MENOUFIA UNIVERSITY

Department of communications

Microelectronics Technology

FACULTY OF ELECTRONIC ENGINEERING

2ND Semester, 1ST Year, 2016-2017

Midterm Exam, Time: 1 Hour

Name : _____

Sec : _____

Answer the following questions

Question 1

10 Marks

(a) We need to introduce (Al) atoms as impurities for a shallow depth in the Si semiconductor. Explain -with draw- the suitable method for that?

(b) What is meant by (annealing)?

(c) A silicon wafer has an Bi doping density of 10^{22} m^{-3} at 300 °K. What is the resistivity of the wafer? $\mu_n = 0.135$ $m^2/V.sec$

Question 2

10 Marks

(a) Explain –with draw– the most common method used to determine type of conductivity of the S.C. material. When this method is not applicable?

(b) Why the Haynes Shockley Experiment was limited in the first days to the germanium atoms only?

(c) A noninjecting metal probe of 1 mm diameters is placed on a plane surface of a semiconductor of **25** Ω-cm resistivity. The outer surface of the semiconductor has an ohmic contact. a **2** V battery is connected between the probe and the ohmic contact. Neglecting the voltage drop across the metal and the ohmic contact, determine the current flowing through the circuit.

WITH BEST WISHES

DR. MOHAMED SALAH

Part1

Answer the following questions

Q1(15 Marks)

1-a- What is meant by class A amplifier? .
Show that its maximum efficiency is 25%.

1-b- Find the maximum ac output power, the dc input power and the maximum efficiency of the amplifier shown in Fig. 1. Also determine the input resistance assuming β_{ac}=50 and r'_e=6Ω.
If the circuit shown in Fig. 1 is replaced by a Darlington class AB push-pull amplifier with β_{ac}=50 for each transistor, what will be the input resistance?, and , what is the advantage of that? .

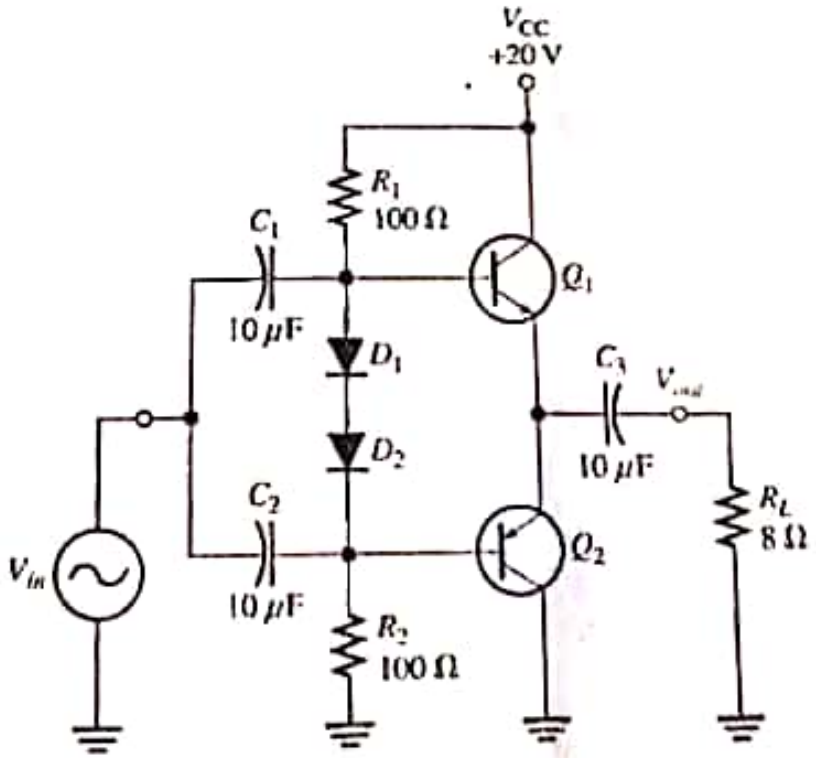


Fig. 1

MENOUFIA UNIVERSITY
Department of communications
Microelectronics Technology
Name : [ ]

FACULTY OF ELECTRONIC ENGINEERING
2nd Semester, 1st Year, 2016-2017
Midterm Exam, Time: 1 Hour
Sec : [ ]

Answer the following questions

Question 1 **10 Marks**

(a) We need to introduce (P) atoms as impurities for a shallow depth in the Si semiconductor. Explain -with draw- the suitable method for that?

(b) What is meant by (annealing)?

(c) A silicon wafer has an Bi doping density of 10^{22} m^{-3} at 300 °K. What is the resistivity of the wafer? $\mu_n = 0.135$ m^2/V sec

Question 2 **10 Marks**

(a) Explain –with draw– the most common method used to determine type of conductivity of the S.C. material. When this method is not applicable?

(b) Why the Haynes Shockley Experiment was, limited in the first days to the germanium atoms only?

(c) A nonlinjecting metal probe of 1 mm diameters is placed on a plane surface of a semiconductor of **25** Ω-cm resistivity. The outer surface of the semiconductor has an ohmic contact. a **2** V battery is connected between the probe and the ohmic contact. Neglecting the voltage drop across the metal and the ohmic contact, determine the current flowing through the circuit.

WITH BEST WISHES
DR. MOHAMED SALAH

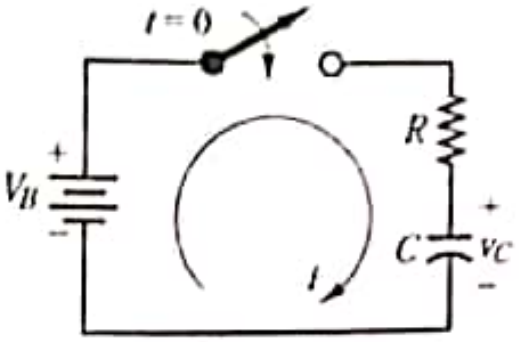


Figure 1

Question – 3: For the ac power circuit shown in Figure 2,

a. Determine the power triangle.

b. Determine the current supplied by the source.

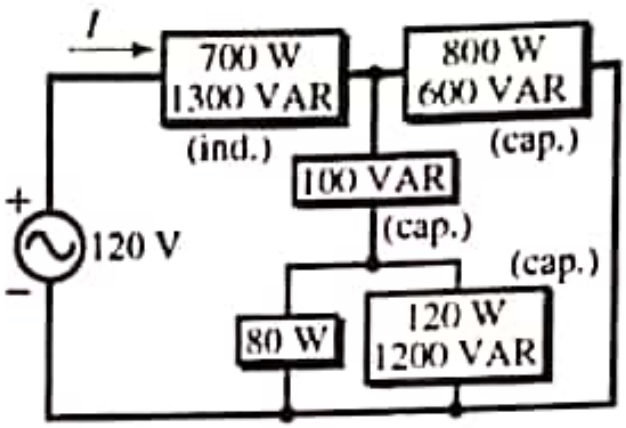
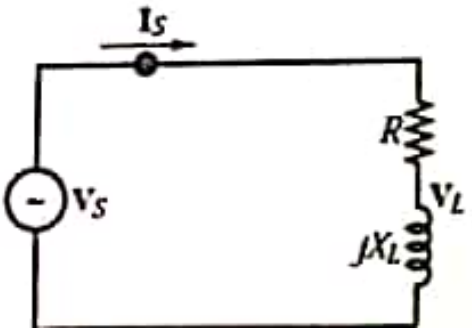


Figure 2

Question – 4: For the circuit shown in Figure 3, if $V_s = 117\angle 0°\ V$, $R_L = 50\ \Omega$, $X_L = 86.7\ \Omega$ and $f = 60\ Hz$. Calculate the complex power and correct the power factor to unity.



Minoufia University
Faculty of Electronic Engineering
Dept. Industrial Electronics and Control Eng.
Course: Electrical Power
Course Field: Specialization Requirements
Academic Level: First Year, 2nd Semester
Academic Year: 2017 / 2018
Course Code: ACE 124

Midterm Exam
Date: 24 / 3 / 2018
Exam Type: Written
No. of Exam Pages: 2
No. of Exam Questions: 3
Exam Marks: 20 Marks
Exam Time: 60 Minutes
From 12:30 AM to 1:30 AM

Name:
Class:

Answer the following questions:

***Question – 1:** Put True (√) or False (×) signs for the following expressions:*

1.	Nuclear power stations of generating electricity have cheaper initial cost, but expensive running cost.	( )
2.	The non-conventional energy sources are further advantageous due to virtually zero running cost.	( )
3.	A fuel cell has an ac output voltage typically of 1.23 volts at normal atmospheric pressure and temperature.	( )
4.	A nuclear power plant is a thermal power station in nature.	( )
5.	Wind power stations is a non-conventional sources of electrical power that have exclusive advantages of being pollution free and renewable.	( )
6.	Raising the voltage makes it possible to transmit large amounts of electric power over long distances with minimum line losses.	( )
7.	Hydroelectric power stations are considered non-conventional sources of electrical power generation.	( )
8.	The nuclear generation of electric power is disadvantageous due to high capital cost as well as the maintenance charges.	( )
9.	Fuel cells operate based on the photo-voltaic effect, which develops an emf. on absorption of ionizing radiation from Sun.	( )
10.	When selecting a method of generating electricity, it is naturally desirable that the source must have not perpetuity.	( )

