جامعة طنطا
كلية الهندسة
قسم الفيزيقا والرياضيات الهندسية

المادة : رياضيات هندسية (أ)
الفرقة : ثانية قوى كهربية (لائحة قديمة)
تاريخ الإمتحان : ١٧/ ١/ ٢٠٠٩

Answer the following Questions

1-a) If a car is traveling along a straight road with constant speed $v = b_1$ [m/sec.] , its position y [m] at time t [sec.] is $y = b_0 + b_1 t$. Suppose that measurements are

t	0	3	5	8	10
y	200	230	240	270	290

Fit a straight line to these data by least squares and estimate from it the speed .

1-b) Given the data

x	0.1	0.2	0.3	0.4	0.5
y = f (x)	0.70010	0.4016	0.1081	- 0.1744	- 0 . 4375

Find an approximate value of the zero of f (x) between 0.3 and 0.4

1-c) Obtain the estimate of the missing figures in the following table

x	2 .0	2 .1	2.2	2.3	2.4	2.5	2.6
f(x)	0.135	- -	0.111	0.100	- -	0.082	0.074

2-a) Evaluate $I = \int_0^1 e^{-x^2} dx$ by Simpson s Rule with $n = 10$

2-b) Find the value of y at $x = 2.6$ by using modified Euler s Methods with $h = 0.2$, if $y = \sqrt{x^2 + 4y^2}$, $y(2.2) = 1.5$

2-c) Apply Runge – Kutta Method to find an approximate value of y when $x = 0.2$ given that

$\frac{dy}{dx} = x + y$, $y = 1$ when $x = 0$ (take $h = 0.1$)

Tanta University (لائحة قديمة) 2nd year 1st term Exam.
Faculty of Engineering Logic and Electronic Circuits
Dept. of Electrical Power Eng. Time allowed : 3 Hours

Answer the following questions:

1- a- Find the Z- parameters of the T-network that has $Z_a = 8\ \Omega$, $Z_b = 10\ \Omega$, and $Z_c = 12\ \Omega$.
b- Find the ABCD parameters of the ideal transformer that has turns ratio of 10 : 4.
c- Find the input impedance of the ideal transformer that is given in (1-a) when it is loaded by a capacitor of 10 micro Farad.

2- a- Find the Y-parameters of the π-network that has $Y_1 = 0.4$ mho, $Y_2 = j\ 0.4$ mho, and $Y_3 = -j\ 0.3$ mho.

b- A Common Emitter Amplifier has the parameters, $h_{re} = 0$, $h_{ie} = 200\ \Omega$, $h_{fe} = 100$, and $h_{oe} = 100\ \mu$ mho. Also $R_E = R_L = R_C = 800\ \Omega$, $R_1 = 1.3\ k\Omega$, $R_2 = 2.7\ k\Omega$, $R_S = 2\ k\Omega$, and $C_E = C_i = C_o = 20\ \mu$ Farad. Calculate the input impedance, voltage gain, and the current gain.

3-a- Show how you could use the operational amplifier to integrate the following inputs:

$V_a = 5$ Sin ωt, $V_b = 5\ t$, $V_c = 5$

b- A five bits A/D converter with resolution 0.5, and $R_F = 0.35$ LSB resistance. Determine the output voltage when the input voltage is "11010".

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4 - Draw the logic circuit of the following functions, and minimize them,

$$F_1 = C + AB\overline{C} + AB$$

$$F_2 = ABC\overline{D} + A\overline{B}C\overline{D} + AB\overline{C}\ \overline{D} + A\overline{B}\ \overline{C}\ \overline{D}$$

5- a- Simplify the functions:

$$F_1 = \sum 0, 1, 2, 3, 4, 6, 7, 8, 12, 13$$

$$F_2 = \overline{A}BC + \overline{A}B\overline{C} + A\overline{B}\ \overline{C} + A\overline{B}C$$

$$F_3 = \overline{A}C + \overline{A}B + A\overline{B}C + BC$$

b- Compare between calculating the value of the following function as Sum of Products and as Product of Sum;

$$F = \overline{A}\ \overline{B} + \overline{A}B + A\overline{B} + AB$$

جامعة طنطا – كلية الهندسة
قسم هندسة الحاسبات والتحكم الآلي
امتحان الفصل الدراسي الأول للعام الجامعي ٢٠٠٨/٢٠٠٩

