

# 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.
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**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)**