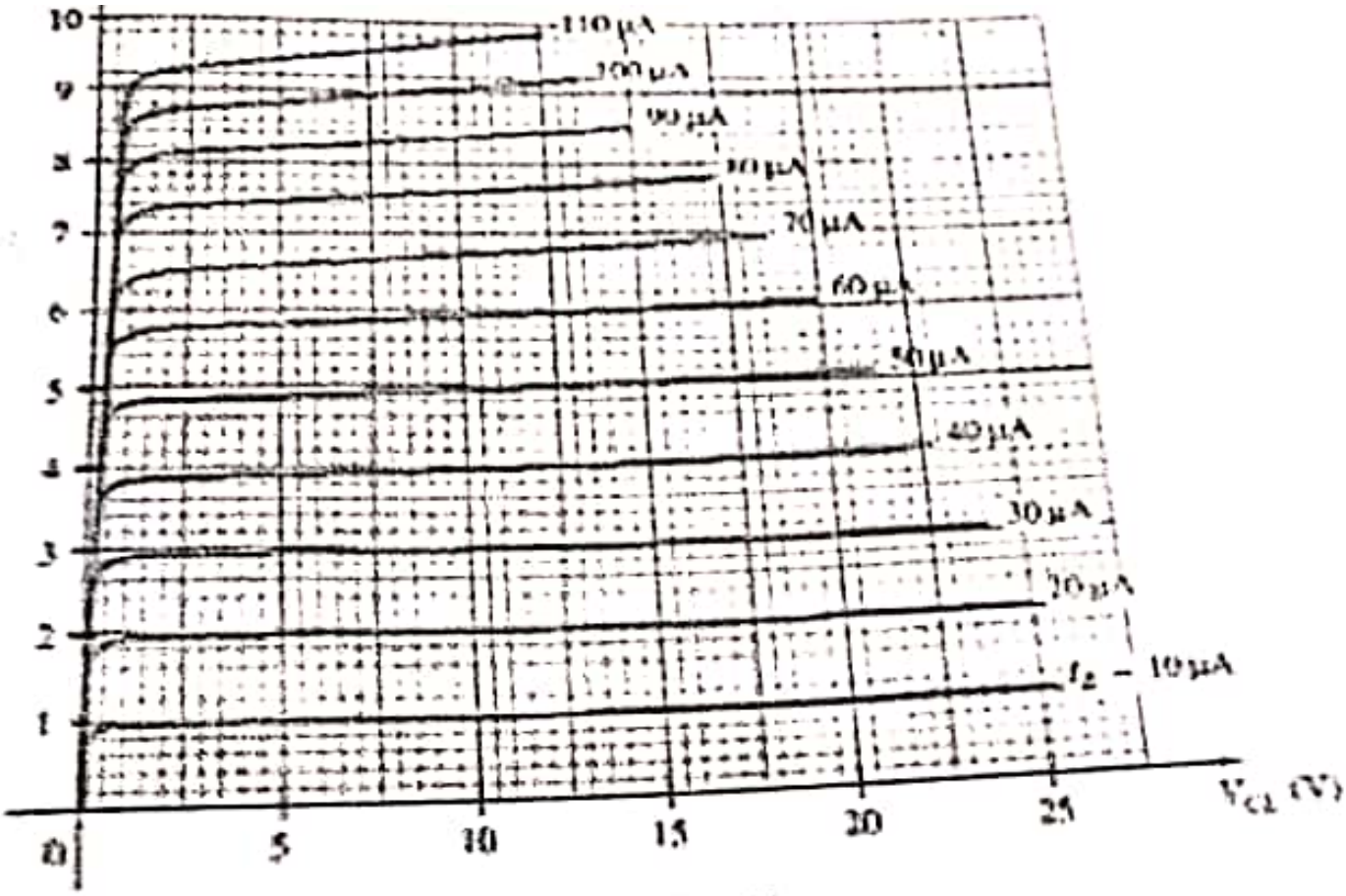


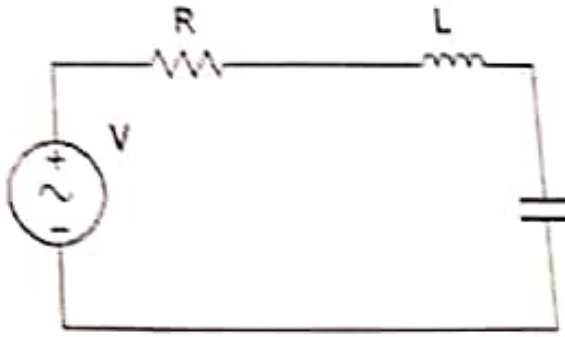
Fig. (1-3)

2) For the circuit shown in Fig.2. (10 marks

$V=V_m \sin \omega t$

a) Find an expression for the circuit impedance.

b) Drive an expression for instantaneous power (P_i) and average power (P_{avg}) delivered by the source.



c) Find the value of ω that makes the impedance minimum.

Fig.2

Q2(a) For the circuit shown in fig (3) draw the output waveform

if i) Both S1 and S2 open.

ii) S1 open ,and S2 closed.

iii) S1 closed , and S2 open.

iv) Both S1 and S2 closed.

(b) If RL = 1kΩ and C = 100μf with both S1 and S2 closed calculate. i) The ripple voltage and the ripple factor .

ii) The dc output voltage .

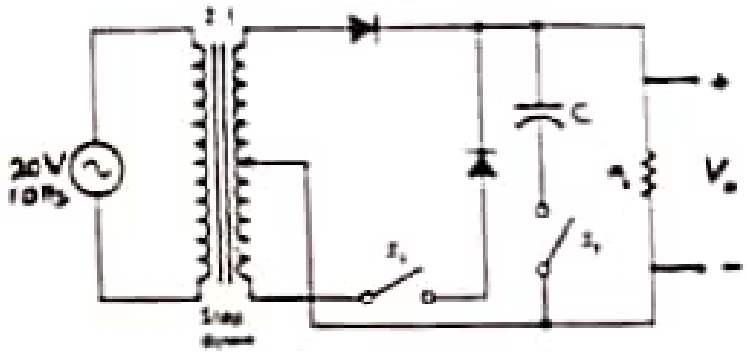


Fig.(3)

كلية الهندسة قسم الهندسة الكهربية
قسم هندسة الحاسبات والنظم الكهربية
السنة الأولى الفصل الدراسي الأول

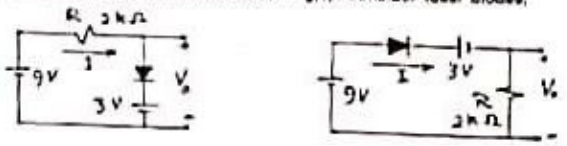
الكهربيات (١)
الزمن: ساعة واحدة

اسم الطالب

الفصل

Answer the following question :

Q1 (a) Calculate I & V_o for each circuit of Fig(1). Consider ideal diodes.



(a) Fig(1) (b)

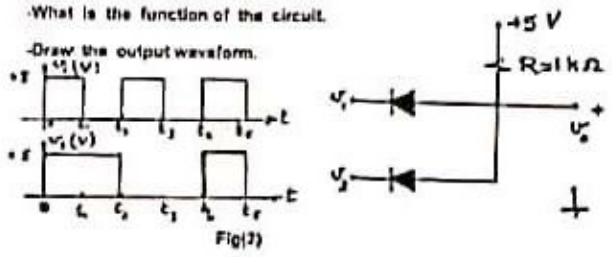
جامعة الزقازيق

دور يناير ٢٠١٨م

Q1 (b) For the logic circuit shown in F(2):

-What is the function of the circuit.

-Draw the output waveform.



Fig(2)

Faculty of Electronic Engineering
Department of Industrial Electronics and Control Eng.
First Year Students
Number of Pages: 2

Electrical Engineering (ACE115)
Mid-term Exam of the First Semester
Date: Thur. 1 / 11 / 2018
Time allowed: 1 Hour

Q1: For the circuit of figure (1). A number of Nickel-Cadmium voltage cells of an internal resistance (r_c = 0.2 Ω) and capacity of (C_c = 10 Ah) per cell, has been connected to form a single battery E_B of e.m.f (E_B = 24V) and (C_B = 20 Ah). Answer the following points: **(7 Marks)**

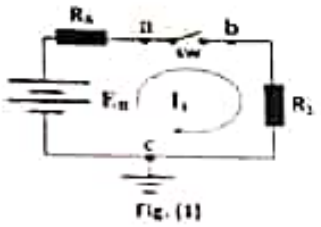


Fig. (1)

1) What is the <u>total number</u> of voltage cells used?
2) Draw the <u>connection diagram</u> of the voltage cells.
3) If the battery E_B is used to drive the motor of an electric car a distance of 2km with a constant speed of 100m/h for an average motor current of 0.5A. What is the <u>capacity</u> of E_B after travelling this distance?
4) Determine the current I_1 flowing in the circuit of figure (1) <u>after</u> closing sw. (R_1 = 8 Ω)
5) Determine the value of V_{ac}, V_{ab} and V_{bc} <u>before</u> and <u>after</u> closing sw.

[Note that: the e.m.f of the Ni-Cd voltage cell E_c = 1.2 V].

+5 V
1kΩ

(8 Marks)

Q2: For the circuit of figure (2). Using the nodal analysis, determine the power dissipation in the resistance R_2.

[where: $R_1 = 50\ \Omega$, $R_2 = 100\ \Omega$, $R_3 = 0.2\ k\Omega$, $R_4 = 0.25 \times 10^{-3}\ M\Omega$, $V_1 = 10V$, $V_2 = 20V$, $I_1 = 2A$].

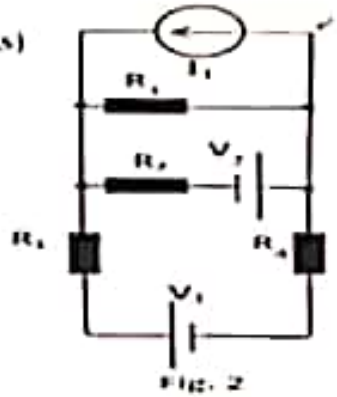


Fig. 2

(5 Marks)

Q1: For the circuit of figure (3). Determine the value of the current I_1 using resistance aggregation and Ohm's law.

