الفرقة الثانية

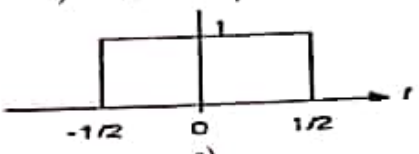
Acd. Year:	2017/2018	Menoufia University			
Semester:	2nd	Faculty of Electronic Engineering			
Year:	second	General			
Time of part one :	1.5 H	Course Title:	Communications Engineering		Part ONE
Examiners:	Prof. Abd-Elnaser A. Mohamed	Date:	24 /5/ 2018	Course Code:	

Final Term Exam

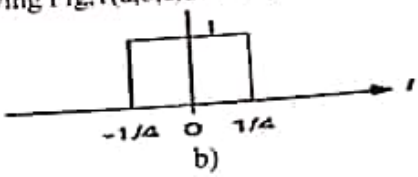
Answer The Following Questions — No. of questions: 3 — ***(10 Marks)***

Question 1

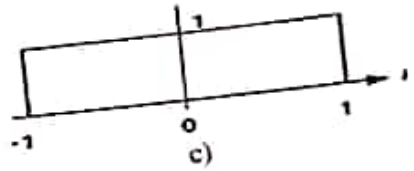
a) Write the equation of following Fig.1(a,b,c,d and e)



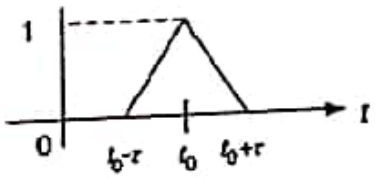
a)



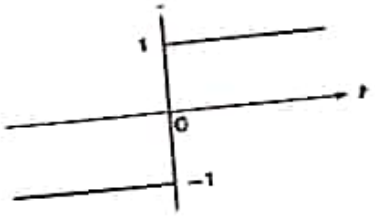
b)



c)



d)



e)

Fig.1(a,b,c,d and e)

b) Find the F.T of the following: i) Unit step, u(t) ii) Unit impulse, ô(t) ***(10 Marks***

Question 2

a) $Sinc(2\pi Wt) \leftrightarrow \frac{1}{2W}\Pi\left[\frac{\omega}{2\pi(2W)}\right]$ using the duality theorem to find F.T

b) Using the modulation theorem to find the F.T of the Fig.(2

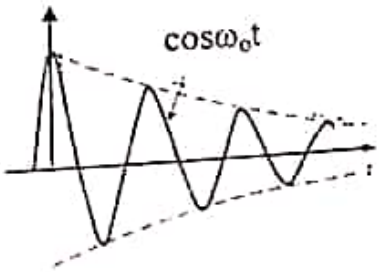


Fig.2

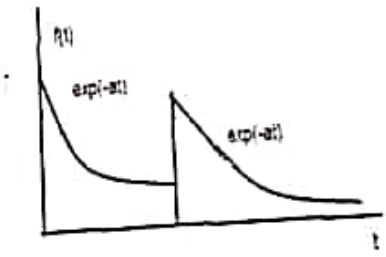


Fig.3

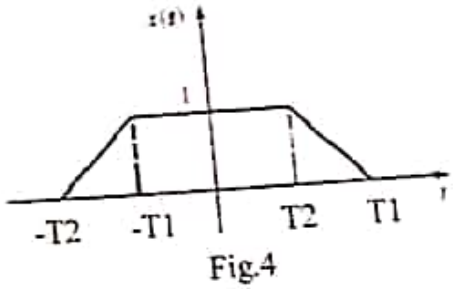


Fig.4

(10 Mark

Question 3

a) Find F.T of the Fig.3

b) From the Fig.4 . Find the following:

i) $F(\omega)$, ii) $\lim_{T2\to T1} F(\omega)$, iii) $\lim_{T1\to 0} F(\omega)$

Total marks: 30

With my best wishes and regards

Scanned by CamScanner

20. In a employee table to include the attributes whose value always have some value which of the following constraint must be used ?
a) Not null b) Null c) Unique d) Distinct

21. An entity set that does not have sufficient attributes to form a primary key is termed a ___
a) Strong entity set b) Weak entity set
c) Variant set d) Variable set

22. Weak entity set is represented as
a) Underline b) Double diamond
c) Double line d) Double rectangle

23. Which one of the following is used to define the structure of the relation ,deleting relations and relating schemas ?
a) DML(Data Manipulation Language)
b) DDL(Data Definition Language)
c) Relational Schema
d) Query

24. Insert into employee ____ (1002,Joey,2000); In the given query which of the keyword has to be inserted ?
a) Table b) Values c) Field d) Relation

25. Which of the following can be a multivalued attribute ?
a) Phone_number b) Name
c) Date_of_birth d) All of the mentioned

26. The total participation by entities is represented in E-R diagram as
a) Double line b) Dashed line
c) Double rectangle d) Circle

27. Which of the following gives a logical structure of the database graphically ?
a) Entity-relationship diagram b) Entity diagram
C) Architectural representation
c) Database diagram

28. The attribute name could be structured as a attribute consisting of first name, middle initial, and last name. This type of attribute is called
a) Composite attribute b) Simple attribute
c) Multivalued attribute d) Derived attribute

29. Key to represent relationship between tables is called
a) Primary key b) Foreign Key
c) Secondary Key d) None of the mentioned

30. Schema is usually stored in_____.
a) Tables b) Data Dictionary
c) Both d) None of these

31. What is a relationship called when it is maintained between two entities?
a) Unary b) Binary c) Ternary d) Quaternary