الفرقة الثانية حاسبات- قوى كهربية (قديم)
المادة : تحليل الدوائر الكهربية (من الخارج)
الزمن : ثلاث ساعات يناير ٢٠٠٩

Answer the following five questions:

Q(1): For the circuit in Fig. Q1

a) Prove that $V_o = \frac{R_b}{R_a}(V_b - V_a)$ when $\frac{Ra}{R_b} = \frac{R_c}{R_d}$

b) For $\frac{Ra}{R_b} = \frac{R_c}{R_d} = \frac{2}{5}$, $V_b = 4.0$ V and $V_{cc} = 15$ V, what range of values for V_a will result in linear operation?

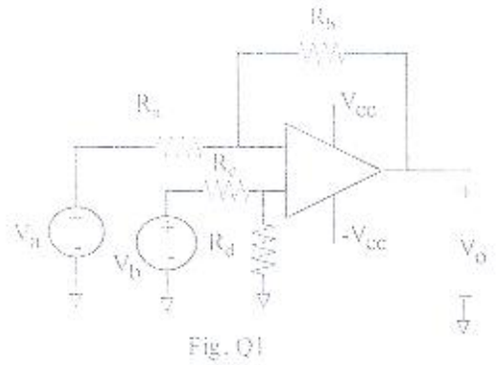

Fig. Q1

Q(2): The voltage pulse described by the following equations is impressed across the terminals of 0.5 μF capacitor:

$V(t) = 0 \qquad t \le 0$

$V(t) = 5t \qquad 0 \le t \le 4$

$V(t) = 20\, e^{-(t-4)} \qquad 2 \le t \le \infty$

a) Derive the expressions for the capacitor current, power, and energy.

b) Specify the interval of time when energy is being delivered by the capacitor.

Q(3): a) Deduce the current response for an RL circuit with step voltage source.

b) The current source in the circuit generates the current pulse shown in Fig. Q3. There is no energy stored at $t = 0$.

1- Derive the numerical expressions for v(t) for the time intervals $t < 0$, $0 < t < 50$ μs, and $50\ \mu s < t < \infty$

2- Calculate $v(50^+\ \mu s)$ and $v(50^-\ \mu s)$

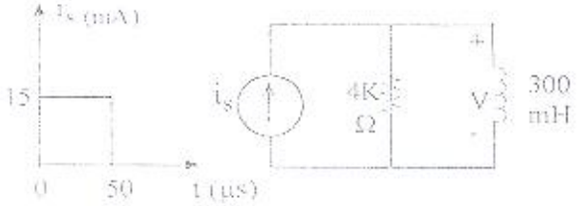

Fig. Q3

(انظر الصفحة التالية)

Q(4): The switch in the circuit shown in Fig. Q4 has been in position a for a long time. At t = 0 the switch is thrown to position b. Find

a) $V_c(t)$ for $t \geq 0$

b) i(t) for $t \geq 0^+$

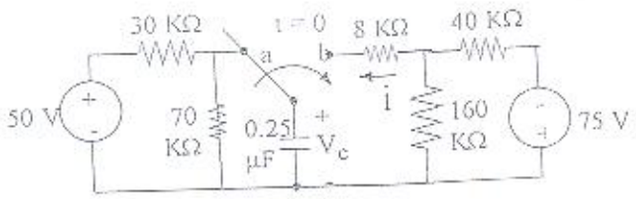

Fig. Q4

Q(5): The initial energy stored in the circuit in Fig. Q5 is zero. At t = 0, a dc current source of 20 mA is applied to the circuit.

a) What is the initial value of I_L and dI_L/dt ?

b) What is the numerical expression for $I_L(t)$ when $t \geq 0$?