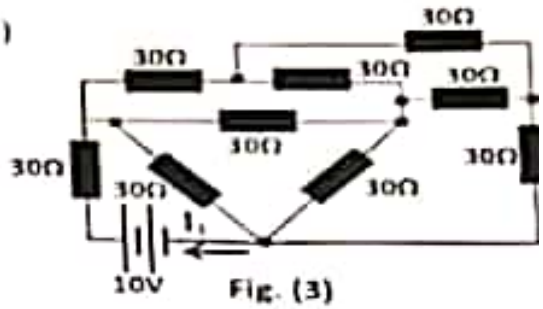


Fig. (3)

Faculty of Electronic Engineering
Department of Industrial Electronics and Control Eng.
First Year Students
Number of Pages: 4

Electrical Engineering (ACE115)
Mid-term Exam of the First Semester
Date: Thur. 1 / 11 / 2018
Time allowed: 1 Hour

Q1: For the circuit of figure (1). A number of Nickel-Cadmium voltage cells of an internal resistance (r_c = 0.2 Ω) and capacity of (C_c = 10 Ah) per cell, has been connected to form a single battery E_B of e.m.f (E_B = 24V) and (C_B = 20 Ah). Answer the following points: **(7 Marks)**

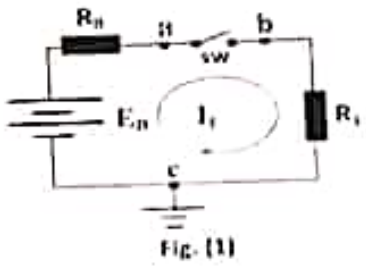


Fig. (1)

1) What is the <u>total number</u> of voltage cells used?
2) Draw the <u>connection diagram</u> of the voltage cells.
3) If the battery E_B is used to drive the motor of an electric car a distance of 2km with a constant speed of 100m/h for an average motor current of 0.5A. What is the <u>capacity</u> of E_B after travelling this distance?
4) Determine the current I_1 flowing in the circuit of figure (1) <u>after</u> closing sw. (R_1 = 8 Ω)
5) Determine the value of V_{ac}, V_{ab} and V_{bc} <u>before</u> and <u>after</u> closing sw.

[Note that: the e.m.f of the Ni-Cd voltage cell E_c= 1.2 V].

Third question: (5 marks)

a) **By using dynamic memory, write a program to find the minimum and the maximum values in a dynamic array of N integer numbers. Print on the screen the minimum and the maximum values.** *(5 marks)*

Best wishes •

```
while (current != NULL)
    {
        temp = current->next;
        current->next = prev;

        prev = current;
        current = temp;
    }
    head = prev;
}
```

Assume that reference head of a linked list contains A <--> B <--> C <--> D <--> E <-->F is passed to above function. What should be the modified linked list after the function call?

(b) By assuming a linked list of N nodes containing integer data, write a function to insert a node in the linked list after the node that has data equals 50. *(5 marks)*

```
#include <iostream>
using namespace std;
int main()
{
   int num[5];
   int* p;
   p = num;
   *p = 10;
   p++;
   *p = 20;
   p = &num[2];
   *p = 30;
   p = num + 3;
   *p = 40;
   p = num;
   *(p + 4) = 50;
   for (int i = 0; i < 5; i++)
      cout << num[i] << ", ";
   return 0;
}
```

Second question: (9 marks)

(a) Consider the following function that takes reference to head of a Linked List as parameter. Assume that a node of linked list has a pointer to next node as *next*. *(4 marks)*

```
struct Node
{    char C;
     Node* next;
};
void function(Node *head)
{  Node *current = head;
   Node *temp  = NULL;
   Node *prev  = NULL;
```

Menoufia University
Faculty of Electronic Engineering
Computer Science and Engineering Dept.
First Year – (2018/2019)

Mid Term Exam
Data Structures and Algorithms
Date: 11/10/2018
Time: 60 min

NAME: Section:

Answer the following questions:

First question: (6 marks)

a) Rewrite the following program after removing the errors. Underline each correction. : *(3 marks)*

Program	Correction

```
#include <iostream>
using namespace std;
struct Pixel
{
        int color, style;
};
void showPoint(Pixel P)
{
 cout << P.color, P.style << endl;
}
int main()
{
        Pixels Point1 = {5, 3};
        showPoint(Point1);
        Pixels Point2 = Point1;
        color.Point1 += 2;
        showPoint(Point2);
        return 0;
}
```

الفرقة الأولى ٢٠١٨/٢٠١٩

Menofia University
Engineering Physics Department
First Year- First Term
Date:29 /10/2018
Full Mark:30

Faculty of Electronic Engineering
Engineering Physics3
Mid Term Exam.
Time: 1hr

Physical Constants:
$m_e=9.1\times10^{-31}$Kg $e=1.6\times10^{-19}$C $h=6.6\times10^{-34}$Js $c=3\times10^{8}$m/s
$k=1.38\times10^{-23}$ J K

Answer the Following Questions:

1) Consider an electron of mass (m) moving in xy-plane in a two- dimensional box of side lengths (L), such that (V=0) inside and (V=∞) outside the box.
Find the eigen-functions and the eigen-values.

[12 Marks]

2) Discuss the mathematical and physical meaning of the four quantum numbers.

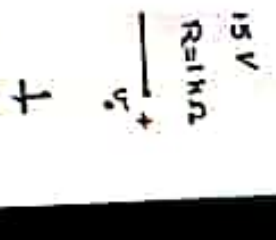
[8 Marks]

3-) Electrons with a maximum kinetic energy of 3eV are ejected from a metal surface by ultraviolet radiation of wavelength 1500A. Find:

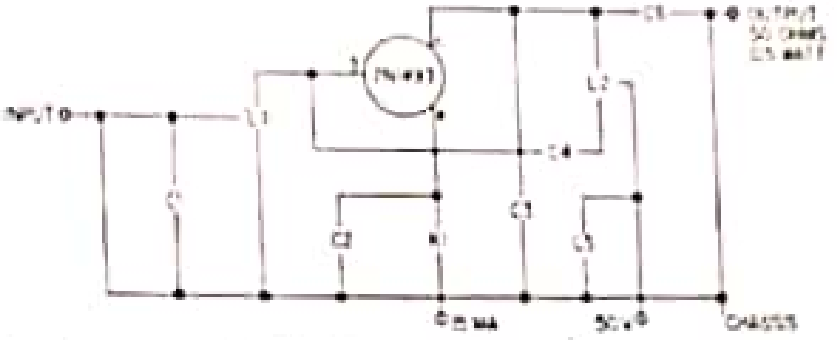
i) The work function of the metal
ii) The threshold wavelength of the metal
iii The stopping potential

[10 Marks]

Good luck Dr.Ahmed Abo Arais



السؤال الثاني: ارسم مخطط توصيل تشكل الذي يعد استكمال البيانات (Free Hand) (١٠ الدرجات)



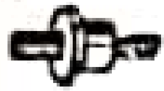
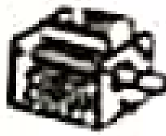
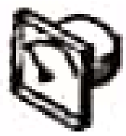
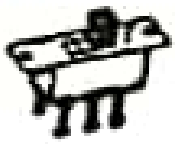
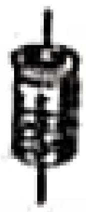
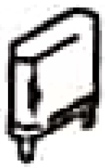
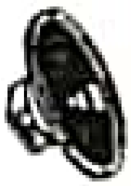
The transistor is of the NPN type. C_1, C_3, C_4 and C_6 are variable.
L_1 and L_3 have fixed taps.

مع التمنيات بالتوفيق و النجاح .

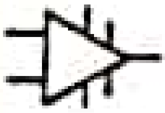
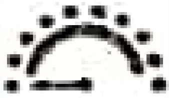
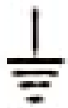
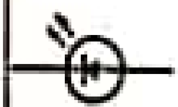
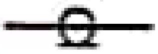
أجب عن الأسئلة الاتية : (Free Hand)

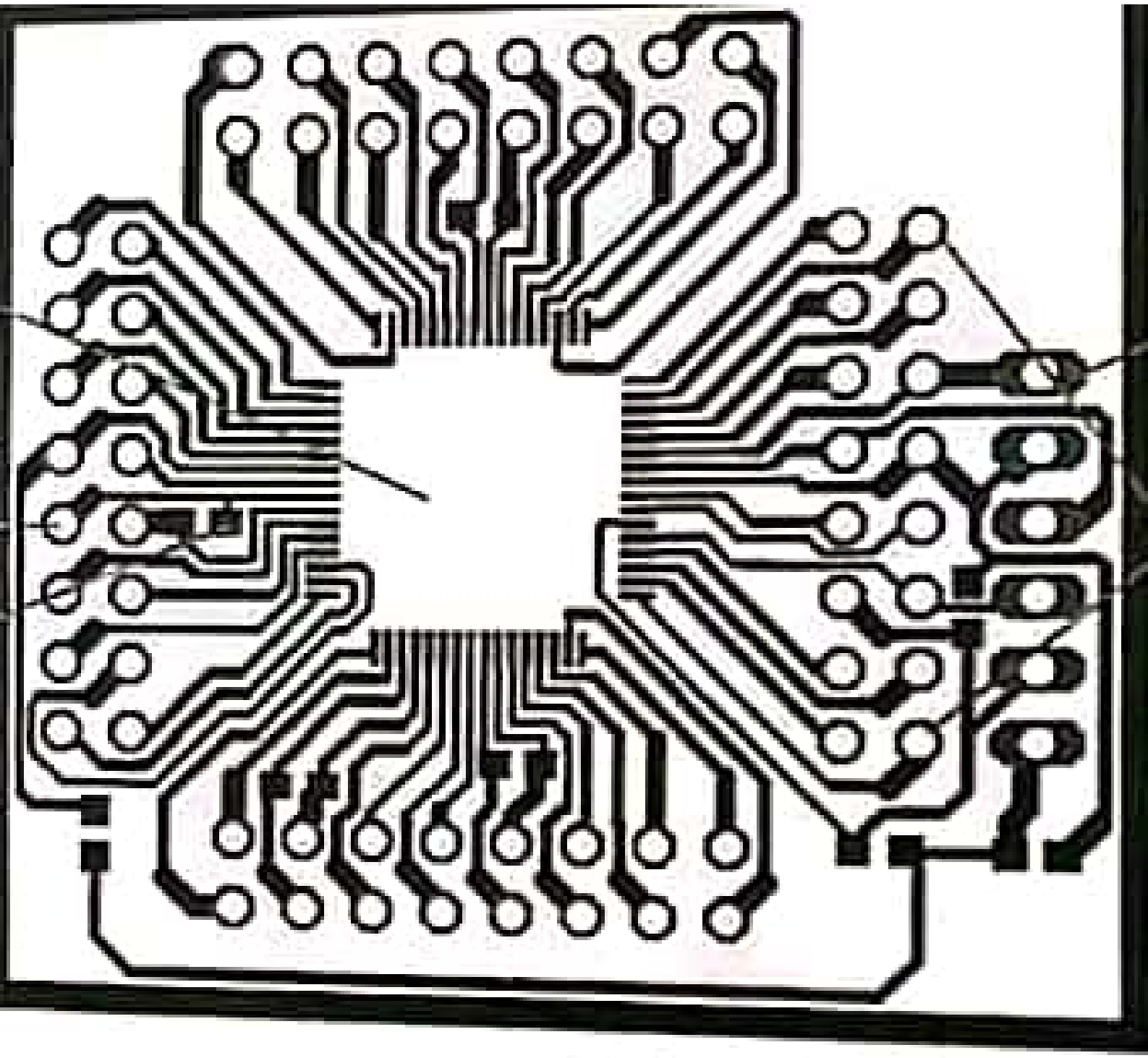
السؤال الأول : (١٠ درجات)

