Name

CA9 Section:

Menoufia University

**Engineering Physics Department** 

Mid-Term Exam Time: 1hr (11-12) **Faculty of Electronic Engineering Engineering Physics3** 

Date: 7/11/2019 Full Mark: 30

Physical Constants: m<sub>e</sub>=9.1x10<sup>-31</sup>Kg

 $k = 1.38 \times 10^{-23} \text{ J/K}$ 

 $h=6.6x10^{-34}$ .Is  $e=1.6x10^{-19}C$ 

 $c = 3 \times 10^8 \text{ m/s}$ **Answer The Following Questions** 

1-Space lattice 2-Unit cell 3-Bravais space lattices 4-Miller indices [4Marks] 1-b) Draw and find the number of atoms per unit cell and the coordination number

3-Face centered cubic 2-Body centered cubic 1-Simple cubic

[6Marks]

1-c) Draw the following planes and directions:-

 $(\bar{1}\bar{1}\bar{1}), (001), (100), [\bar{1}\bar{1}\bar{1}], [001]$ 

[5Marks]

2-a) Why we need to study quantum theory in electronics?

[3Marks]

2-b) Given the wave function as:-

 $\Psi(\mathbf{x},t) = \Psi_0 \exp \left[ 2\pi \mathbf{i} \left( \mathbf{x}/\lambda - t/T \right) \right]$ 

With accepted notation:

- Derive the operators of momentum (P) and energy (E).
- ii) Find the Schrodinger wave equation.
- iii) Deduce the time-dependent Schrodinger wave equation.

iv) Find the time-independent Schrodinger wave equation. 2-c) It is proposed to send a beam of electrons through a crystal of inter-planer

distance (d). The electrons have a speed of 400m/s. How large must (d) be if the electrons are scattered at an angle of 25° for the first order of diffraction? [4Marks]

Good luck

Prof.Dr.Mohamed Dawoud

Assoc. Dr Ahmed Abo Arais

C/4 Chia C/91

Minoufia University

Faculty of Electronic Engineering

Dept. Industrial Electronics and Control Eng.

Course: Electrical Engineering

Course Field: Specialization Requirements Academic Level: First Year, 1st Semester

Academic Year: 2019 / 2020 Course Code: ACE 115



Midterm Exam
Date: 3/11/2019
Exam Type: Written
No. of Exam Pages: 2

No. of Exam Questions: 3 Exam Marks: 20 Marks Exam Time: 60 Minutes

From 11:00 AM to 12:00 PM

Student Name:	Class:

### Answer the following questions:

# Question – 1: Put True $(\sqrt{\ })$ or False $(\times)$ signs for the following expressions: [5 Marks]

1.	Voltage sources of different potentials should never be connected in series.	( )
2.	The internal resistance of the ammeter must be very large for less loading effect.	( )
3.	The total power consumed by the series or parallel circuits is equal to the SUM of the power dissipated by the individual resistors.	( )
4.	Power is the capacity for doing work, so two identical jobs or tasks can be done at different rates.	( )
5.	The same meter may give different loading effects if it is used for different circuits.	( )
6.	$I_{OC} = 0$ for both the voltage source and the current source at open-circuit load.	( )
7.	The electric voltage is defined as the force per unit charge acting at a point in the field.	( )
8.	Conventional current is what actually happens and electrons flow out of the negative terminal, through the circuit to the positive terminal of the source.	( )
9.	In linear resistors, the current isn't directly proportional to the applied voltage.	( )
10.	The kinetic energy possessed by an object is dependent upon mass and speed.	( )

### Question - 2:

a. A 750 W electric motor is to be connected to a 130 V supply via two cables, which are each 64 m in length. If the voltage at the motor terminals is to be not less than 125 V, determine the minimum thickness of the copper conduction in the cables. (Given the specific resistance of the copper is  $1.72 \times 10^{-8} \Omega$ . m) [4 Marks]

b. Tungsten wire is used as filaments in incandescent light bulbs. Current in the wire causes the wire to reach extremely high temperatures. Determine the temperature of the filament of a 100-W light bulb if the resistance at room temperature is measured to be 11.7  $\Omega$  and when the light is on, the resistance is determined to be 144  $\Omega$ . (Given the temperature coefficients, per degree Celsius of the Tungsten is 0.0045)

[4 Marks]

Question – 3:

[7 Marks]

For the circuit shown in Figure 1, Calculate the current I and the voltage  $V_{ab}$  when:

- a.  $R_{\rm x}$  is short circuit.
- b.  $R_{\rm x} = 15 \ k\Omega$ .
- c.  $R_x$  is open circuit.

