(بسم الله الرحمن الرحيم***لا إله إلا الله محمد رسول الله)

جامعة المنوفية كلية الهندسة بشبين الكوم قسم الهندسة الكهربية

الدراسات العليا:دكتوراه مادة:تحليل التوافقيات في محركات الجر ELE719

الفصل الدراسي الثاني 2019-2020 م التاريخ:الخميس 13/8/2020 النهاية: 100 درجة

Answer the following questions [25 Marks for each]

Question1: a)- What do you know about: 1- Non-sinusoidal wave . 2-Odd function . 3-Even function . 4-Fourier series .

b)- A full-wave rectified voltage has the following Fourier series expansion;
e= 314/л [1 + 2/3 cos 2wt -2/15 cos 4wt +2/35 cos 6wt +....], w=314 rad/sec.
This voltage is applied across an inductive coil has 100Ω resistance &0.1 H inductance. Fined the coil current as Fourier series, the average power loss and the over-all power factor .

Question2: (a)-What are the principle sources of harmonics in electrical networks?
(b)- The transients in electric circuits may be a source of harmonics .
Discus the dc transients for R-L & R-C circuits .
c)-The switch S in the circuit of Fig.1 is closed for long time and open until the coil current finished. The circuit parameters are; E=24V, R1=R2 =1Ω, L=1 H & C= 1F. Find the coil current at on & off cases .

Question3: (a)- What do you know about the Fourier analyzer?
(b)- A three- phase generator has an EMF of 11 KV/phase, 50Hz with 15% third harmonic and 10% fifth harmonic. Calculate: 1 –the r.m.s value of line voltage for four-line, star-connection . 2—the r.m.s value of line voltage for delta-connection .
3-the circulating current in delta- connection if (R = 0.5Ω & L = 1H) / phase .

Question4: (a)- Electronic control of electric motors may be a big source of harmonics in electric networks, discuss the half-wave rectifier with R-L load.
b)- Figure 2, shows An inverter circuit has the following parameters; E=48V, R=0.01Ω, L=0.2 H. Draw the waves of the gat currents, the output voltage across the load and the instantaneous current throw it.
c)- A chopper-driven for DC series motor is shown in Fig,3. The motor voltage and the expected steady-state armature current are given, also. The data pertaining to the motor and chopper are: R=8mΩ, L=0.025 mH, Ka= 8, λ=1 sec.,α =0.6 and Vt =24 V. Obtain the motor torque-speed and η-speed. The motor magnetization characteristic is given as :

I_{av} , m A	5000	4600	4200	3800	3200	2250
Flux/pole, m Wb	2.25	3.2	3.8	4.2	4.6	5.0

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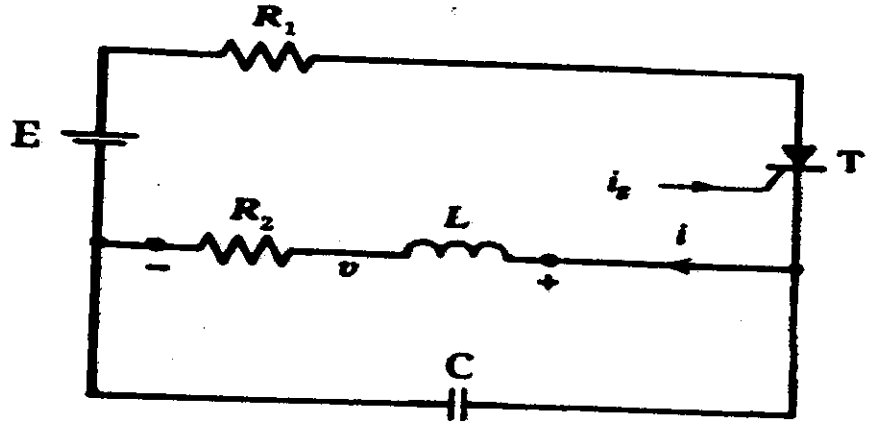

Fig.(1)

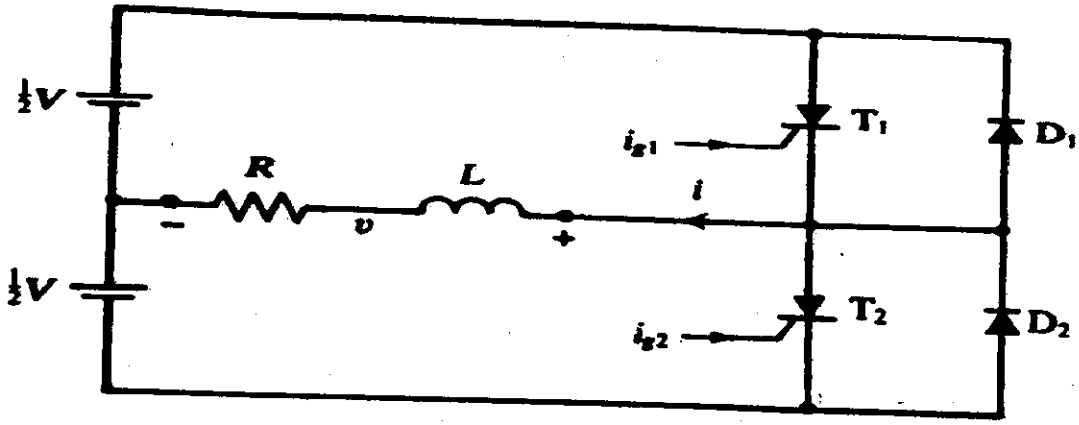

Fig.(2)

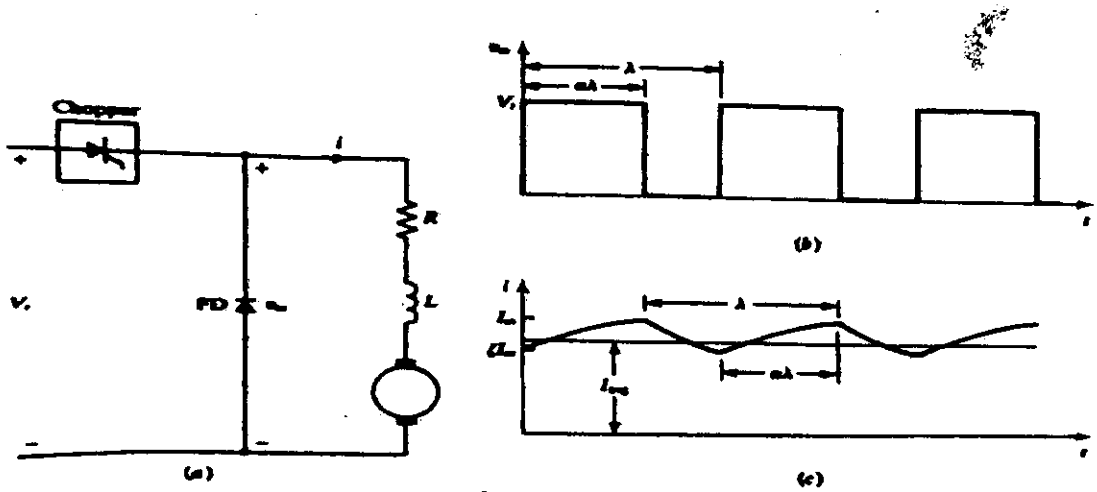

Fig.(3)

Good Luke

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