ارسم رموز المكونات التالية:

اكتب أسماء الرموز التالية:



صر الالكتروني الذي سبثت في المنطقة ١ هو (عنصر نقيدي – عنصر سطحي
إن العنصر الإلكتروني الموضوع في المنطقة رقم ١ يساوي (.....) طرف

المقصود الانجليزي لعناصر التثبيت السطحي SMD يعني بالإنجليزية	
أ- Surface Mount Devices	ب- Surface Maintain Devices
ج- Surface Mount Designs	د- Surface Made Devices
نوع الدائرة المطبوعة الخام Raw هو عبارة عن نوع الدائرة العازل مشتق عليه	
أ- الطبقة النحاسية قبل تشكيلها	ب- الطبقة النحاسية بعد تشكيلها
ج- الطبقة النحاسية مع تثبيتها	د- لا يوجد إجابة صحيحة
النموذج الأولي Prototype لأي دائرة أو جهاز هو	
أ- نواة تصميم أي خط انتاج	ب- الخطوات الأولى لوضع استراتيجية التصنيع
ج- دراسة خطوات التصنيع الأولى لجهاز	د- كل ما سبق
شكل بقطة لحام طرف العنصر السطحي نقطة الهبوط Land يستخدم للربط الكهربائي والميكانيكي	
أ- للعناصر التقليدية	ب- للعناصر سطحية التثبيت
د- للتوصيل نقطة الأرضي بالدائرة المطبوعة	د- لا يوجد إجابة صحيحة
يشير واجهة التحكم Control Panel للبرنامج المستخدم في تصميم النوع للمشروع	
أ- مركز تحكم البرنامج	ب- مدخل البرنامج
د- نافذة البرنامج	د- لا يوجد إجابة صحيحة

Answer all of the following questions

Question (1): (10 Marks)

a) Find the Laplace transform of the following functions.

1). $f(t) = \sinh^2(3t) + 3t^3 - 5t$ 2). $f(t) = t^3 e^{3t} + 3t^3$

3). $f(t) = t\,e^{-3t}\cos(\omega t)$ 4). $f(t) = \begin{cases} 1, & 0 < t < 1 \\ -1, & 1 < t < 2 \end{cases}; \quad T = 2$

b) Write the function $f(t)$ in terms of unit step function, then find it Laplace transform,

where $f(t) = \begin{cases} 2, & 0 \le t < 1 \\ t, & 1 \le t \le 5 \end{cases}$

Question (2): (10Marks)

Fin the inverse Laplace transform for the following functions:

1). $F(s) = \dfrac{2s+4}{s^2+1}$ 2). $F(s) = \dfrac{3s-4}{(s+2)^2(s-1)}$

3). $X(s) = \dfrac{s^2+1}{s^2+s-2}e^{-2s}$ 4). $F(s) = \dfrac{(1-e^{-s})}{s(1+e^{-s})}$

University	Menoufia	Date	24/1/2019
Faculty	Electronic Engineering	Time	3 Hours
Department		No. of pages	
Academic level	1st Year	Full Mark	60 Marks
Course Name	Electronics 1	Exam	Final Exam
Course Code		Examiner	Prof. Dr. El-Dokany Dr. M Zien

part (1) 30 Marks Prof. Dr. El-Dokany

Answer all the following questions (30 degrees)

Question No 1: How we can express such expressions, (10 degrees)

(a) Forward voltage, Reverse voltage, Cut-in Voltage, cut off voltage, Peak-inverse Voltage (5 degrees)

(b) Consider a silicon crystal whose band gap energy is $E_g = 1.12$ eV and its temperature are kept at T=300◦K.

1. If the Fermi level, E_F, is in the middle of the band gap, what is the probability to found electron at $E = E_c + kT$. (2.5 degrees)

2. If the Fermi level, E_f is located at the conduction band edge, $E_F = E_c$, what the probability to find an electron at $E = E_c + kT$. (2.5 degrees)

Question No 2: (10 degrees)

(a) We know that, for electronic uses, the most important property of semiconductor material is that its conductivity be modulate by external signals, can you determine which parameter that effect the conductivity? (5 degrees)

(b) What are the main factors affecting the mobility of charge carriers in semiconductors? (5 degrees)

Question No 3: (10 degrees)

A. (a) How PN junction comes in equilibrium statement? (4 degrees)

(b) Consider Silicon abrupt p-n diode with $N_a = 10^{15}$ cm^{-3} and $N_d = 10^{16}$ cm^{-3}. Calculate the junction capacitance at 3V, diode area equals 10^{-4} cm^2, Si intrinsic concentration is10^{10}, Si relative permeability is 16, free space permittivity is 8.87×10^{-15} F/cm , electronic charge is 1.6×10^{-19} , KT/q = 1/40, The constant for material properties (a) equal two

B. Calculate the built-in potential of the diode? Calculate the depletion layer thickness in each side of the junction?, the total depletion layer thickness? , the depletion region capacitance in both cases (alloyed junction and diffused junction)? (6 degrees)

With my best wishes

(٢)

4.a) Briefly discuss nanostructures in terms of their dimensionality. [5Marks]

4.b) What are the confinement regimes for quantum dots with infinite potential barriers? [5Marks]

4.c) What are the possible applications of nanostructures? [5Marks]

.....

5.a) How are X-rays generated? Describe the construction and operation of Coolidge X-ray tube. How are intensity and hardness of X-rays controlled? [5Marks]

5.b) Why exposure to X-ray injurious to health but exposure to visible light is not, when both are electromagnetic waves? [5Marks]

5.c) What is the coordination number? Calculate the coordination number for simple cubic. bcc and FCC lattices? [5Marks]

.....

6.a) Explain why the properties of polycrystalline materials are most often isotropic? [5Marks]

6.b) Briefly discuss the similarities and difference between photons and phonons. [5Marks]

6.c) Briefly explain why some transparent materials appear colored whereas others are colorless. [5Marks]

.....

مع خالص أمنياتي بالتوفيق والنجاح ا.د سناء محمود الربيعي.

1-a) Explain the physical meaning and the properties of the wave function (ψ) according to quantum theory. [5Marks]

1-b) Consider an electron of mass (m) moving in x-direction in an infinite potential well of width (L), such that (V=0) inside and ($V=\infty$) outside the well.
Find and draw the eigenfunctions, the eigenvalues and the probability of finding the electron for n =1,2,3. [5Marks]

1-c) Calculate the amount of energy emitted radiation when an electron in a three-dimensional box of side length 0.5nm makes transition from the third excited state to the first excited state. Find the corresponding wavelength of the emitted radiation. [5Marks]

2-a) Define: 1-Degeneracy 2-Zeeman effect 3-Fermi energy level
4-Pauli exclusion principle 5-Heizenberg uncertainty principle [5Marks]

2-b) Plot the energy of electrons (E) against the wave number (k) for free electron theory and band theory. Then show the first and second Brillouin zones. [5Marks]

2-c) Calculate the probability of electron occupancy for state whose energy is:
i)0.1eV above Fermi energy level. ii)0.1eV below Fermi energy level.
iii)equal to Fermi energy level.
Assume the temperature of 800K. [5Marks]

2. a. Derive The instantaneous power entering a circuit $p(t)$

2. b. The voltage across a load is $v(t) = 6.0 \cos(\omega t - 10^{\circ})$ V and the current through the element in the direction of the voltage drop is $i(t) = 1.5 \cos(\omega t + 50^{\circ})$ A. Find:
(a) the complex and apparent powers.
(b) the real and reactive powers, and (c) the power factor and the load impedance.

(10 Marks)

2-1) For the electrical circuit of Fig. 2, determine:

a) The equivalent resistance which is seen by the source 100V.
b) The voltage drop 'V' across the 35 Ω resistance.
c) Thevenin equivalent circuit across the 30 Ω resistance.

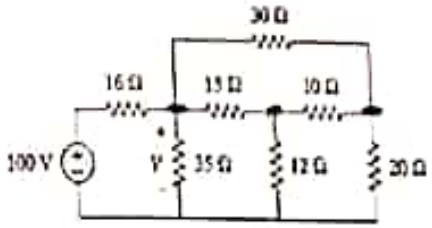


Fig. 2

2-2) If the battery of Fig. 3 is connected to the circuit of Fig. 4. Determine the current supplied by the battery when:

a) The battery is connected across the terminals a-b.
b) The battery is connected across the terminals c-d.