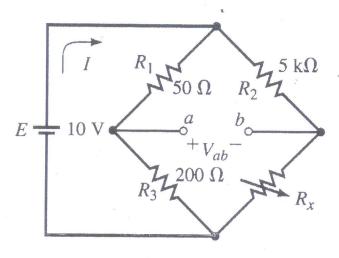


Figure 1

18. Transform the following infix expression to postfix form:

```
(A + B) * (C - D) / E
```

a. AB+CD\*-/E

c. AB+CD-\*E/

b. ABC\*CD/-+

- d. AB\*C+D/-
- 19. The result of evaluating the postfix expression 5, 4, 6, +, \*, 4, 9, 3, /, +, \* is?
  - a 600
- b. 350
- c. 200
- d. 450

20. Which of the following name does not relate to stacks?

a. FIFO lists

c. Piles

b. LIFO lists

- d. Push down lists
- 21. Consider the following pseudocode that uses a stack

```
declare a stack of characters
while ( there are more characters in the word to read )
{
  read a character
  push the character on the stack
}
  while ( the stack is not empty )
  {
    pop a character off the stack
    write the character to the screen
}
```

What is output for input "DataStructure"?

- a. DataStructureDataStructure
- b. erutcurtSataD
- c. DataStructure
- d. erutcurtSataDerutcurtSataD
- 22. True statements about Stack and Queue are
  - I. Stack and Queue both are linear data structures
  - II. Stack is non-linear data structure.
  - III. Stack is LIFO
  - IV. Queue is FIFO
  - a. I and II only

c. III and IV

b. I and III

- d. All are correct.
- 23. In a priority queue, insertion and deletion takes place at .....
  - a. front, rear end

c. only at front end

b. only at rear end

d. any position

With all my best wishes of great success! Dr. Abeer Eshra

Answers:					
18	19	20	21	22	23

Compute	er Science and Engineering Dept.	1 <sup>st</sup> Grade
Data Str	ucture and Algorithms	Student Name:
Midterm	Exam, Model 1, November 4th 2019	Section:
Pla	ease answer all of the followin	g questions:
1	Float * $p = new float [50]$ ; is an exa	mple of
1.	a. Static array declaration	c. Multi-dimensional array declaration
	b. Dynamic array declaration	d. Both A and B
2		rrect with respect to dynamic memory allocation.
۷.		tructured area of memory, known as heap
	b. Used for unpredictable memory	
	-	ster than that of static memory allocation
		ged during the run time of the program based on the
	requirement of the program	ged during the run time of the program based on the
2	Which of the following is <i>true</i> state	ment about next energian?
3.	a. It can't be overloaded.	ment about new operator:
	b. It returns garbage value when r	namory allocation fails
	c. It automatically computes the s	
	d. All of these	ize of the data object.
Λ		ay to allocate memory for an integer by dynamic
4.	memory allocation in CPP?	ay to anocate memory for an integer by dynamic
	a. int *p = new int(100);	
	b. int *p; p = new int; *p = 100;	
	c. int *p = NULL; p = new int; *p	=100:
	d. All of these	, 100,
5		tems are logically related defines
J.	a. storage structure	c. data relationship
	b. data structure	d. data operation
6	node.next -> node.next.next; will m	-
0.	a. node.next inaccessible	c. this node inaccessible
	b. node.next.next inaccessible	d. none off the above
7		t node of the list points to the first node of the list is
	a. Singly linked list	c.· Circular linked list
	b. Doubly linked list	d. Multiply linked list
8.	In doubly linked lists, traversal can	
0.	a. Only in forward direction	c. In both directions
	b. Only in reverse direction	d. None of the above
Q	The advantage of using linked lists	
· ).	T 1 111 1 1 1 611	
	_	ment can be done at any position in a linked list
		-
	d. The size of a linked list is fixed	a collection of heterogeneous data types
	u. The size of a linked list is lixed	<u>.</u>

