced a.c. into d.c.

b) The critical resistance of the d.c.generator is resistance of
(A) Armature
(B) Field
(C) Load
(D) brushes

c) The commercial efficiency of a shunt generator is maximum when its variable losses equal……...losses.
(A) Constant
(B) Stray
(C) Iron
(D) Friction and windage

d) The principle of operation of a 3 phase induction motor is most similar to that of
(A) Synchronous motor
(B) Repulsion-start induction motor
(C) Transformer with a shorted secondary
(D) Capacitor start, induction run motor

e) In a d.c.generator, the effect of armature reaction on the main pole flux is to
(A) Reduce it
(B) Distort it
(C) Reverse it
(D) Both (a) and (b)

f) No-load test on transformer is carried out to determine
(A) copper loss
(B) magnetising current

(C) magnetising current and loss
(D) efficiency of transformer

g) Slip rings are usually made of
(A) copper
(B) carbon
(C) phosphor bronze
(D) aluminum

h) D.C. shunt motors are used for driving
(A) trains
(B)cranes
(C)hoists
(D)machine tools

i) How can the direction of rotation of a d.c. motor be reversed?

j) What is the function of compensating winding?

k) Explain the function of armature winding.

l) Define the term: All day efficiency

m) Define the term: voltage regulation

n) Explain the function of commutator.

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

Q-2		**Attempt all questions**	**(14)**
	(a)	Derive the E.M.F. Equation of D.C. generators.	**(07)**
	(b)	Explain Swinburne's test to find the efficiency of a d. c. motor.	**(07)**
Q-3		**Attempt all questions**	**(14)**
	(a)	What is need of starter? Explain the construction and working of three point starter.	**(07)**
	(b)	Explain the armature reaction in D. C. generator.	**(07)**
Q-4		**Attempt all questions**	**(14)**
	(a)	Explain the different types of D.C. Generator.	**(07)**
	(b)	Explain the Equivalent circuit of Transformer.	**(07)**
Q-5		**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)	Explain the Speed control of D.C Shunt Motor.	**(07)**
Q-6		**Attempt all questions**	**(14)**
	(a)	A short-shunt compound generator delivers a load current of 30A at 220V, and has armature, series-field and shunt-field resistances of 0.05 Ω, 0.30 Ω and 200 Ω respectively. Calculate the induced e.m.f. and the armature current. Allow 1.0 V per brush for contact drop.	**(07)**
	(b)	Explain the methods of improving Commutation in D.C. Generator.	**(07)**
Q-7		**Attempt all questions**	**(14)**
	(a)	Explain the different losses in D.C.generator.	**(07)**
	(b)	Explain the operation of transformer on load and no load with vector diagram.	**(07)**

Q-8 **Attempt all questions** **(14)**

(a) A 30kVA, 2400/120 V, 50 Hz transformer has a high voltage winding resistance of 0.1 Ω and a leakage reactance of 0.22Ω. The low voltage winding resistance is 0.035Ω and the leakage reactance is 0.012Ω. Find the equivalent winding resistance, reactance and impedance referred to the (i) high voltage side and (ii) the low voltage side. **(07)**

(b) Explain the Production of Rotating field of 3 Phase Supply for Induction Motor. **(07)**