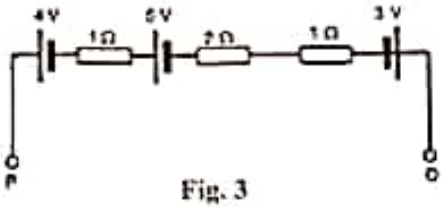


Fig. 3

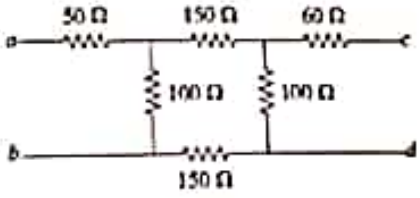


Fig. 4

Q3: (10 Marks)

3-1) For the electrical circuit of Fig. 5. Determine:

a) The value of R for a maximum power 'P_{max}' of 3 mW delivered to R_L.
b) The value of R_L for this condition.
c) The value of P_{max}.

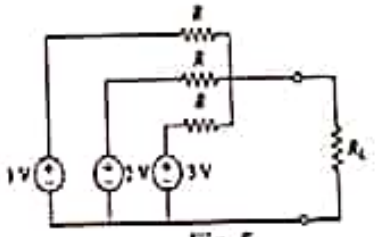


Fig. 5

3-2) For the electrical circuit of Fig. 6, determine the total power delivered to the circuit by the two sources using the super-position principle.

3-3) For the circuit of Fig. 7. Determine the matrix form of the mesh equations.

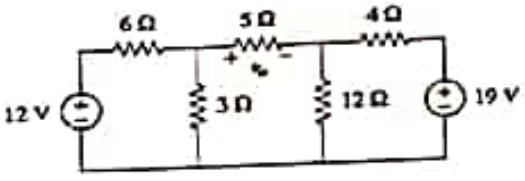


Fig. 6

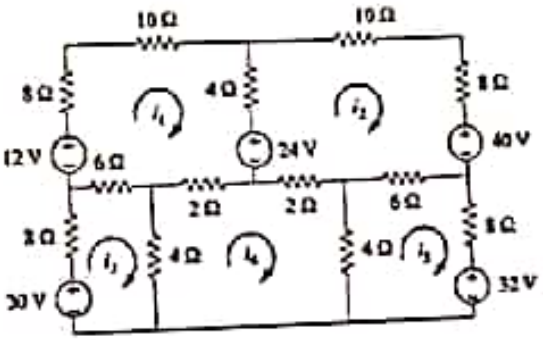


Fig. 7

End of part I

Faculty of Electronic Engineering
Department of Industrial Electronics and Control Eng.
First Year Students (2018 – 2019)
Number of Pages: 2

Electrical Engineering (ACE115)
Final-term Exam of the 1st Semester
Date: Thur. 10 / 1 / 2019
Time allowed: 3 Hours for both of the two parts

Part 1: DC Circuit Analysis

Q1: Choose the most correct answer from the multiple choices **(10 Marks)**

1. ..... is the type of materials which has a negative temperature coefficient of resistance.
(a) metals (b) alloys (c) semiconductors (d) insulators (e) None of such choices

2. A wire of aluminum of 100 meters long, 1 mm^2 cross-section, has a conductance of ..... S. ($\rho_{Al} = 2.8 \times 10^{-8} \Omega.m$).
(a) 2.8 (b) 1.4 (c) 7×10^{-1} (d) 36×10^{-2} (e) None of such choices

3. A coil has a total resistance of 20 Ω at 0 °C, its resistance becomes ..... Ω at 373 °K assuming the material of the coil wire has $\alpha_0 = 4.26 \times 10^{-3}/°C$. (note that: T °K=t °C +273).
(a) 31.8 (b) 28.5 (c) 212.8 (d) 11.5 (e) None of choices

4. The circuit of Fig. 1 has ..... independent current sources and ..... dependent voltage sources.
(a) 2 / 1 (b) 1 / 2 (c) 0 / 2 (d) 2 / 0 (e) None of such choices

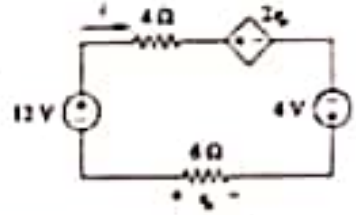


Fig. 1

5. An 100 Vdc source is connected to a group four parallel bulbs of 200V / 100 watt each. The source supplies a current of ..... mA.
(a) 4000 (b) 1000 (c) 400 (d) 100 (e) None of such choices

6. The polarization in a voltage cell has the effect of ..... its internal resistance.
(a) fixing (b) increasing (c) decreasing (d) changing (e) None of choices

7. Lead-acid cell is one of the ..... cells.
(a) primary (b) secondary (c) dry (d) high-resistive (e) None of choices

8. The Li-ion cell has ..... capacity compared to the nickel-cadmium cell.
(a) equal (b) lower (c) higher (d) linear (e) None of choices

9. Three identical voltage cells are parallel connected to form a battery. Each cell has an open circuit voltage of 5V and internal resistance of 0.6 Ω. The battery terminal voltage for 1A load is equal to ..... V.
(a) 13.2 (b) 4.8 (c) 14.4 (d) 4.4 (e) None of choices

10. The capacity of the voltage cell is measured by .....
(a) watt (b) Wh (c) VA (d) Ah (e) None of choices

كلية الهندسة الإلكترونية بمنوف
امتحان الفصل الدراسي الأول
الفرقة الأولى : 2018/2018
تاريخ الامتحان: 3 / 1 / 2019

الفرقة الأولى

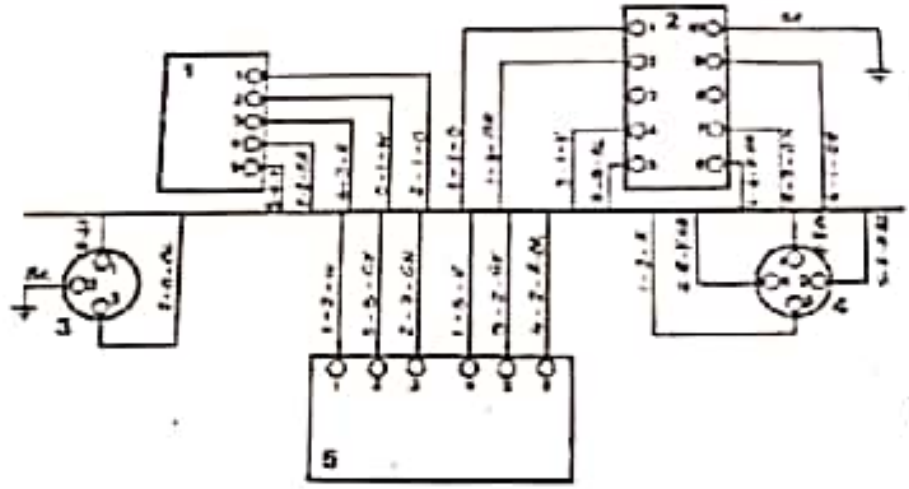
المادة:رسم العناصر والدوائر الالكترونية
عدد صفحات الأسئلة: (1)
درجة الورقة الأولى: (30 درجة)
زمن الورقة الأولى: ساعة ونصف

الورقة الأولى (أ.د/ طه السيد طه)

ملاحظات هامة: - تقسم لوحة الرسم الى أربعة أقسام ويخصص قسم لكل شكل - تراعى قواعد رسم الدوائر الالكترونية مع استخدام الأدوات الهندسية

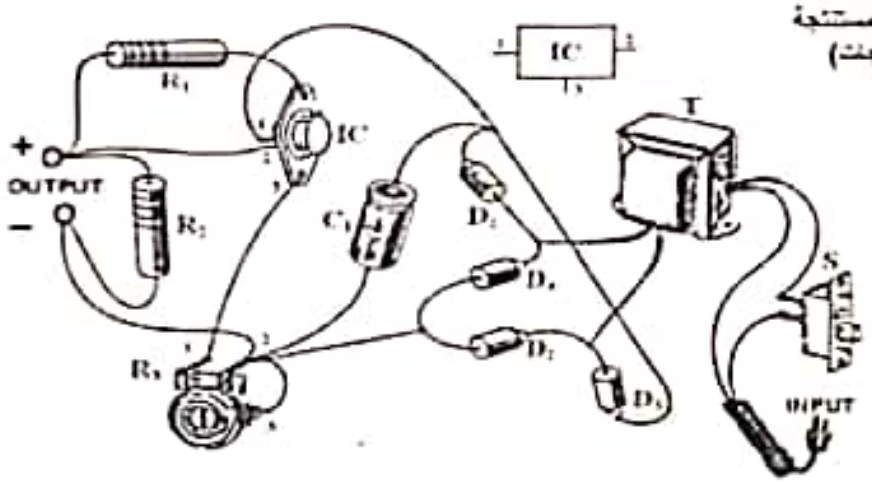
أجب عن الأسئلة الآتية :

1- أرسم مخطط توصيل للشكل (أ) بنظام التوصيل من نقطة الى نقطة (Point-to-Point Diagram) (10درجات)



