

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Electrical Machine - II

Subject Code: 4TE04EMC1

Branch: B.Tech (Electrical)

Semester : 4

Date : 31/10/2018

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) Define : Slip
- b) Define : Voltage regulation
- c) Define : Crawling
- d) Which is the usual cause of blow-outs in induction motors?
- e) The capacitor in a capacitor-start induction- run ac motor is connected in series with winding.
(a) starting (b) running
(c) squirrel-cage (d) compensating.
- f) In circle diagram for induction motor, diameter of circle represents which of the following?
(a) slip (b) rotor current
(c) running torque (d) line voltage
- g) The V- curves of a synchronous motor show relationship between
(a) excitation current and back e.m.f.
(b) field current and p.f.
(c) d.c. field current and a.c. armature current
(d) armature current and supply voltage
- h) Slip rings are usually made of
(i) copper (ii) carbon
(iii) aluminum (iv) phosphor bronze
- i) One of the characteristics of a single – phase motor is that it
(i) is self-starting (ii) is not self-starting
(iii) requires only one winding (iv) can rotate in one direction only
- j) Which type of single phase induction motor is having highest power factor at full load?
(i) shaded pole type (ii) split phase type
(iii) capacitor start type (iv) capacitor run type
- k) The term 'cogging' is associated with
(i) induction motors (ii) DC series motors
(iii) DC shunt motors (iv) DC compound motors



- l) In alternator, the rotary part is
 (i) core (ii) magnetic field poles
 (iii) armature (iv) none of these
- m) A 50-Hz alternator will run at the greatest possible speed if it is wound for _____ poles.
 (i) 8 (ii) 6
 (iii) 4 (iv) 2
- n) As compared to $\Delta - \Delta$ bank, the capacity of the V – V bank of transformers is _____ percent.
 (i) 57.7 (ii) 66.7
 (iii) 50 (iv) 86.6

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

- Q-2 Attempt all questions (14)**
 (a) Explain different methods of speed control of three phase induction motor. (07)
 (b) Draw the circle diagram for a 3.73 kW, 200 V, 50 Hz, 4-pole, 3-phase star connected induction motor from the following test data: (07)
 No-load : line voltage 200 V, line current 5 A; total input 350 W
 Blocked rotor : line voltage 100 V, line current 26 A; total input 1700 W
 Estimate from the diagram for full-load condition, the line current, power factor and also the maximum torque in terms of the full-load torque. The rotor Cu loss at standstill is half the total Cu loss.
- Q-3 Attempt all questions (14)**
 (a) Explain the Open Delta connection of Three Phase Transformer. (07)
 (b) Draw the Connection Three phase transformer (Dd6,Yy0,Dy11,Yd1,Yd11 and Yy6). (07)
- Q-4 Attempt all questions (14)**
 (a) Explain the starting of Induction motor with (i) Primary Resistors (ii) Star-delta starter. (07)
 (b) Explain the effect of over excitation and under excitation on power factor on Synchronous motor. (07)
- Q-5 Attempt all questions (14)**
 (a) A 3-phase,400V induction motor gave the following test readings: (07)
 No load:400V,1250W,9A, Short circuit:150V,4kW,38A
 Draw the circle diagram.
 If the normal rating is 14.9kW, find the circle diagram, the full –load value of current, pf and slip.
 (b) Derive the equation of induced emf for an a.c. generator. (07)
- Q-6 Attempt all questions (14)**
 (a) Explain effects of varying excitation on armature current and power factor in a synchronous motor. Draw “V” curves. (07)
 (b) Explain the construction and working principle of Repulsion motor. (07)
- Q-7 Attempt all questions (14)**
 (a) Why the Single Phase induction motor is not self-starting? Explain the making of (07)



- single phase induction motor self-starting.
- (b) Explain construction and working of universal motor. Where it is used? How can control the speed of universal motor? (07)

Q-8

Attempt all questions

(14)

- (a) What is Voltage regulation? Write different methods of voltage regulation in alternator and Explain any one method. (07)
- (b) Write Short note on Shaded pole Induction motor. (07)