Answers:								
1	2	3	4	5	6	7	8	9

10. The following C++ function takes a simply linked list as input argument. It modifies the list by moving the last element to the front of the list and returns the modified list. Some part of the code is left blank. Choose the correct alternative to replace the blank line.

```
struct Node
{
  int value;
  Node *next;
};
Node *move_to_front(Node *head)
{
  Node *p, *q;
  if ((head == NULL) || (head->next == NULL))
    return head;
  q = NULL; p = head;
  while (p-> next !=NULL)
  {
    q = p;
    p = p->next;
  }
  return head;
}
```

```
a. q = NULL; p->next = head; head = p;
```

- b. q > next = NULL; head = p; p > next = head;
- c. head = p; p->next = q; q->next = NULL;
- d.  $q\rightarrow next = NULL$ ;  $p\rightarrow next = head$ ; head = p
- 11. Inserting an item into the stack when stack is not full is called ...... operation and deletion of item form the stack, when stack is not empty is called ...... operation.
  - a. push, pop

c. insert, delete

b. pop, push

d. delete, insert

12. When new data is to be inserted into a data structure, but there is no available space; this situation is usually called ....

a. Underflow

c. houseful

b. overflow

d. saturated

13. Which of the following is an application of stack?

a. finding factorial

c. infix to postfix conversion

b. tower of Hanoi

d. all of the above

14. The data structure which is one ended is ......

a. queue

b. stack

c tree

d. grap

15. User perform following operations on stack of size 5 then - push(1); pop(); push(2); push(3); pop(); push(4); pop(); pop(); push(5); at the end of last operation, total number of elements present in the stack are -

a. 2

b. 3

c. 1

d. 4

			Answers:		
10	11	12	13	14	15

16. What is the functionality of the following piece of code?

```
void f2(int n, Node * Head)
{
    Node *p, *q;
    p = Head;
    if (!Head)
        return;
    else
    {
        for(int i=1; i < n; i++)
        {
            q = p;
            p = p->Next;
        }
        q->Next = p->Next;
        delete p;
    }
}
```

- a. Find and delete an element at a specific position in the list
- b. Find and return the given element in the list
- c. Find and return the position of the given element in the list
- d. Find and insert a new element in the list
- 17. The following function can be used to delete the whole list

```
void destroy(Node* Head)
{
    Node *p = Head;
    Node * q;
    while(p!=NULL)
    {
        q = p->Next;
        delete p;
        p = q;
    }
    Head = NULL
}
```

In which order the list nodes are deleted?

- a. From the beginning of the list to its end
- b. Starting from the last node till reaches the first
- c. Deletion happens randomly
- d. None of the above.

	Answers:	
16	17	



امتحان نصف الفصل د/جابرالابيض	رسم العناصر و الدوائر الإلكترونية (الفرقة الأولى)	
زمن الامتحان: ٣٠ دقيقة	تاريخ الامتحان ٥ / ١ ١ / ٢ ٠ ١	\$200,000 \
الدرجة:	اسم الطائب:	جامة النوفية كلية الهندسة الإلكترونية بمنوف
فصل رقم :	توقيع الطالب:	كيية المتناسة الإنجازونية بمنوت

فصل رقم :	توقيع الطالب:	
	بدقة :	ارسم ما يلي مع وضع البيانات
مقاومة كربونية.	مطبوعة أحادية الجانب النحاسي، قطاع كامل، مثبت عليه	ارسم المسقط الرأسي للوح دائرة
، مقاهمة كربونية بتوصيل الفتحة	مطبوعة ثنائي الجانب النحاسي، قطاع كامل، مثبت عليه	ارسد المسقط الرأسي لله ح دائرة
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ضع علاه	مة صح على الإجابة المناسبة:	
1	طبقة النحاس الأساسية Base Copper الملتصقة على	اللوح المطبوع هي
	أ- الطبقة النحاسية قبل تشكيلها	ب- الطبقة النحاسية بعد تشكيلها
	ج- الطبقة النحاسية و اللوح العازل	د- لا يوجد إجابة صحيحة
۲	النموذج الأولي Prototype لأي دائرة أو جهاز هو	
	أ- نواة تصميم أى خط انتاج	ب- الخطوات الأولى لوضع استراتيجية التصنيع
	<ul> <li>ج- دراسة خطوات التصنيع الأولى لجهاز</li> </ul>	د- كل ما سبق
٣	Wire الأيقونة	
ī	أ- تعتبر كائن رسومي في نافذة المكتبة	ب- تعتبر توصيل كهربي في نافذة تخطيط اللوح
	ج- كل ما سبق	د- لا يوجد إجابة صحيحة
٤	الرمز Symbol هو التمثيل البياني للعنصر المستخدم.	<u>.</u>
	أ- لوح الدائرة المطبوعة Layout	ب-
	ج- رسم العناصر على ظهر اللوح المطبوع	د- جميع الإجابات السابقة.
0	الدائرة التخطيطية Schematic هي الدائرة التي	
	أ- يمكن قراءة مواصفات العناصر كاملة	ب- يمكن قراءة الوظيفة من خلالها
	ج- يمكن قراءتها من اليمين لليسار	د- تعبر عن مراحل و وحدات الدائرة
٦	لوح الدائرة المطبوعة يطلق عليه بالإنجليزية	
	Printed Circuit Board -1	ب- Printed Wiring Board
	Layout - <sub>ج</sub>	د- كل ما سبق