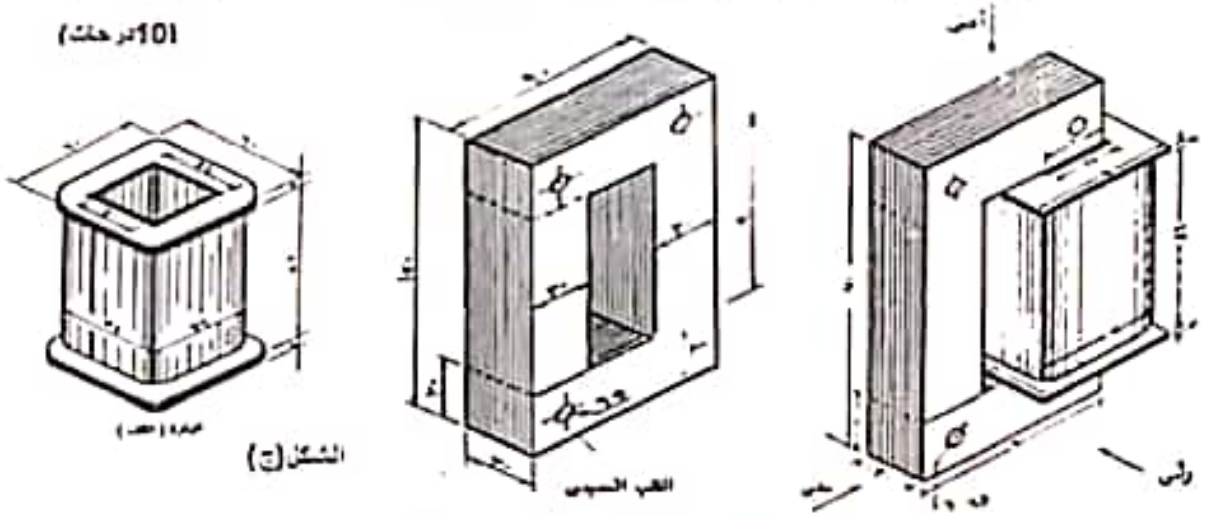
الشكل (أ)

2- أرسم الدائرة النظرية المستنتجة من الشكل(ب).(10درجات)



الشكل (ب)

3- الشكل(ج) يبين مجمع وأجزاء ملف خانق والمطلوب رسم مسقط راسي قطاع كامل عند المنتصف بمقياس رسم مناسب.
(10درجات)



الشكل(ج)

مع التمنيات بالتوفيق و النجاح

انظر الورقة الثانية للدكتور/ جابر الأبيض

PART II Laplace Transforms and Their Applications

Question (1) {20 Marks}

a) Find Laplace transform of the following functions:

1. $f(t) = t^{10}e^{3t}$
2. $f(t) = \frac{1}{\sqrt{t}} + \sin^2(5t)$
3. $f(t) = \begin{cases} 3e^t, & 0 \le t \le 2 \\ 0, & \text{otherwise} \end{cases}$
4. $f(t) = \int_0^t e^{3t}\sin(\omega t)dt$

b) Fin the inverse Laplace transform for the following functions:

1. $F(s) = \frac{1}{\sqrt{s}} + \frac{2}{s^3} + \frac{5s+1}{s^2}$
2. $F(s) = \frac{s^3+1}{s^4+2s^3+s+2}e^{-2s}$
3. $F(s) = \frac{3s-4}{(s+2)^2(s-1)}$
4. $F(s) = \frac{(s+1)^3}{(s+2)^4}$

Question (2) {20 Marks}

a. The RLC circuit shown in Fig. 1 consists of a resistor $R = 160\,\Omega$, a capacitor $C = 10^{-4}F$ and an inductor $L = 1\,H$ connected in series together with a voltage source $e(t) = 10\,V$. Prior to closing the switch at time $t = 0$, both the charge on the capacitor and the resulting current in the circuit are zero. Find:

1. The differential equation governing the charge $q(t)$ on the capacitor.
2. The current $i(t)$ in the circuit at any time t.

b. Determine the response of the mechanical system shown in Fig. 2 when subjected to the force $f(t) = \begin{cases} 1, & 1 \le t \le 2 \\ 0, & otherwise \end{cases}$, if $M = 1\,kg$, $K = 2Nm^{-1}$ and $B = 3Nm^{-1}s$

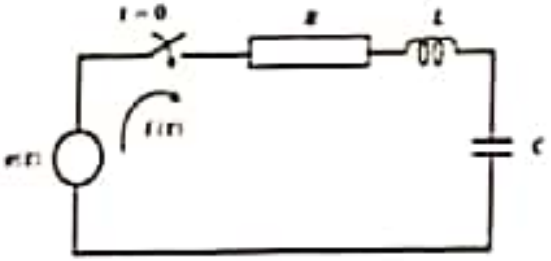


Fig. 1

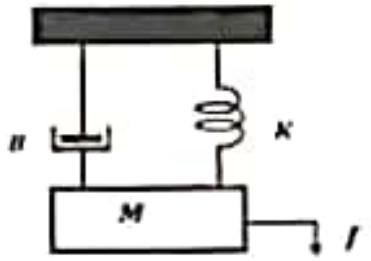


Fig. 2

Question (3) {10 Marks}

Find the general solution near $x = 0$ of the variable coefficients linear differential equation (Bessel's equation):

$$x^2y'' + xy' + (x^2 - \tfrac{1}{9})y = 0$$

With My Best wishes

الورقة الأولي

جامعة المنوفية
كلية الهندسة الالكترونية
قسم الفيزيقا والرياضيات الهندسية

الاختبار : النهائي فبر : 101 التاريخ : 31 – 12 – 2018
مادة : الرياضيات الهندسية(3) الزمن : 3 ساعات
الفرقة : الأولى الفصل الدراسي : الأول

أجب عن جميع الأسئلة الآتية — 50 درجة

السؤال الأول — 20 درجة

(i) أوجد الحل العام والخاص للمعادلة التفاضلية التالية :

$$(x^2y^2 - xy - y\sin x)dx + (x^3y - x^2 + 2\cos x)dy = 0 \quad , \quad y(0) = 1$$

إذا علم أن لها عامل مكامل دالة في y فقط — 7 درجات

(ii) أوجد الحل العام للمعادلة التفاضلية الآتية (معادلة برنولي) : — 7 درجات

$$\frac{dy}{dx} + \frac{1}{x}y = (x^4\sin x + x^2)y^4$$

(iii) استخدم طريقة بيكارد لحساب قيمة تقريبية لـ y (التقريب الثالث) عندما $x = 0.02$

علماً بأن : $y' = x^2 + y \quad , \quad y(0) = 1$ — 6 درجات

السؤال الثاني — 30 درجة

(i) أوجد الحل العام للمعادلة التفاضلية الخطية الغير متجانسة التالية — 10 درجات

(باستخدام طريقة المؤثر التفاضلي العكسي في إيجاد الحل الخاص)

$$(D^3 + D^2 - D - 1)(D^2 - 2D + 5)y = e^{-x} + \sin(2x + 3)$$

(ii) أوجد الحل العام للمعادلة التفاضلية الخطية الغير متجانسة التالية — 10 درجات

(باستخدام طريقة المعاملات الغير معينة في إيجاد الحل الخاص)

$$y''' + 3y'' + 2y' = (x + 2) + e^x + \cos 2x$$

(iii) أوجد الحل العام للمعادلة التفاضلية الخطية الغير متجانسة التالية — 10 درجات

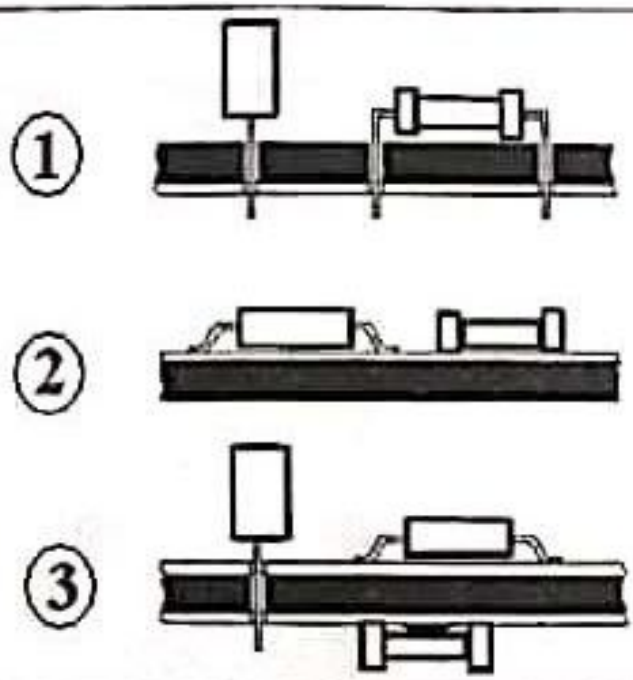
(باستخدام طريقة تغيير البارمترات في إيجاد الحل الخاص)

$$(x^3D^3 - x^2D^2 - 2xD + 6)y = x^5$$

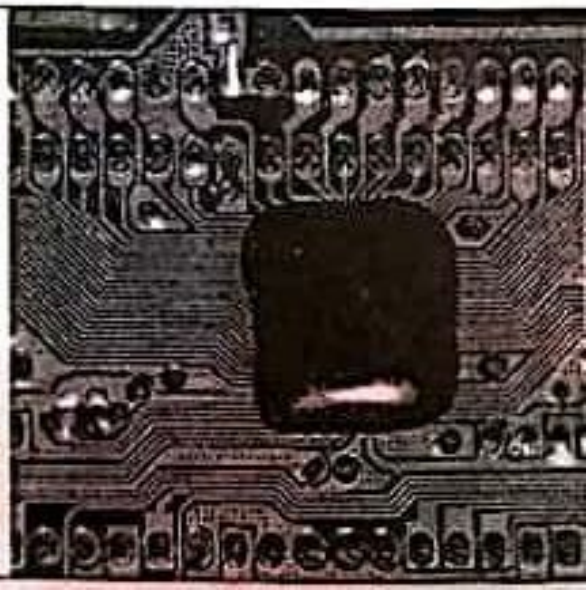
اقلب الورقة

أطيب التمنيات للجميع بالنجاح والتوفيق

١- اكتب طريقة اللحام المستخدمة في الربط الميكانيكي والتوصيل الكهربائي للعناصر في كل شكل من الاشكال التالية مع ذكر نوع الدائرة المطبوعة وأى عمليات اضافية..... (٣ درجات)



٢- ما هى التكنولوجيا المستخدمة في هذا الشكل ؟ ارسم شكل تخطيطي يوضح مكونات ما تحت البقعة السوداء..... (درجتان)