32. Which is not the feature of database:
a) Independence b) Data redundancy
c) Flexibility d) Data Integrity

33. _____is the attribute or group of attributes that uniquely identify occurrence of each entity.
a) Super Key b) Foreign key
c) Primary Key d) All of these

34. Which level of database is viewed by user:
a) Internal level b) Conceptual Level
c) External Level d) All of these

35. Internal level has:
a) Individual Users View of the database
b) Community view of the database
c) Physical Representation of the database
d) All of these

36. Which person is responsible for overall activities for database:
a) Database designer b) Database manager
c) Database analyst
d) Database Administrator

37. DML language is used to:
a) Define schema b) Define internal level
c) Access Data d) All of these

38. Which is the most popular database model:
a) Network Model b) Hierarchical Model
c) Object Oriented d) Relational Model

39. In relational database records are called:
a) Attributes b) Entity c) Relations d) Tuples

40. _____is the information about data.
a) Data b) Entity c) Relations d) Meta-Data

Scanned by CamScanner

Answer the Following Two Questions:

Question One **Choose the correct answer** **(20 Marks)**

1. A relational database consists of a collection of
a) Tables b) Fields c) Records d) Keys

2. The term _____ is used to refer to a row.
a) Tuple b) Attribute c) Field d) Instance

3. For each attribute of a relation, there is a set of permitted values, called the _____ of that attribute.
a) Domain b) Relation c) Set d) Schema

4. The term attribute refers to a _____ of a table.
a) Column b) Record c) Tuple d) Key

5. A _____ in a table represents a relationship among a set of values.
a) Column b) Row c) Key d) Entry

6. A ____ indicates an absent value that may exist but be unknown or that may not exist at all.
a) Empty tuple b) Null value
c) New value d) Old value

7. To remove a relation from an SQL database, we use the _____ command.
a) Delete b) Drop table c) Remove d) Purge

8. Using the _____ clause retains only one copy of such identical tuples.
a) Null b) Distinct c) Not null d) Unique

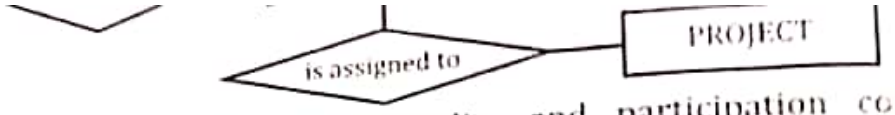
9. The tuples of the relations can be of _____ order.
a) Same b) Sorted c) Any d) Constant

10. A domain is atomic if elements of the domain are considered to be _____ units.
a) Different b) Constant c) Indivisbile d) Divisible

11. A _____ integrity constraint requires that the values appearing in specified attributes of any tuple in the referencing relation also appear in specified attributes of at least one tuple in the referenced relation.
a) Referencing b) Specific c) Referential d) Primary

12. Course(course_id, sec_id, semester)
Here the course_id, sec_id and semester are _____ and course is a _____
a) Relations, Attribute b) Tuple, Relation
c) Attributes, Relation d) Tuple, Attributes

Scanned by CamScanner



a. Modify the ER-diagram showing the cardinality and participation constraints according to the following rules: [8 Marks]

- A department employs many employees, but each employee is employed by one department.
- Some employees are not assigned to any department.
- A division operates many departments, but each department is operated by one division
- An employee may be assigned to many projects, and a project may have many employees assigned to it.
- A project must have at least one employee assigned to it.
- One of the employees manages each department, and each department is managed by only one employee.
- One of the employees runs each division, and each division is run by only one employee.

b. Map the modified ER-diagram into the corresponding relational database schema (assume some attributes to each entity). [6 Marks]

Question Three [20 Marks]

Consider the following Company relational database schema:

EMPLOYEE

Scanned by CamScanner

a. **Specify the following queries in SQL:** (9 Marks)

1. Retrieve the names of all employees in department 5 who work more than 10 hours per week on the ProductX project.
2. List the names of all employees who have a dependent with the same first name as themselves.
3. Find the names of all employees who are directly supervised by 'Franklin Wong'.

b. **Specify the following updates. Specify if any of each may violate the integrity constraints (key, entity integrity, or referential integrity)** (10 Marks)

1. Insert <'Production', 4, '943775543', '2007-10-01'> into DEPARTMENT.
2. Insert <'677678989', NULL, '40.0'> into WORKS_ON.
3. Delete the WORKS_ON tuples with Essn = '333445555'.
4. Delete the PROJECT tuple with Pname = 'ProductX'.
5. Modify the Mgr_ssn and Mgr_start_date of the DEPARTMENT tuple with Dnumber = 5 to '123456789' and '2007-10-01', respectively.
6. Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '999887777' to '943775543'.

تمنياتي لكم بالتوفيق والنجاح

د/محمد بدوي

Scanned by CamScanner

Answer the following questions:

Part – 2:

Question-1: *Put True (√) or False (×) signs for the following expressions:* [5 Marks]

a) Synchronous machines are motors and generators whose magnetic field current is supplied by a separate dc power source.

b) The voltage in any real machine will depend on three factors are the flux in the machine, the speed of rotation, and field current.

c) The electric frequency is smaller than the mechanical speed.

d) The number of conductors in each slot is given by the equation $n_c = N_C \sin \alpha$.

e) In ac machines under normal operating conditions, there are two magnetic fields present- a magnetic field from the rotor circuit and another magnetic field from the stator circuit.

f) The losses that occur in ac machines can be divided into four basic categories: Electrical or copper losses, Core losses, Mechanical losses, and Stray load losses.

g) Speed regulation (SR) is a measure of the ability of a generator to keep a constant voltage at its terminals as load varies.

h) Slip rings and brushes do not increase the amount of maintenance required on the machine.

i) Armature reaction is caused the difference between E_A and V_ϕ in a synchronous generator.

j) Machines are called induction machines because the rotor voltage is induced in the rotor windings rather than being physically connected by wires.