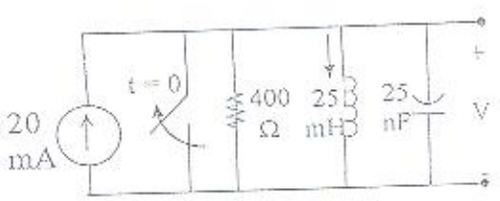

Fig. Q5

مع أطيب الأمنيات بالتوفيق والنجاح

نسخه
مرى قديم ٢٠٠٦/٧

Tanta university	**Final Term Exam**
Faculty of engineering	**2-nd Year**
Electrical Power and Machine Dept.	**2008-2009**
A course of Power System (1)	**Allowable Time: 3 H**

Solve The Following Questions

Question 1 (25 Marks)

a) Define The following terms and state the factors that affect each one:

(i) Skin Effect

(ii) Ferranti Effect.

b) A balanced 3-phase overhead transmission line has a total series impedance per phase of $200\angle 80^0\,\Omega$/phase and a total shunt admittance of $0.0013\angle 90^0\,\Omega^{-1}$/phase. The line delivers a load of 80 MW at 0.8 lagging power factor and 220 kV. Calculate: (i) the ABCD for T-model representation; (ii) the sending end voltage, current and power factor of the line; (iii) the line efficiency and line voltage regulation.

Question 2 (20 Marks)

a) Derive an expression of line inductance for three phase transmission line with an unequal spacing.

b) Three-phase double circuit are arranged as shown in Figure (1). If the diameter of each conductor is 5 cm, find capacitive reactance to neutral and the charging current per km per phase at 220 kV and 50 Hz, assuming that the line is regularly transposed.

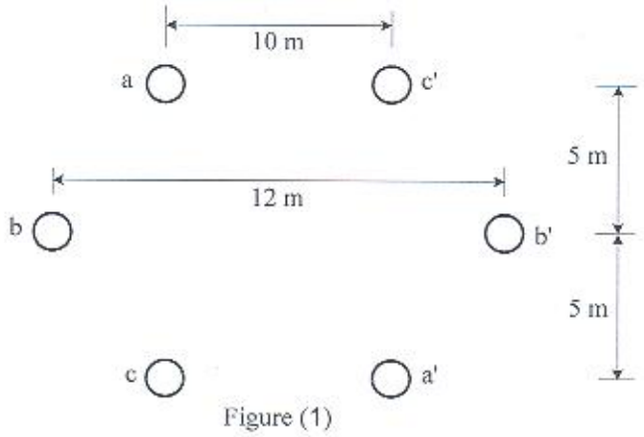

Figure (1)

Question 3 (25 Marks)

a) (i) **What are** the main types of distribution systems according to scheme of connections?

(ii) **What are** the main methods used to improve string insulators efficiency?

b) Define the following terms: (i) Flashover voltage; (ii) Puncture voltage

c) A DC ring distributor shown in Figure (2) is fed at point A from 250 V supply. The resistances of the various sections (go and return) are indicated in Figure (2). **Determine**: (i) the current in each distributor sections; (ii) the load voltages; (iii) the distributor efficiency.

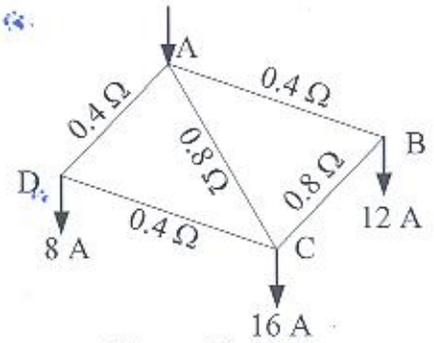

Figure (2)

Question 4 (20 Marks)

a) Compare between aluminum and copper conductors.

b) An overhead line is supported between two towers 200 m apart having a difference in their levels equal to 10 m. The conductor diameter is 2 cm and weight of 2.3 kg/cm. **Calculate** the position of minimum point of conductor from each tower if the wind pressure is 57.5 kg/cm^2 of projected area and a factor of safety is 4. The maximum tensile strength of copper is 4220 kg/cm^2

(With My Best Wishes)

Dr. Ibrahim Bedir

جامعة طنطا
كلية الهندسة
قسم القوى الكهربية

المادة/ اقتصاد هندسى
(EP21H2)
الفرقة الثانية (لائحة قديمة)

بسم الله الرحمن الرحيم
التاريخ : 2009 /1/28
الزمن : ساعتان

أجب عن الأسئلة الآتية:- (30 درجة)

السؤال الأول:-

1- " هناك العديد من انواع التكاليف تستخدم فى الاقتصاد الهندسى عند تحليل الجدوى المالية للمشروعات الصناعية" تكلم بالتفصيل عن انواع التكاليف.

