KafferElshik University
Faculty of Engineering
Electrical Engineering Department
Final 2nd Term Exam 2016-2017

Subject: Electric Machines 2
Time Allowed: 3 hours
Examiner: Dr.S.Gharib
3rd Year Date: / /2017

Answer all questions total marks =100

Q1 25 marks

choose the correct answer.

(a) A transformer cannot be used for DC power supply because .....
i) Dc power supply cannot produce varying magnetic field.
ii) It is costlier than AC power supply transmission.
iii)DC power supply has more losses.

(b) ..... will improve the mutual coupling between
i) primary and secondary of transformer.
ii) winding material of high resistivity.
iii) low reluctance magnetic core.
iv) high reluctance magnetic core.

(c) A transformer is an electrical machine which transfers ..... from one electric circuit to another circuit.
i) Frequency.
ii) Power.
iii) voltage.
iv) current.

(d) If the secondary leakage flux in transformer is high, ...
i) The primary terminal voltage will be less
ii) The secondary induced emf will be less.
iii) The primary induced emf will be less

(e) In a two winding transformer, the primary emf and secondary emf voltages are always .....
i) in phase
ii) Equal in magnitude
iii) Anti phase with each other

(f) An auto transformer give ..... than the two winding transformer for the same dimension.
i)less power than
ii)More power than
iii) The same power

(g) The secondary emf voltage of the three phase transformer in (Y/Δ) connection is.....of the primary emf voltage .
i) lag by 30
ii)lead by 30

iii) in phase

h) In SC test measuring instruments must be added in .....
i) HVS
ii) LVS
iii) any side.

Q2 15 marks

a) why does a transformer draw a current when the secondary is opened, explain how you can minimize this current.

b) Explain how you can improve the power transformer efficiency.

Q3 20marks

a 25 kVA ,2300/460 V transformer has tests that give cupper loss of 700W ,full load current 10A,short circuit voltage of 108V ,no load current of 1.5 A, no load voltage of 460V and core loss of 450W.Detemine i) approximate equivalent circuit as seen from HV side. ii)The transformer maximum efficiency when maximum efficiency occur at .0.75 loading and 0.85 PF.

Q4 20marks

a) The parameters of 12 kVA ,120/480V,60HZ , two winding ,step up transformer are R_H=0.6 Ω,X_H=1.2 Ω,R_L=0.1Ω, X_L=0.3 Ω,R_{CH}=3.2 KΩ, X_{mH}=1.2 KΩ, the transformer is connected as a 600 /120 V step up –autotransformer, it delivers its rated load at power factor of 0.866 leading .Find its efficiency and voltage regulation.

Q5 20marks

Three of 2 kVA ,440/ 220V,60HZ single phase transformers are connected to form Y/Δ three phase step down transformer ,each single phase transformer has the following parameter values, R_H= 1.2Ω, X_H=2 Ω, R_L= o.3 Ω, X_L= o.5 Ω, R_{CH}= 2.2 KΩ, X_{mH}= 1.8 KΩ, find nominal voltage and power rating and then draw the connection diagram, the winding arrangement and the per phase equivalent circuit both Y/Δ and Δ/Y configurations.