Scanned by CamScanner

Answer all the following questions: (35 degrees)

Question 1: complete the following (5 degrees):

1. There are several attributes of technical writing such as ……, ……, ……, ……, and ……
2. The abstract should contain four elements ……, ……, ……, and ……
3. The generic steps in a failure analysis study are …… , ……, ……, and ……
4. Presentation includes all factors such as ……, ……, ……, and ……
5. The language skills have to do with conformance to the rules are ……, ……, ……. and ……
6. The elements of style are ……, ……., and ……
7. The three categories of illustrations used in technical documents are ……, ……, and ……
8. Reasons for Using Illustrations are ……, ……, and ……
9. The basic ingredients of an introduction are ……, ……, ……, and ……
10. The basic elements of the report body are ……, ……, and ……

Scanned by CamScanner

University	: Menoufia		Date : 31/5/2018
Faculty	: Electronic Engineering		Time : 2 Hours
Department	: Computer Sci & Eng		No. of pages : 3
Academic level	: 2nd Year		Full Mark : 35 Marks
Course Name	: Technical Writing		Exam : Final-Term Exam
Course Code	: UR 227		Examiner : Dr. Mohamed Moawed

Answer all the following questions: (35 degrees)

Question 1: complete the following (5 degrees):

1. There are several attributes of technical writing such as ....., ..., ..., and .....
2. The abstract should contain four elements ....., ..., ..., and .....
3. The generic steps in a failure analysis study are ..... , ..., and .....
4. Presentation includes all factors such as ....., ..., ..., and .....
5. The language skills have to do with conformance to the rules are ....., ... and .....
6. The elements of style are ....., ..., and .....
7. The three categories of illustrations used in technical documents are ...., and .....
8. Reasons for Using Illustrations are ....., ..., and .....
9. The basic ingredients of an introduction are ....., ..., and .....
10. The basic elements of the report body are ....., ..., and .....

Question 2: choose the correct Answer (10 degrees):

1. The verb that is probably associated with factual statements **(Suggested – Thou Invented – Appear)**
2. In the Formal technical reports, the procedure means **(what happened - what result - what was learned - what you did)**
3. A plan or strategy for writing is **(abstract – introduction – outline – purpose)**
4. Table of Contents usually found in **(articles – email – informal report - thesis)**
5. A tabulated listing of the variables and their units that will be used in the docu **(nomenclature – references – outline – sections)**
6. The process of gathering facts that can be used to make business decisions is **Analysis - Feasibility Study - Develop Something New - Research a Mechanism**
7. The objective is determined by **(sponsor – reader – government – scientists)**

Scanned by CamScanner

University	:	Menoufia		Date	: 28/05/2018
Faculty	:	Electronic Engineering		Time	: 3 Hours
Department	:	Electronics & Electrical Communications		No. of pages	: 1
Academic level	:	2nd Year		Full Mark	: 45 Marks
Course Name	:	Electronic circuits		Exam	: Final Exam
Course Code	:	ECE 223		Examiner	: Dr: A. I. Bahnacy

(يرجاء إجابة الجزء الاول من الناحية اليمنى والجزء الثانى من الناحية اليسرى فى كراسة الإجابة)

PART 1

Answer all the following questions :

Question No 1 : (15 Marks)

1-a- What is meant by class A amplifier?.
Show that its maximum efficiency is 25%. (5 Marks)

1-b- Determine the following values for the amplifier shown in Fig.1 when operated With maximum possible output signal:

i- Minimum transistor power rating.
ii- AC output power
iii- Efficiency (10 Marks)

