

C.U.SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Electrical Machine Design – II

Subject Code: 4TE08EMD1

Branch: B.Tech (Electrical)

Semester : 8

Date : 01/10/2019

Time : 10:30 To 01:30

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) Write the different parameter for the design of induction motor.
- b) Give the definition of slip in induction motor.
- c) What do you mean by hunting in synchronous motor?
- d) Write the equation of synchronous speed of induction motor.
- e) Define the term : total magnetic loading.
- f) Define: specific electrical loading.
- g) In induction motors a large value of air gap flux density will increase/iron losses due to decrease/efficiency.
(A) True (B) False
- h) In an induction motors as the length of the air gap is increased, the reluctance variation due to slots will decrease.
(A) True (B) False
- i) What are the parameters which come under the term “Main Dimensions”?
(A) diameter (B) length
(C) diameter and length (D) area
- j) What is the value of the ratio of the core length to pole pitch for good efficiency?
(A) 1 (B) 2
(C) 1.5 (D) 0
- k) The width of each duct is about 8 to 10 mm?
(A) True (B) False
- l) What are the factors the value of core length to pole pitch depends upon?
(A) area of the slots (B) size of machine
(C) size of conductors (D) size of machine, minimum cost
- m) How many categories can the synchronous motors are divided into?
(A) 5 (B) 4
(c) 3 (D) 2
- n) The use of double squirrel cage winding on the rotor provides
(A) low noise (B) reduced starting torque



(C) A large starting torque

(D) higher efficiency.

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

- Q-2 Attempt all questions (14)**
- (a) Derive the output equation for ac machine. (07)
- (b) Compare the squirrel cage induction motor with wound rotor machine. (07)
- Q-3 Attempt all questions (14)**
- (a) What are the main dimensions of induction motor? Explain peripheral speed and ventilating ducts. (07)
- (b) Explain design of rotor bars and slots of three phase induction motor. (07)
- Q-4 Attempt all questions (14)**
- (a) Which factors should be considered when estimating the length of the air-gap of the induction motor? Why the air-gap should be as small as possible? (07)
- (b) A 90 kW, 500 v, 50 Hz, 3 phases, 8 pole induction motor has a star connected stator winding accommodated in 63 slots with 6 conductors per slot. If the slip ring voltage on open circuit is to be about 400 V, find a suitable rotor winding, stating:
 (a) Number of slots (b) number of conductors per slot (c) coil span (d) slip ring voltage on open circuit (e) approximate full load current per phase in rotor. Assume efficiency = 0.9; power factor = 0.86. (07)
- Q-5 Attempt all questions (14)**
- (a) State different methods to reduce the harmonic torque in induction motors. (07)
- (b) What is Short circuit ratio? Explain effect of SCR on synchronous machine performance. (07)
- Q-6 Attempt all questions (14)**
- (a) Explain choice of specific magnetic loading and choice of specific electric loading in synchronous machines. (07)
- (b) Explain design of rotor and height of pole for synchronous machines. (07)
- Q-7 Attempt all questions (14)**
- (a) Explain design of damper winding. (07)
- (b) How do you calculate the following for an induction motor? (07)
 (i) area of stator slots
 (ii) length of mean turn
 (iii) Stator teeth.
- Q-8 Attempt all questions (14)**
- (a) What are the different approaches for computer aided design? (07)
- (b) Explain design of starting winding for split phase motors. (07)

