C.U.SHAH UNIVERSITY
Winter Examination-2015

Subject Name: Electrical Machine
Subject Code: 4TE03EME1   **Branch: B.Tech (IC)**

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 critical resistance of the D.C. generator is the resistance of
          (1)Armature (2) Field (3)Load (4) Brushes
   b)   In a D.C. generator the effect of armature reaction on the main pole flux is to
          (1) Reduce it (2) Distort it (3) Reverse it(4)Both (a) & (b) it
   c)   The D.C. series motor should never be switched on at no load because
          (1) The field current is zero (2) The machine does not pick up
          (3) The speed becomes dangerously high (4) It will take too long to accelerate
   d)   The induced e.m.f. in the armature conductors of a D.C. motor is
          (1) Sinusoidal (2)Trapezoidal (3) Rectangular (4) Alternating
   e)   In a two winding transformer the e.m.f per turn in secondary winding is always
          _____ the induced e.m.f per turn in primary.
          (1)Equal to K times (2)Equal to 1/k times (3) Equal to (4) Greater than
   f)   Transformer cores are laminated in order to
          (1)Simplify its construction (2) Minimize eddy current loss
          (3)Reduce cost (4) Reduce hysteresis loss
   g)   The main purpose of performing open circuit test on a transformer is to measure
          its (1) Cu loss (2) Core loss (3) Total loss (4) Insulation resistance
   h)   Which of the following connection is best suited for 3 phase, 4wire service
          (1)Delta-Delta (2) Star- Star (3) Delta-Star (4) Star -Delta
   i)   In a3 phase Induction motor the rotor field rotates synchronous speed with
          respect to (1)Stator (2) Rotor(3) Stator flux (4) None of the above
   j)   What is the equation of starting torque of 3 phase Induction?
   k)   What is the condition for efficiency for transformer?
   l)   An Induction motor can be treated as a _____ transformer.
   m)   What is the e.m.f. equation of simplex wave wound generator?
   n)   In an ideal transformer ,
          (1)Windings have no resistance (2) Core has no losses
          (3) Core has infinite permeability (4) All of the above

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

Q-2		**Attempt all question.**	**(14)**
	A	Draw schematic diagram of a D.C. machine with labels. State the functions of (a) Pole shoe (b) Commutator (c)Yokes	**(7)**
	B	Differentiate between self excited and separately excited D.C. machine. Draw the load characteristics of D.C. shunt and series generator.	**(7)**
Q-3		**Attempt all questions**	**(14)**
	A	Derive the e.m.f. equation of a single phase transformer.	**(7)**
	B	Explain the Swinburne test of a D.C. machine for finding losses with necessary diagram.	**(7)**
Q-4		**Attempt all questions**	**(14)**
	A	A long shunt compound generator delivers a load current of 50A at 500 V and has armature, series field and shunt field resistances of 0.05Ω, 10.03Ω and 250 Ω respectively. Calculate the generated voltage and the armature current. Allow 1V. per brush for constant drop.	**(7)**
	B	Describe an auto transformer including its points such as definition, comparison with two winding transformer, saving of copper and its application.	**(7)**
Q-5		**Attempt all questions**	**(14)**
	A	Explain Scott connection used for the 3 phase to 3 phase transformation in 3 phase transformer.	**(7)**
	B	Describe crawling and cogging of an induction motor.	**(7)**
Q-6		**Attempt all questions**	**(14)**
	A	A 25KVA transformer has 500turns on the primary and 50 turns on the secondary winding. The primary is connected to 300V, 50 hz supply find the full load primary and secondary currents, the secondary emf and the max. flux in the core. Neglect leakage drops and no-load primary current.	**(7)**
	B	What is slip of a 3 phase Induction motor?	**(2)**
	C	Write different starters used for 3 phase induction motor and Explain any one of them.	**(5)**
Q-7		**Attempt all questions**	**(14)**
	A	Explain the phenomena of armature reaction in a D.C. machine. State its remedies.	**(7)**
	B	Differentiate between squirrel cage and slip ring induction motor. Explain how is the torque developed in a 3 phase induction motor?	**(7)**
Q-8		**Attempt all questions**	**(14)**
	A	Explain the speed control of induction motors.	**(7)**
	B	Explain the various losses taking place in a transformer. Derive the equation for its maximum efficiency. Define all day efficiency.	**(7)**