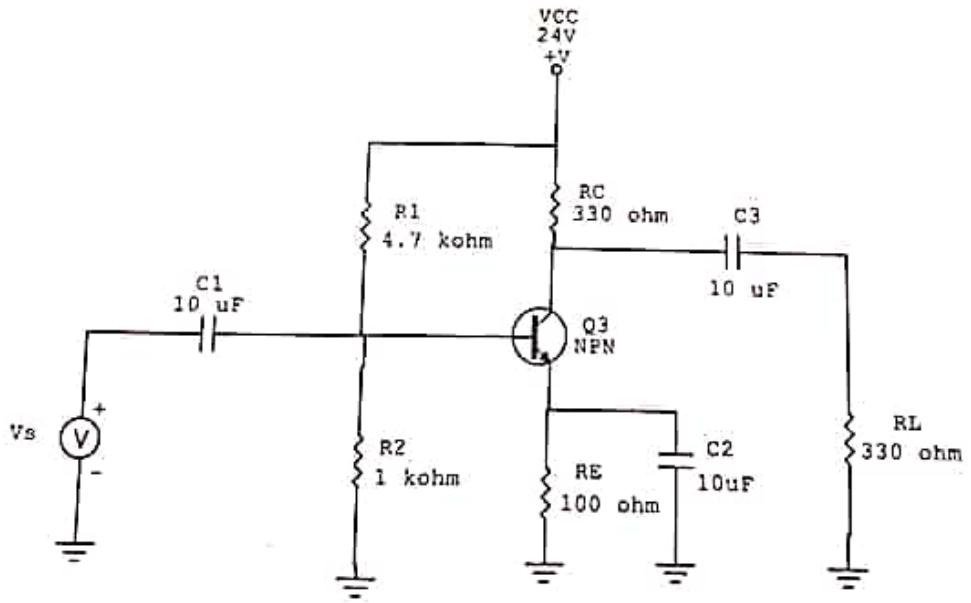


Fig. 1

من فضلك اقلب الورقة

Scanned by CamScanner

14. There is no numerical rule on the number of sentences or words in a paragraph
15. Newspapers and magazines less interesting than insurance policy.
16. A photo of equipment with an operator is less interesting than just a photo of machinery.
17. Using odd-scale increments better than even-scale
18. There may be multiple purposes and objectives in a single report.
19. Interpretation and explanation of results is done in the result section of a report.
20. The discussion is the place to compare your results with the work of others.

Question 3 Answer the following (8 degrees):

1. What are the major types of technical writing?
2. What does the Technical Content of the technical document consists of?
3. What is the difference between active and passive sentences? Convert the next passive sentence to active: "**The exam was solved on May 31**".
4. What are the reasons of adding derails to the procedure?

Question 3 Answer the following (2 degrees):

If you asked to write a report about the problem of about the problem of **improvement the quality of education.**

What are the common components of this Report?

With my best w

Scanned by CamScanner

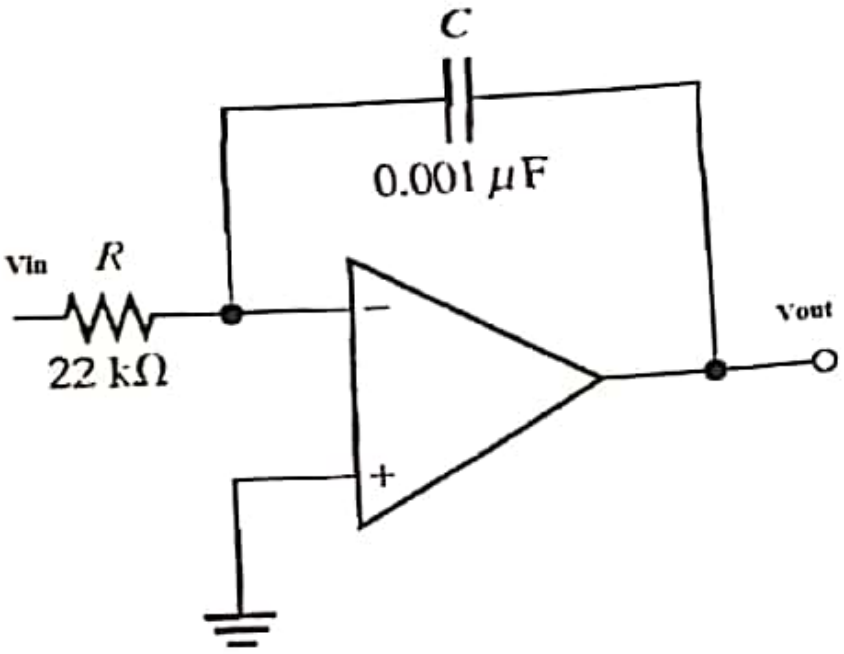
10 Marks

Question No 2

2-a) Find the relation between the output voltage V_{out} and input voltage V_{in} for Op-Amp integrator given below. What is the value of Z_{in} of the given circuit.

2-b) Replace the integrator R in Figure with one that uses a switched-capacitor with a capacitance value of 2200 pF to emulate the resistor. Draw the new circuit and specify the frequency at phase which the capacitor must be switched.

2-c) Draw a simplified CAB block diagram.



10 Marks

Question No. 3

3-a) Compare between linear and logarithmic signal compression discussing who is better. Then, draw and discuss a circuit that work as logarithmic amplifier.

3-b) An input signal Vi(t) is applied to C and R circuit that are connected in series. V_o (t) is taken across the resistor R. Find $V_o(\omega)/ V_i(\omega)$ in general. Then, draw the frequency response of the given circuit showing the cutoff frequency fc. Also, derive the conditions that force the given circuit to works as a differentiator.

10 Marks

Question No. 4

4-a) A 555 timer is configured to run in the astable mode oscillator with V_{cc} = 15 V, R1 = 4.0 kΩ and R2 = 8.0 KΩ and C_{ext} = 0.040 μF. Calculate T_H,T_L, T, Duty cycle D and the output frequency f_r Then, draw the voltage across the external capacitor c_{ext} discussing in detail the values of its minimum and maximum & the output voltage of the oscillator.

4-b) Draw and discuss the block diagram of a phase-locked loop PLL. What is the difference between physical meaning of the lock range and the capture range of the PLL. What are the basic conditions for PLL to acquire lock. If a frequency modulated FM signal is applied to the input of the PLL circuit what will be the PLL output. What will be the output of the VCO part of the PLL if a sinusoidal signal is applied to its input. Derivation of equations are not required.

