



COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & Control Engineering

Lecturer : Prof. M. Abouzeid

Course : Electrical Machines III

Course Code: EE 422

Date : 23 / 5 / 2015

Time : 2 hours

Answer The Following Questions:

Question One:

- a) In case of losing one phase of three phase delta connected load (open delta) derive a percentage of power decreasing ratio.

(3 marks)

In 440/11000 V Scott connection transformers, the two phase loads side are:
10 KW, 11 KV, 0.8 lag PF & 12 KW, 11 KV, 0.9 lag PF, find:

- i) Line input current of the three phase side. (4 marks)
ii) Repeat if both of the two phase loads are the same (10 KW, 11 KV, 0.8 lag PF)

(3 marks)

Question Two:

- a) Explain with the necessary sketches a drawing for brushless synchronous generator showing the connections between Exciter & Alternator (3 marks)

- b) Three phase, 380 V, 50 Hz, 4 poles synchronous generator has $Z_S = (1+j5)$ ohm, given $E_{PH} = 300$ and power factor = 0.75 lag, find :

- i) Output power, current and load angle δ . (3 marks)
ii) For same E_{PH} find max. output power & its current & PF. (4 marks)

Question Three:

- a) Explain the possible methods of starting the synchronous motors, showing the best recommended one. (3 marks)

- b) Three phase, 380 V, 50 Hz, 4 poles delta connected synchronous motor has $Z_S = (1+j5)$ ohm, given input power 25 KW with load angle δ of 15° , find:

- i) E_{PH} , current and PF. (3 marks)
ii) Efficiency given $V_{Field} = 200$ V and $R_{Field} = 200$ ohm. (4 marks)

Question Four:

- a) Why delta connection is preferred in case of three phase balanced loads such as synchronous motor. (3 marks)

- b) Three phase salient pole synchronous generator, 380 V, 50 Hz, 4 poles with direct and quadrature synchronous impedances of 24 & 16 ohms respectively, delivers a phase current 15 Amperes at 0.8 lag power factor, find :

- i) E_{PH} and load angle delta. (4 marks)
i) Output load power. (3 marks)

Members of course Examination Committee:	Signature:	Date:
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With Our Best Wishes