		لامة صح على الإجابة المناسبة:	ضعع
هذه الأيقونة تقوم:	۲	الْتُنْتُفُ هذه الأيقونة تقوم:	١
<ul> <li>أ- بتغيير الخواص في الكائن الرسومي</li> <li>ب- بصيانة الكائن الرسومي</li> </ul>		<ul> <li>أ- بتثقيب اللوح المطبوع</li> <li>بإعداد خواص الشبكة البيانية</li> </ul>	
- ج- بفك و ربط نقاط الوصل بالرسم		ب باعداد خواص السبك البيانية ج- كل ما سبق	
هذه الأيقونة تقوم:	٤	هذه الأيقونة تقوم :	- "
<ul> <li>أ- بمبادلة طرفى العنصر</li> <li>ب- بتوسيع المسافة بين طرفى العنصر</li> </ul>		أ- بسحب البوابات الإلكترونية	
ج- بتوصيل طرفى العنصر		<ul> <li>ب- بإضافة عناصر إلى مساحة الرسم</li> <li>ج- بتحريك العناصر على الرسم</li> </ul>	
مده الأيقونة تقوم :	٦	هذه الأيقونة تقوم :	0
أ- برسم الوصلات في محرر تخطيط اللوح		أ- بتصغير أو تكبير الرسم	
ب- برسم الوصلات في المحرر التخطيطي		ب- بتحريك أى كائن رسومي ج- كل ما سبق	
ج- كل ما سبق		ج- کل ما سبق	

رمرا لعد المادة: رسم العناصر والدوائر الالكترونية الزمن ساعة عدد صفحات الأسئلة: (٢) الدرجة العظمى: (٢٠ درجة)

17



كلية الهندسة الإلكترونية بمنوف امتحان نصف الفصا، الدراسي ألأول الفرقة: الاولي تاريخ الامتحان: ٥/ ١١/ ٢٠١٩

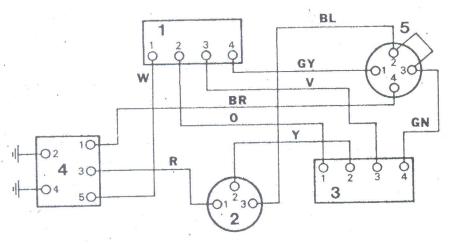
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فصل رقم:	 الطالب:	اسىم

## أجب عن الأسئلة الآتية: (Free Hand)

السؤال الاول: (١٠درجات)

اكتب أسماء الرموز التالية:				ارسم رموز المكونات التالية:			
	<b>B</b>		$\forall$	e.			
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	<del>_</del>	,	***				
			*			,	

### ٢ - أرسم مخطط توصيل للشكل التالي بنظام ألخط الأساس (Baseline). (١٠ درجات)



الفرق إلى مسلم ١٩١٠):

#### PART II

All questions have the same weight of marks

#### **ANSWER THE FOLLOWING QUESTIONS**

- Q1 :a) For a certain diode  $I_o = 2x \ 10^{-14} \ A$  at 17 C°. Calculate  $I_d$  at 47 C° if  $V_d = 0.7 \ V$ .
  - b) A certain diode has a rated power of 2 W  $\,$  At 25 C $^{\circ}$  . Find the diode power at 75 C $^{\circ}$  If the power derating factor is 0.005 W /C $^{\circ}$ .
- Q2: For each circuit of fig.(1) find the output voltage Vo and the current in each diode.