توقيع أستاذ المادة :

مع أطيب التمنيات بالتوفيق

Scanned by CamScanner

(يرجاء إجابة الجزء الأول من الناحية اليمنى والجزء الثاني من الناحية اليسرى في كراسة الإجابة)

PART 1

Answer all the following questions :

Question No 1 : **(15 Marks)**

1-a- What is meant by class A amplifier?.
Show that its maximum efficiency is 25%. (5 Marks)

1-b- Determine the following values for the amplifier shown in Fig.1 when operated With maximum possible output signal:

i- Minimum transistor power rating.
ii- AC output power
iii- Efficiency (10 Marks)

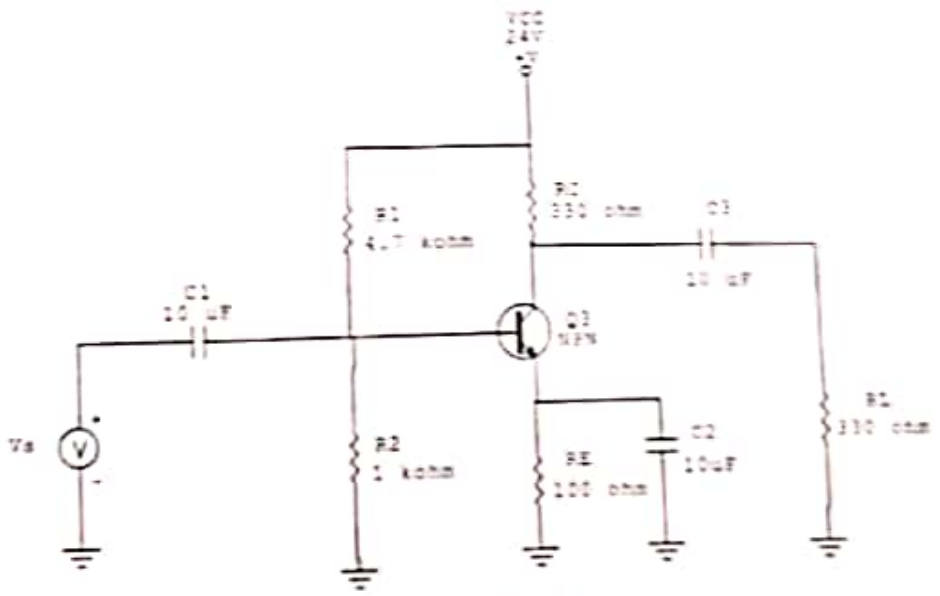


Fig. 1

من فضلك اقلب الورقة

Scanned by CamScanner

الفرقة الثانية

University : Menoufia Faculty : Electronic Engineering Department : Electronics and Electrical Communication Academic level : Second Year Course Name : Communications Engineering Course Code : ECE 222		Date : 24/5/2018 Time : 3 Hours No. of pages : 1 for Part 2 Full Mark : 70 Marks Exam : Final Exam Examiner : Dr: Mohammed Abd-Elnaby	

* برجاء أجابة هذا الجزء من يسار ورقة الأجابة

Question 1: (20 Marks)

a) For ordinary amplitude modulation (AM)
   i) Write the time domain and frequency domain equations for AM signal.
   ii) Explain the demodulation process.
   iii) Define the overmodulation distortion.

b) For single sideband (SSB) modulation
   i) Write the time domain equation for SSB signal $X_{SSB}(t)$.
   ii) Explain the frequency discrimination method for SSB signal generation.
   iii) Explain the demodulation process of SSB signal.

c) How many single sideband (SSB) stations can be accommodated in a 300 KHz bandwidth if the highest modulating signal frequency f_{max} is 25 KHz?

d) An AM signal has a power at its carrier frequency (P_C) of 150 W. determine the power transmitted at each of the sidebands (P_{USB}, P_{LSB}) when the modulation factor is 0.75?

Question 2: (20 Marks)

a) Write the time domain equation for phase modulated (PM) signal and drive the equation of the instantaneous frequency ω_i.

b) Sketch the block diagram for narrowband frequency modulated (NBFM) signal generation.

c) Prove that $X(t)=A\cos(\omega_c t) - A\Phi(t)\sin(\omega_c t)$ for narrow band (NB) angle modulated signal.

d) For FM signal having a frequency deviation of 90 KHz, compute the bandwidth and the highest and lowest frequencies (f_H, f_L) when the modulating signal frequency is 20 KHz and the carrier frequency is 10 MHz.

e) Explain the demodulation of angle modulated signals (FM and PM signals) using frequency discriminator.

Best wishes. (Assoc. Prof. Mohammed Abd-Elnaby)