Menoufia University
Faculty of Electronic Engineering
Department of Computer Science & Eng.,
First Year

Final Written Exam
CSE 116: Data Structures and Algorithms
Date: 17 01 2018
Time: 180 min (10.00am 1.00pm)

No of Questions: 4 | No of Pages: 2 | Ac. Year: 2017/2018

Answer the following questions: *Total mark: [60]*

First question: *[10]*

Choose the correct answer:

1. **Sorting is not possible by using which of the following methods?**
   (a) Insertion (c) Exchange
   (b) Selection (d) Deletion
2. **An array can be accessed by referring to the indexed element within the array:**
   (a) Yes (b) No
3. **Stack is :**
   (a) FIFO (c) LIFO
   (b) FCFO (d) LIFI
4. **For a binary search algorithm to work, it is necessary that the array (list) must be:**
   (a) Sorted (c) In a tree
   (b) Unsorted (d) Pushed into stack
5. **How many swaps are required to sort this array {2, 5, 1, 3, 4} using bubble sort:**
   (a) 4 (c) 6
   (b) 5 (d) 8
6. **Which of the following algorithm does divide the array in two halves:**
   (a) Insertion sort (c) Linear search
   (b) Binary search (d) Bubble sort
7. **A procedure that calls itself is called**
   (a) Illegal call (c) Recursive
   (b) Reverse polish (d) None of the above
8. **What is the worst case time complexity of linear search algorithm?**
   (a) O(1) (c) O(log n)
   (b) O(n) (d) $O(n^2)$
9. **Which of the following uses FIFO method**
   (a) Queue (c) Linked list
   (b) Stack (d) Binary Tree
10. **What is the best time complexity of bubble sort?**
    (a) $O(n^2)$ (c) O(n)
    (b) O(n log n) (d) $O(n \log n^2)$

==========

Second question: *[20]*

(a) Write a function called ***Count( )*** that counts and returns the number of nodes in a linked list pointed by ***head.***

اكتب ستة وصلات خرج وحدة الدائرة المطبوعة للربط مع ضفيرة الجهاز واتجاهاتها.(درجة واحدة)

لون السلك	من		لون السلك	إلى	
	رقم الوحدة	رقم الطرف		رقم الوحدة	رقم الطرف
BK			O		
BR			Y		
R			GR		

ارسم بالقلم الرصاص توزيع عناصر الواجهة الامامية لجهاز تغذية القدرة:..... (٣ درجات)

٣- بالنسبة للمحول الكهربائي في الدائرة المذكورة ..... (درجة واحدة)

نوع المحول (مثالي أم واقعي)		تردد جهد التغذية	
نوع مادة قلب المحول		أقصى تيار حمل	
جهد الدخل مقداره		جهد الخرج مقداره	

٤- ارسم بالقلم الرصاص الدائرة التخطيطية لدائرة تغذية القدرة بعد رفع العناصر ذات التثبيت الميكانيكي المستقل.
.....(درجتان)

PART 2

1) For the circuit shown in Fig.1. (10 marks)

V=200 sin ωt

R1 = R2 =10 KΩ,

L=0.1 mH and C=0.01μf.

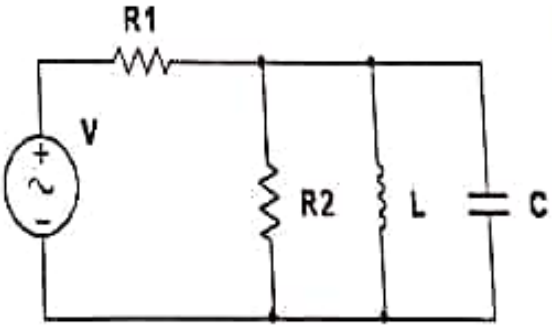


Fig.1

a) Find the resonance frequency (ω_0).

b) Calculate the R.M.S values of V_C, I_L ($\omega = \omega_0$).

c) Find the active power delivered by the source at ($\omega = \omega_0$).

d) For ($\omega = 2\omega_0$), determine whether the impedance circuit is inductive or capacitive.

---

2) For the circuit shown in Fig.2. (10 marks)

$V = V_m \sin \omega t$

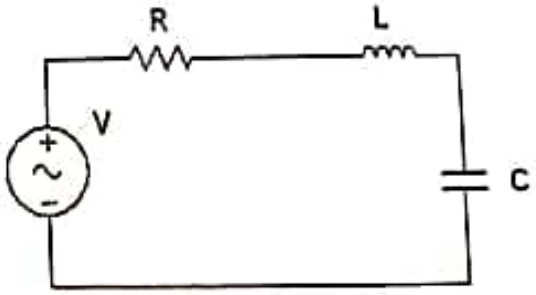


Fig.2

a) Find an expression for the circuit impedance.

b) Drive an expression for instantaneous power (P_i) and average power (P_{avg}) delivered by the source.

c) Find the value of ω that makes the impedance minimum.

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3) For the circuit shown in Fig.3. (10 marks)

V=50 sin 2Πft, F=50 HZ

R=10Ω, L=10 mH

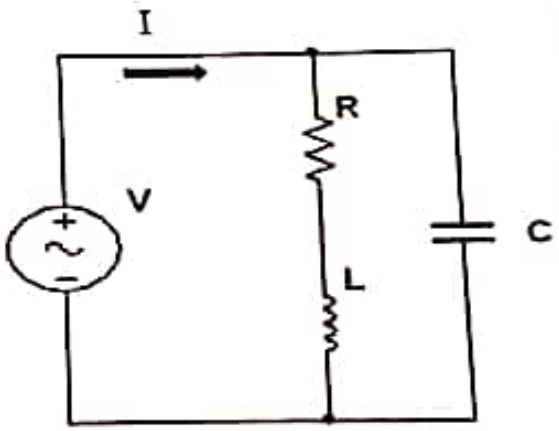


Fig.3

a) Find the value of C that makes the reactive power = 0.

b) Find the R.M.S value of the current (I).

c) What is the phase shift between I and V

University	Menoufia		Date	14/01/2018
Faculty	Electronic Engineering		Time	From 10 am to 1 pm
Department	General		No.of Pages	2
Academic Level	1st Year		No. of Questions	5
Academic Term	1st Term		Full Mark	60
Course Name	Electrical Engineering		Exam	Final Exam
Course Code	ACE 115		Examiner	Prof. Dr. Abdul-Azim S.
Academic Year	2017/2018			Dr. Ramy Farid

Answer all the following questions

PART 1

Question 1 (15 marks)

For the circuit in Figure 1, calculate total power delivered from the current source at maximum power transfer to R_L, and then sketch the characteristic curve of the total power delivered from the source by varying the load R_L

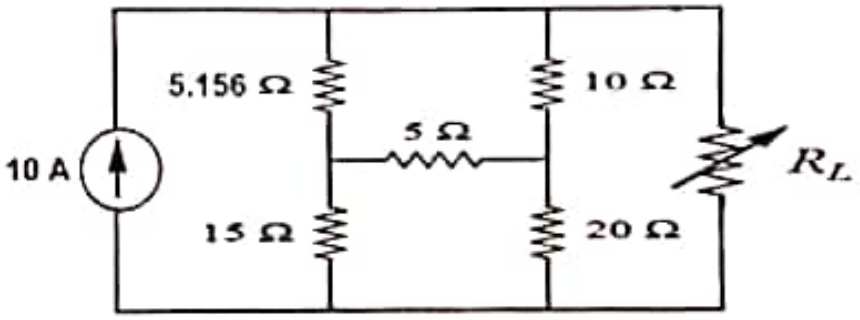


Figure 1

كليه الهندسه الالكترونيه بمنوف
امتحان الفصل الدراسي الأول
الفرقة الأولي : (٢٠١٧/٢٠١٨)
تاريخ الامتحان: ٣ / ١ / ٢٠١٨

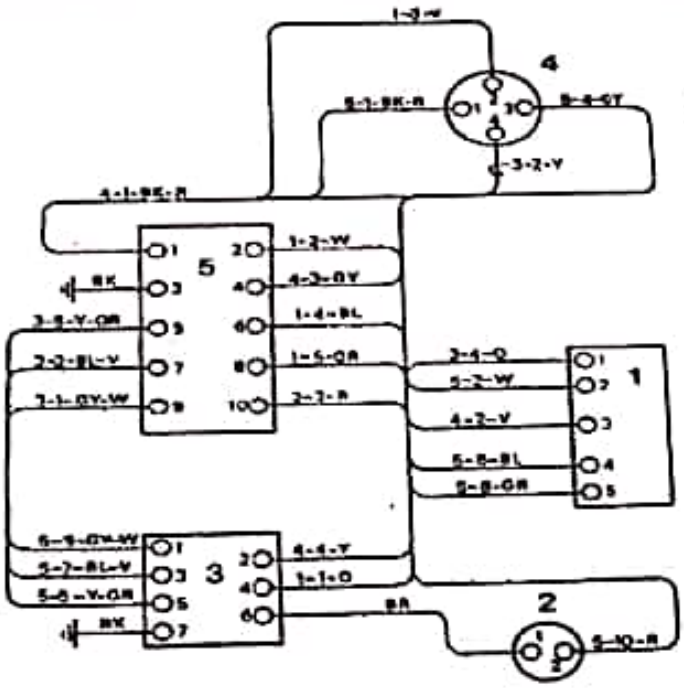
المادة:رسم العناصر والدوائر الالكترونيه
عدد صفحات الأسئلة: (١)
درجة الورقة الأولي: (٣٠ درجة)
زمن الورقة الأولي: ساعة ونصف

الورقة الأولى (ا.د./ طه السيد طه)

ملاحظات هامة: - تقسم لوحة الرسم الي أربعة أقسام ويخصص قسم لكل شكل - تراعي قواعد رسم الدوائر الإلكترونية مع استخدام الأدوات الهندسية

