EN 212 Electrical Machines
Assignment - 1

Instructions

- ***Write all the steps clearly.***
- ***Scan and attach one pdf document or word document on MS Teams page.***
- ***If your roll number is 201700123 and first name is "John" then the file name should be 201700123_John.pdf***
- ***After uploading the document in MS Teams Assignment page you must click on Turn-in (submit button). Then the submission process is complete.***

1. Derive the condition for maximum efficiency of a transformer

2. A 10 kVA, 2500/250 V, single phase, two-winding transformer is used as an autotransformer to raise the supply voltage of 2500 V to an output voltage of 2625 V. The low voltage winding of the two-winding transformer consists of two equal parts of 125 V each. If the both parts of the low voltage winding are used, determine:

    a. Autotransformer kVA output
    b. kVA transformed and conducted

3. Derive the equation(s) for voltage regulation (approximate) of a transformer for lagging and leading loads. Form these equation)s, find the condition for (a) zero voltage regulation and (b) maximum voltage regulation

4. The maximum efficiency of a single phase, 11000/400 V, 500 kVA transformer is 98% and occurs at 80% full load, unity power factor. The percentage impedance is 4.5%. Load power factor is now varied while load current and the supply voltage are held constant at their rated values. Determine the load power factor at which the secondary terminal voltage is minimum and find the value of the later.

5. A 20 kVA, 2500/250 V, single phase transformer has the following parameters:

HV winding	LV winding
r1 = 8 ohm	r2 = 0.3 ohm
x1 = 17 ohm	x2 = 0.7 ohm

    Find the voltage regulation and the secondary terminal voltage at full load for a power factor of (a) 0.8 lagging and (b) 0.8 leading. The primary voltage is held constant at 2500 V.