Scanned by CamScanner

Answer the following four questions **15 Marks**

Question No. 1

1. When negative feedback is used, the gain-bandwidth product of an op-amp
(a) increases (b) stays the same (c) fluctuates. (d) decreases
2. If the voltage gain for each input of a summing amplifier with a 4.7 kΩ feedback resistor is unity, the input resistors must have a value of
(a) 4.7 kΩ divided by the number of inputs. (b) 4.7 kΩ. (c) 4.7 kΩ times the number of inputs.
3. The output of an Op-Amp differentiator is proportional to
(a) the RC time constant. (b) the rate at which the input is changing.
(c) the amplitude of the input (d) answers (a) and (b).
4. The common-mode rejection ratio (CMRR) is a measure of an op-amp's ability to.....
5. Slew rate is the rate in .... at which the output voltage of an op-amp can change in response to.....
6. Why the phase shift oscillator uses three RC sections that gives 180° total phase shift?.
7. For an oscillator to properly start, the gain around the feedback loop must initially be
(a) less than 1 (b) greater than 1 (c) 1 (d) equal to β.
8. In a Wien-bridge oscillator, if the value of the resistances in the positive feedback circuit is decreased, the frequency (a) decreases (b) increases (c) remains the same.
9. An oscillator converts a) AC input energy to AC output energy.
b) DC input energy to DC output energy. c) DC input energy to AC output energy.
10. Draw the output of an Op-Amp differentiator due to an input square wave input signal.
11. The reason behind that Field Programmable Array FPAA uses emulated resistors that uses switched capacitor technology instead of using real resistors is that.....
12. During reprogramming of an FPAA running in a system, the first memory into which reconfiguration data are stored is the
(a) configuration RAM (b) look-up table (c) main memory (d) shadow RAM
13. A typical setup for programming Field Programmable Array FPAA must include
(a) a computer, an FPAA chip on a development board, development software, a standard interface, and a bezel tester.
(b) a computer, an FPAA chip on a development board, development software, and a standard interface to connect the computer and development board.
(c) a computer, an FPAA chip on a development board, development software, and a signal generator.
14. For best results, you should implement the software design of an analog circuit in an FPAA by
(a) selecting appropriate CAMs, interconnecting them to each other and to inputs and outputs, and downloading to the FPAA.
(b) selecting appropriate CABs, interconnecting them to each other and to inputs and outputs, running a simulation, downloading to the FPAA if the simulation is successful, and testing the FPAA.
(c) selecting appropriate CAMs, interconnecting them to each other and to inputs and outputs, running a simulation, and downloading to the FPAA if the simulation is successful.
15. In a switched-capacitor circuit, the 1000 pF capacitor is switched at a frequency of 10 kHz. What resistor value is emulated?.

مع أطيب التمنيات بالتوفيق

Scanned by CamScanner

Question No 2: **(15 Marks)**

2-a-What is meant by cross over distortion in class B push-pull amplifier?.
Describe one method to overcome this distortion.
Clarify your answer with drawing. (7 Marks)

2- b- A class C amplifier is driven by 200 KHz signal. The transistor is on for 1μs and the amplifier is operating over 100% of its load line. If I_{Csat}=100mA and V_{CEsat} = 0.2V, what is the average power dissipation?. If V_{cc}=24V and the equivalent resistance of the tank circuit R_C=100Ω, determine the maximum ac output power and the efficiency. (8 Marks)

Question No 3 : **(15 Marks)**

3-a- What is meant by:-
Amplifier frequency response – Critical frequency – Voltage gain roll off (6 Marks)

3-b-Determine the high critical frequency of the input and output RC circuit for the FET amplifier in Fig.2. Which RC circuit is dominant?.
Draw the Bod plot showing the total high frequency response.
Ciss = 8 pF, C rss = 5 pF, and gm = 7500 μS. (9 Marks)

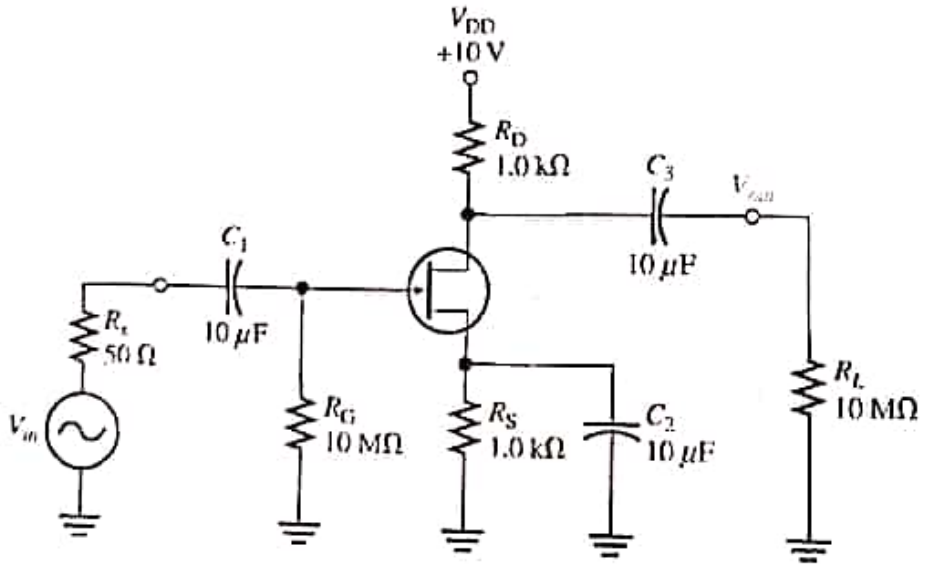


Fig. 2

مع أطيب الامنيات بالنجاح والتفوق

Scanned by CamScanner

8. The most important document that you can write in many industries is **(formal report – patent - Informal report – letters)**
9. The documents that concern temporal matters, and they are considered to be transient documents **(formal report – patent - Informal report – papers)**
10. A technical document is said to be good if it has **(unclear Purpose – plagiarism – bias – cite to other work)**
11. A technical document is said to be good if it has **(statistics – several acronym – unknown source – plagiarism)**
12. **(Bias – Purpose – plagiarism – Acronym)** is imposing a personal opinion or proclivity in your writing
13. Utility words such as **(verbs – but – nouns – adjectives)**
14. "et al." means **(in the same place - and others - that is - and so forth)**
15. The big word of "therefore" can be replaced with short word **(Also – try – use – so)**
16. **(Illustration - Graphs - Charts - Resolution)** is expressed in terms of pixels
17. Helpful illustrations for documents relating to project management **(Schematics – Histograms - Clip art – Timeline)**
18. Good illustration to show the distribution of a large amount of data **(Schematics – Histograms - Clip art – Timeline)**
19. **(Lower case – Roman numbers - Capital letters - Numbers)** can be used for C heads.
20. The **(abstract – results – introduction – procedure)** presents the reader with the five "Ws" of writing: who, what, where, when, and why.