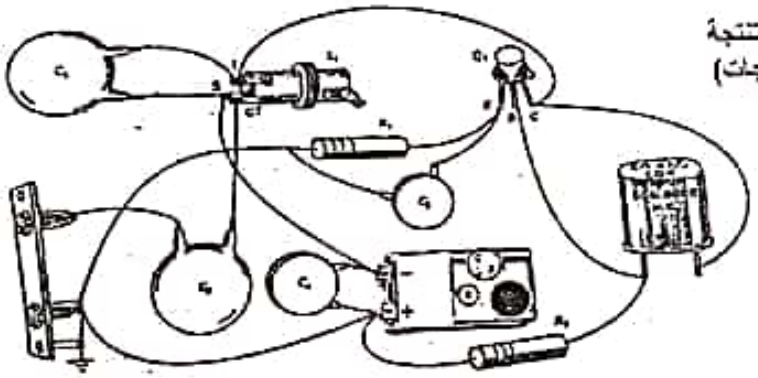
أجب عن الأسئلة الآتية :

١- أرسم مخطط توصيل للشكل (أ) بنظام التوصيل من نقطة الي نقطة (Point-to-Point Diagram) (١٠درجات)



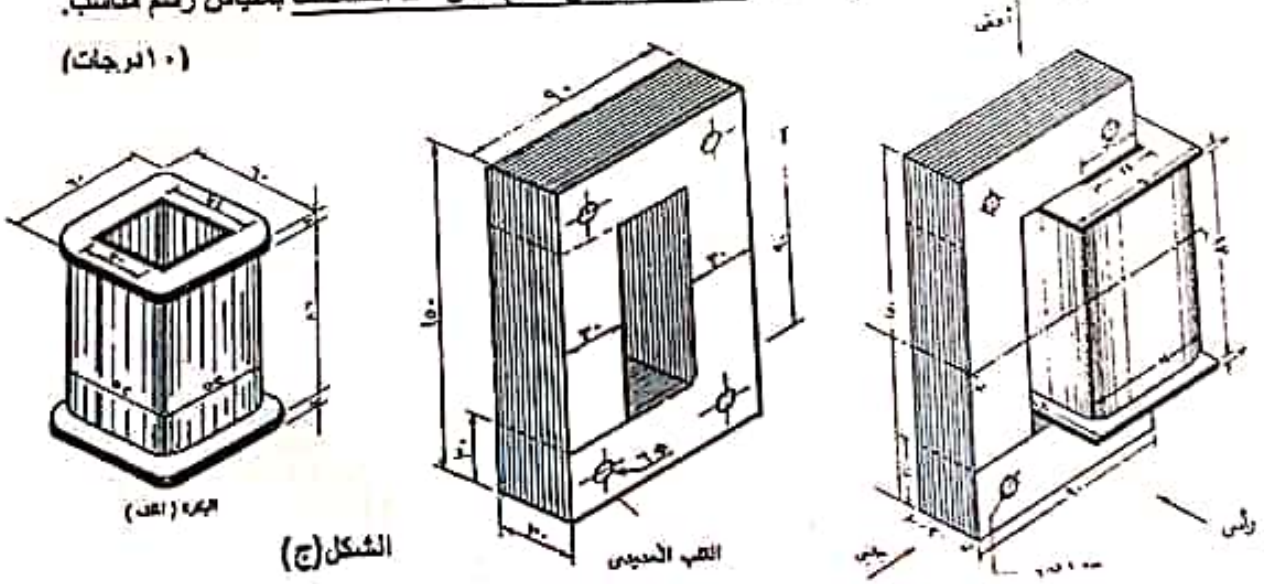
الشكل (أ)

٢- أرسم الدائرة النظرية المستنتجة من الشكل(ب). (١٠درجات)



الشكل (ب)

٣- الشكل(ج) يبين مجمع وأجزاء ملف خانق والمطلوب رسم مسقط راسي قطاع كامل عند المنتصف بمقياس رسم مناسب.
(١٠درجات)



الشكل(ج)

Answer all the following questions

PART 1

Question 1 **(15 marks)**

For the circuit in Figure 1, calculate total power delivered from the current source at maximum power transfer to R_L, and then sketch the characteristic curve of the total power delivered from the source by varying the load R_L

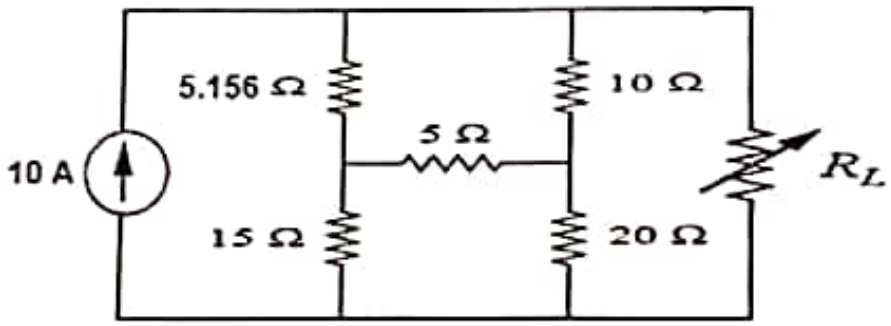


Figure 1

4-a) The K_α and K_β X-rays of molybdenum have wavelengths 0.71 and 0.63Å respectively. Find the wavelength of L_α X-ray of molybdenum. [5 Marks]

4-b) Calculate the corresponding thickness x required to reduce the amount of transmitted X-ray intensity by half of Fe-17 mass % Cr alloy (density = 7.76×10^6 g/m^3 and mass absorption coefficients of Fe and Cr are 37.6 and 29.9 cm^2/g respectively for Mo-K_α radiation). [10 Marks]

5-a) Convert the plane (101) into the four-index Miller–Bravais scheme for hexagonal unit cells. [5 Marks]

5-b) The unit cell for tin has tetragonal symmetry, with a and c lattice parameters of 0.583 and 0.318 nm, respectively. If its density, atomic weight, and atomic radius are 7.27 g/cm^3, 118.71 g/mol, and 0.151 nm, respectively, compute the atomic packing factor. [10 Marks]

6-a) Briefly explain the two possible origins of specific properties of nanostructured materials. [5 Marks]

6-b) The reflectivity of silicon at 633 nm is 35% and the absorption coefficient is 3.8×10^5 m^{-1}. Calculate the transmission and optical density of a sample with a thickness of 10 μm. [10 Marks]

Question	3(a)	3(b)	3(c)	2(a)	2(b)	2(c)	3(a)	3(b)	3(c)	4(a)	4(b)	5(a)	5(b)	6(a)	6(b)
Achieved ILOs	a1-3	b7-1	c1-2	a1-4	a1-3	b7-2	a1-3	a3-2	c1-2	a1-1	b2-2	a3-2	b2-1	a1-2	b2-3

الفرقة الأولى

Menofia University
Engineering Physics Department
First Year- First Term
Date:10/1/2018
Full Mark: 90

Faculty of Electronic Engineering
Engineering Physics3
Final Exam.
Time: 3hrs (10-13)

Physical Constants: $m_e=9.1\times10^{-31}$Kg $e=1.6\times10^{-19}$C $h=6.6\times10^{-34}$Js
$c=3\times10^{5}$m/s $k=1.38\times10^{-23}$ J/K

Answer the following questions:

1-a) Discuss the physical meaning and the properties of the wave function (ψ) according to quantum theory. [5Marks]

1-b) Consider an electron of mass (m) moving in x-direction in an infinite potential well of width (L), such that (V=0) inside and (V=∞) outside the well.
Find and draw the eigenfunctions, the eigenvalues and the probability of finding the electron for n =1,2,3. [5Marks]

1-c) A photon with wavelength 0.5nm strikes an electron at rest and rebounds at angle of 120 to its original direction. Find the wavelength and speed of the photon after collision. [5Marks]

2-a) Define: 1-Degeneracy 2-Zeeman effect 3-Fermi energy level
4-Pauli exclusion principle 5-Heizenberg uncertainty principle [5Marks]

2-b) Plot the potential energy of an electron in a linear periodic lattice and Kronig -Penny model. State the Bloch solution. [5Marks]

2-c) Calculate the probability of electron occupancy for state whose energy is:
i)0.2eV above Fermi energy level ii)0.2eV below Fermi energy level
iii)equal to Fermi energy level
Assume the temperature of 400K. [5Marks]

3-a) Explain the following:-
i) Meissner effect ii) Electron pairs formation in BCS theory [5Marks]

3-b) Compare between type I and type II superconductors. [5Marks]

3-c) Electrons with a maximum kinetic energy of 3eV are ejected from a metal surface by ultraviolet radiation of wavelength 1500A. Find:
i)the work function of the metal
ii)the threshold wavelength of the metal
iii)the stopping potential [5Marks]

Good luck *Dr.Ahmed Abo Arais*

الدرجة الأولى سبتمبر ٢٠١٨

Menoufia University
Faculty of Electronic Engineering
Dept. of Electronics and Electrical Comm.
1st Year

Subject: **Electronics 2**

Time Allowed: 1 Hours

Name:..... Section:.....

Question One (10 Marks)

A1) Derive the complete hybrid equivalent circuit model for common Emitter transistor, and find an expression for the following parameters

1. Total voltage gain
2. Total current gain
3. Input impedance of the stage
4. Output impedance of the stage

B1) The transistor shown in Fig. (1-1) has the following h-parameters values: h_{ie}= 2.75 KΩ, h_{fe}= 180, h_{re}= 2×10^{-4}, h_{oe}= 25 μS. Find (1) Z_{in}, (2) $r_{in(stage)}$ (3) A_v, (4) A_i, (5) $A_{v(total)}$, and (6) $Z_{o(stage)}$.

Question Two (10 Marks)

A2) Draw the DC load lines for the network of Fig. (1-2) on the characteristics of Fig. (1-3).

(B2) Determine the peak-to-peak value of I_c and V_{ce} from the graph if the input voltage V_i has a peak value of 10 mV. Determine the voltage gain A_v.