2- تكلم عن اهم الخطوات الرئيسية للدراسة الاقتصادية .
3- اشرح بالتفصيل العناصر الاساسية لتصنيع منتج ما.

السؤال الثانى:-

1- ما هى العناصر الاساسية لتكلفة منتج ما.
2 -ما اهمية دراسة الجدوى الفنية للمشروعات- مع شرح لأهم المسائل التى تعالجها دراسات الجدوى الفنية.
3- اشرح بالتفصيل أهم مراحل المفاضلة بين المشروعات.

مع أطيب التمنيات بالنجاح
ا.د/عبد الفتاح مصطفى خورشد

قوى - كهربية - قديم
تحويل الطاقة

Tanta University
Faculty of Engineering
Electrical Power and Machines Engineering

Electromagnetic Energy Conversion
Second Year/ First Term/ Final Exam
Time(٣:٠٠ hr)

Attempt All Questions

Question ١:

١- A series magnetic circuit consists of a permanent magnet, a steel material with assumed infinite permeability and an air gap. Derive the necessary condition to minimize the volume of the permanent magnet for a desired value of the flux density in the airgap.

٢- Show that the two coupled coils shown in Fig.١ can be replaced by a single coil having an inductance of $L_{ab}=L_1+L_2\pm 2M$. Show the possible dot marks positions where the third term has negative sign.

Question ٢:

١- For a singly-excited translational magnetically linear electro-mechanical energy system, derive an expression for current, flux linkage and force in terms of stored energy and coenergy.

٢- Fig. ٢ shows a solenoid where the core cross section is square.

i. For a coil current of I (DC), drive an expression for the force on the plunger.

ii. Let the coil have a resistance R and be excite by a voltage of $v(t)=V_m \sin(\omega t)$. For a displacement g between the plunger and the pole. Determine the steady state coil current and mechanical force.

Question ٣:

١- For two magnetically coupled coils, show that the total stored energy W_t is given by:

$$W_t = \frac{1}{2}L_{11}I_1^2 + \frac{1}{2}L_{22}I_2^2 + MI_1I_2$$

٢- a) For a doubly excited rotating magnetically linear electromechanical energy system with cylindrical start and salient rotor, sketch the space variation of self and mutual inductances.

b) In a doubly excited rotating system both the rotor and stator self inductances are assumed constants. The mutual inductance is a cosinusoidal function of the angular position. The two windings are connected in series and carry a current $i_1 = 5\sqrt{2}\sin(\omega t)$. Drive expressions for the average and peak values of the torque acting on the rotor that rotates with an angular speed ω rad/sec.

Question ٤:

١- Write notes on the following:

a- conversion of solar energy into electrical energy

b- utilization of geothermal energy for electricity generation

٢- For an AC excited single phase distributed windings of ٦ slots:

i- Deduce graphically the space distribution of the resultant mmf.

ii- Explain the nature of the MMF produced, then

iii- Show that this MMF can be viewed as the resultant of two rotating MMFs in opposite directions.

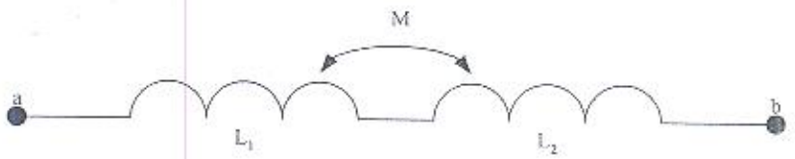

Fig. ١

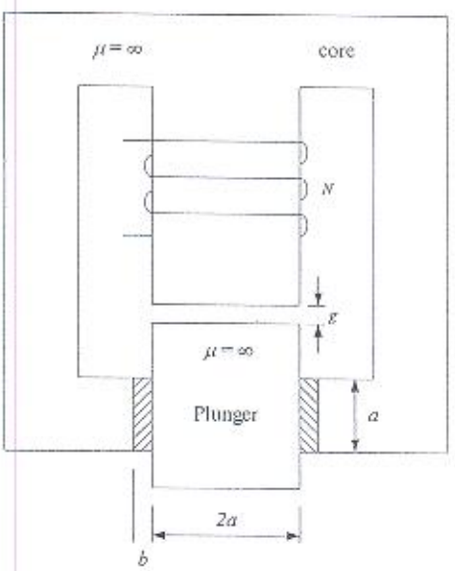

Fig. ٢

With Best Wishes