



Attempt all question

Q1: (15 Mark)

- a) In your lab., show the procedure to discriminate
- the performance of different types of dc motors
 - controlled and un-controlled rectifier devices
- b) The magnetization curve for 4-pole, 230 V shunt motor with 450 wave connected armature conductors is given below:

If A	0.5	1	1.5	2	2.5	3	3.5	4
Flux/pole mWb	5.8	11	14.8	17	18.4	19.4	20.2	21.2

The armature and field resistances are 1.2 and 60 Ω , respectively. With full load current, the machine runs at 750 rpm. Determine the resistance that may be inserted in series with the field circuit to increase the speed by 33% . Consider the torque and back-emf remains constant.

Q2: (15 Mark)

A variable speed drive system uses a dc motor which is supplied from a variable voltage source. The drive speed is varied from 0 to 1500 rpm (base speed) by varying the terminal voltage from 0 to 500 V with the field current terminal constant.

- (a) Determine the motor armature current if the torque is held constant at 300 N.m. up to the base speed.
- (b) the speed beyond the base speed is obtained by field weakening while the armature voltage is held constant at 500 V. determine the torque available at a speed of 3000 rpm if the armature current is held constant at the value obtained in (a)

Q3: (15 Mark)

a- What are the effects of removing the freewheeling diode in single phase semiconverters.

b- Single phase semiconverters is operated from a 120 V, 50Hz, supply. The load consists of series connected resistance $R = 10 \Omega$, inductance $L = 5 \text{ mH}$, and battery voltage $E = 20 \text{ V}$. sketch the following waveforms: $v_s, i_s, i_{dc}, v_{dc}, i_{T1}, v_{T1}$.



Q4: (15 Mark)

- a- What the reference to OCC of a dc generator explain the following:
- Why the emf not zero when field current is zero?
 - Will the residual flux induce a voltage in the machine, if speed of machine is zero
 - Why does the slop of the curve change after a certain value of field current
- b- Fill in the blank(s) with appropriate word(s)

- In a single phase fully controlled converter the _____ of an uncontrolled converters are replaced by _____.
 - In a fully controlled converter the load voltage is controlled by controlling the _____ of the converter.
 - A single phase half wave controlled converter always operates in the _____ conduction mode.
 - The voltage form factor of a single phase fully controlled half wave converter with a resistive inductive load is _____ compared to the same converter with a resistive load.
 - The load current form factor of a single phase fully controlled half wave converter with a resistive inductive load is _____ compared to the same converter with a resistive load.
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With my best wishes
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