Scanned by CamScanner

	Acd. Year:	2017/2018	Menoufia University			
	Semester:	2nd	Faculty of Electronic Engineering			
	Year:	second	General			
	Time of part one :	1.5 H	Course Title:	Communications Engineering		
	Examiners:	Prof..Abd-Elnaser A. Mohamed	Date:	24 /5/ 2018	Course Code:	Part ONE
	Final Term Exam					
Answer The Following Questions				No. of questions: 3		

Question 1 ***(10 Marks)***

a) Write the equation of following Fig.1(a,b,c,d and e)

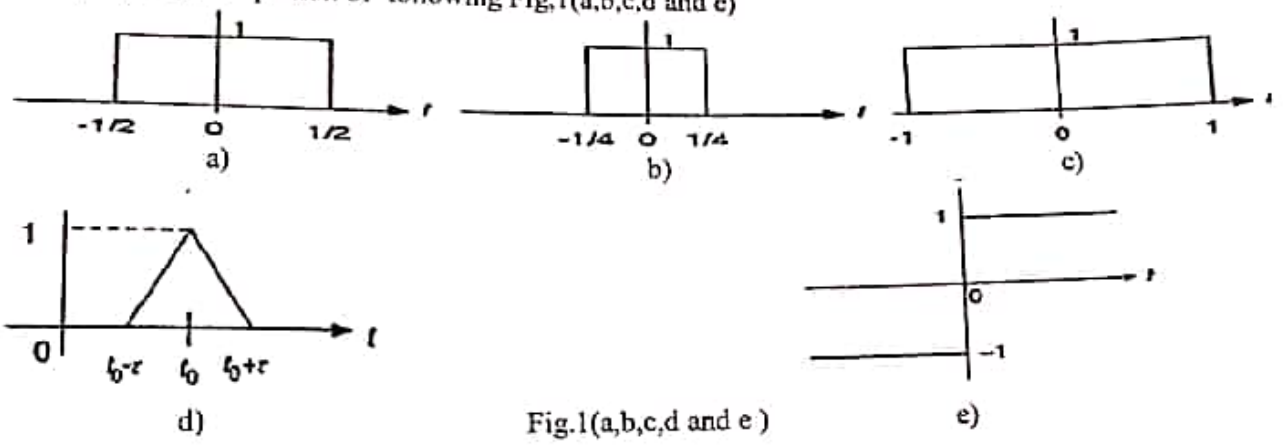


Fig.1(a,b,c,d and e)

b) Find the F.T of the following: i) Unit step, u(t) ii) Unit impulse, ô(t)

(10 Marks

Question 2

a) $Sinc(2\pi Wt) \leftrightarrow \frac{1}{2W}\Pi\left[\frac{\omega}{2\pi(2W)}\right]$ using the duality theorem to find F.T

b) Using the modulation theorem to find the F.T of the Fig.(2

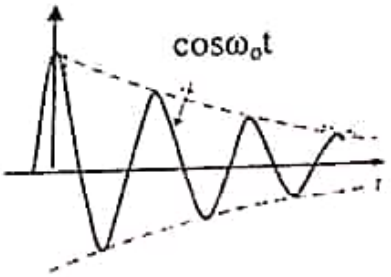


Fig.2

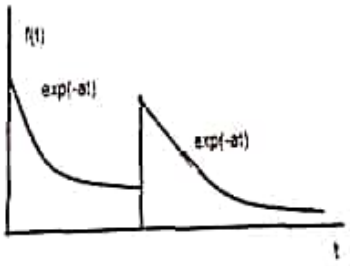


Fig.3

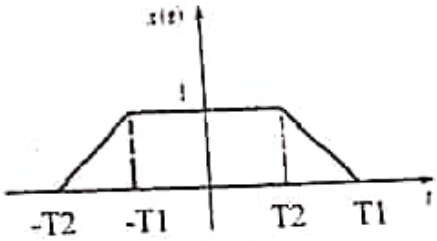


Fig.4

(10 Mark

Question 3

a) Find F.T of the Fig.3

b) From the Fig.4 . Find the following:

i) $F(\omega)$, ii) $\lim_{T2\to T1} F(\omega)$, iii) $\lim_{T1\to 0} F(\omega)$

Total marks: 30

With my best wishes and regards

Scanned by CamScanner

Menoufia University
Faculty of Electronic Engineering
2nd year. 1st Term Exam.
Very large scale Integrated Circuit Technology
Time allowed: 3 hours
Prof.Dr. Hossam Ahmed

10-1-2018

ANSWER ALL QUESTIONS:

1- a) Remembersthe six processes for planar technologyofbipolar junction transistor (BPJ)?(Remember the points don't Explain).

b) Define lithography processes and explain the steps of Photo lithography processesuse the color in your explained drawingboxes?

2-For each of the two transistors cases (a,b) below, find the NMOS drain current I_D. Use the followingparameters:

$V_{T0} = 0.5V, \gamma = 0.2\ V^{1/2}$, $\lambda = 0.05\ V^{-1}$, $|2\phi_f| = 0.52V$; $k'_n = 80\ \mu A/V^2$, $(W/L)_n = 20$

a. V_D=3V, V_{Ga}=3V, V_{Sa}=1V, V_{Bl}=1V
b. V_D=3V, V_{Gb}=4V, V_{Sb}=1V, V_{Bl}=0 V

3- Calculate thresholdvoltage V_{to} at V_{SS}=0 for the polysilicon gate.
Given the following parameters, p-substrate $N_A = 10^{16}\ cm^{-3}$, polysilicon gate doping concentration $N_D = 10^{16}\ cm^{-3}$, intrinsic concentration of Si, $ni = 1.45 \times 10^{10}\ cm^{-3}$, gate oxide thickness t_{ox} =500 Å, oxide charge density $N_{ox} = 4 \times 10^{10} cm^{-2}$, and

$\varphi_{F(Gate\ polysilicon)} = -0.55$ V.

