Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

III SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: ELECTRICAL MACHINERY - 1 [ELE 2103]

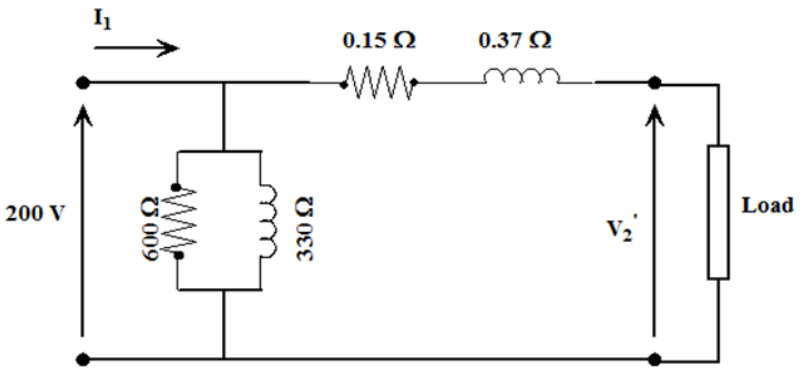
REVISED CREDIT SYSTEM

Time: 3 Hours December 3, 2015 MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** Questions
- Missing data may be suitably assumed.
- Graph sheet may be used.

1A. Equivalent circuit shown refers to 4 kVA, 200/400 V, 50 Hz, single phase transformer. For a secondary current of 8 A at 0.9 pf lagging; Find (a) primary current (b) secondary terminal voltage (c) efficiency



(06)

1B. An 11500/2300 V two winding transformer is rated at 100 kVA. If the windings are connected in series to form an autotransformer, what are the possible voltage ratios and corresponding kVA ratings? **(04)**

2A. Derive the approximate equivalent circuit of a single phase transformer. Also sketch the phasor diagram of a transformer connected to a lagging power factor load. **(05)**

2B. A 50 kVA, 6350/240 V, 50 Hz, single-phase transformer gave the following test figures:

No load (OC)(LV side) : 240 V, 10 A, 500 W
Short circuit (SC)(HV side) : 100 V, 6 A, 360 W
During the day it is loaded as follows:

a.	8 hours	20 kVA	@ pf 0.6
b.	6 hours	40 kVA	@ pf 0.8
c.	6 hours	50 kVA	@ pf 0.9
d.	4 hours	50 kW	@ pf 0.95

Find its All-day efficiency. **(05)**

3A. Explain with connection diagram how transformers can be used for the following phase conversion.
(a) 3 phase to 2 phase (b) 3 phase to single phase (c) 3 phase to 6 phase **(05)**

3B. A 3 phase, 4 pole, squirrel cage induction motor has 36 slot stator with double layer wave winding. If the phase sequence is RYB design the winding table. **(05)**

4A. Why induction motors are recommended to start with reduced voltages? Sketch & explain the working of star-delta starter. **(04)**

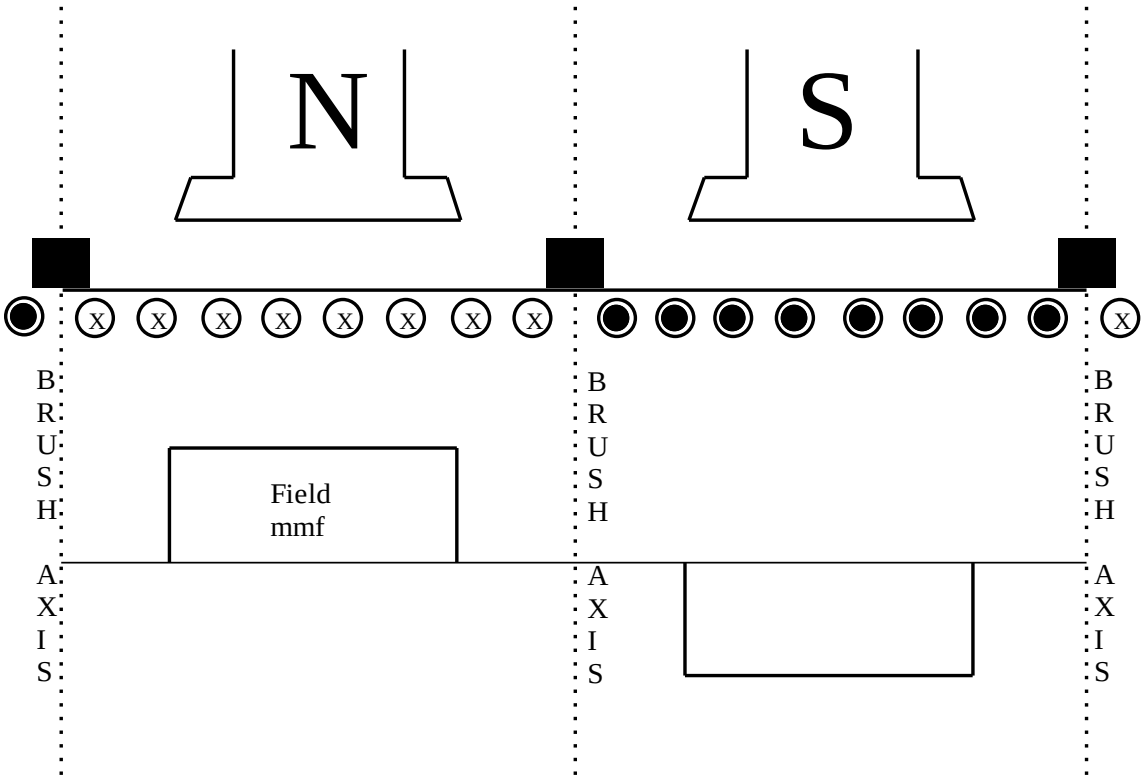
4B. A 3 phase, 415 V, 50 Hz, 4 pole, Delta connected Induction motor gave following test results:

No load	415 V	14.42 A	1800 W
Blocked rotor	190 V	32 A	4450 W

Determine using circle diagram, Mechanical output, torque & speed when the motor is operated with maximum torque. Assume stator & rotor resistances are equal. **(06)**

5A. Using double field revolving theory, explain the slip-torque characteristics of a single phase induction motor. **(05)**

5B. Field mmf distribution of a DC machine is as shown in the figure. Assuming that the machine is loaded, sketch (a) flux produced due to the field current (b) mmf and flux produced due to the armature current. Also sketch the resultant flux and explain the effects armature reaction.



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