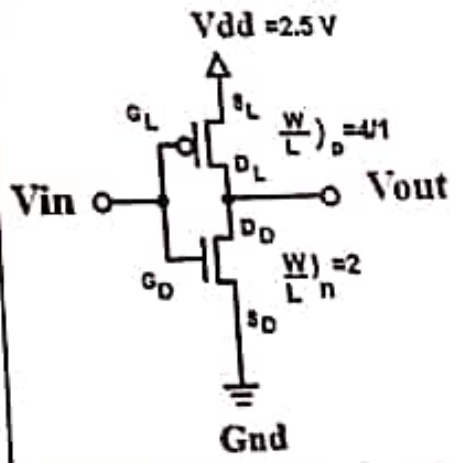
4- Consider a static CMOS inverter with the following parameters. Assume all transistors fabrication channel length L=0.25 um (to have λ scale),

V_{dd}=2.5V,V_{Tn}= 0.5V ,V_{Tp}= 0.5V ,λ= 0, kn= 100 μA/V², kp= 50 μA/V² ,

a-Calculate: VOH, VOL, VIL, VM By the help of define operation points on Current Voltage charactristic curve and voltage transfer curve?

b- Calculate Nominal Low Voltage

c-Draw the stick Diagram and the Layout Diagram?



Scanned by CamScanner

University	:	Menoufia		Date	: 14/01/2018
Faculty	:	Electronic Engineering		Time	: 3 Hours
Department	:	Electronics and Electrical Comm.		No. of pages	: 1
Academic level	:	2nd Year		Full Mark	: 70 Marks
Course Name	:	Static Field Theory		Exam	: Final Exam
Course Code	:	ECE 214		Examiner	: Dr: Ahmed I. Bahnacy

برجاء اجابة الجزء الاول من الناحية اليمنى والجزء الثاني من الناحية اليسرى في كراسة الاجابة

Part I

Answer all the following questions :

Question No 1(11 Marks) :

1- a - For the scalar function $f=x^2 y^2 z^2$, Evaluate ∇f and $\nabla^2 f$ at the point P(4,5,6) and verify that $\nabla \times \nabla f = 0$. (5 Marks)

1-b- Determine the electric field intensity E at the point P(2,2,2) produced by two point charges, Q_1= 3nC located at the point P_1(1,1,0) and Q_2=4nC located at the point P_2(1,-1,0). (6 Marks)

Question No 2 (12 Marks):

2-a-Using Gauss's law determine the electric field intensity E of a uniform line charge of linear charge density ρ_L lying along z axis and extending from z=- ∞ to z= ∞. Calculate the value of E at a radial distance ρ=2m from the line charge when ρ_L =30nC/m . (6 Marks).

2-b- Derive expressions for the electrostatic potential V and electric field intensity E produced by a small electric dipole composed of two point charges +q positioned at P_1(0,0,d/2) and –q positioned at P_2(0,0,-d/2) at a distant point P separated by distance r from the center of the dipole, r>>d. Determine V and E when q=100nC, d=10 cm, r=10m and θ=45°. (6 Marks)

Hint: $\nabla V = \frac{\partial V}{\partial r}\mathbf{a}_r + \frac{1}{r}\frac{\partial V}{\partial \theta}\mathbf{a}_\theta + \frac{1}{r\sin\theta}\frac{\partial V}{\partial \varphi}\mathbf{a}_\varphi$ (Spherical Coordinates)

Question No 3 (12 Marks):

3-a- Derive the electrostatic boundary conditions at the interface between perfect conductor and perfect dielectric. (4 Marks)

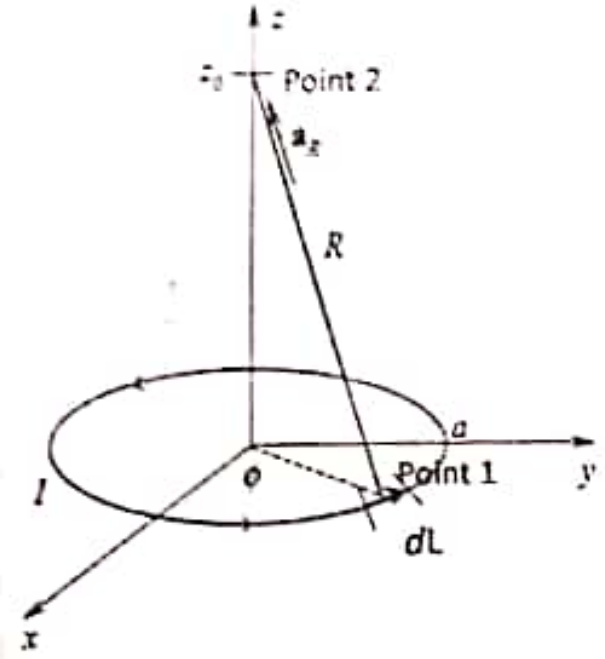
3-b- Write Poisson's and Laplaces's equations. (2 Marks)

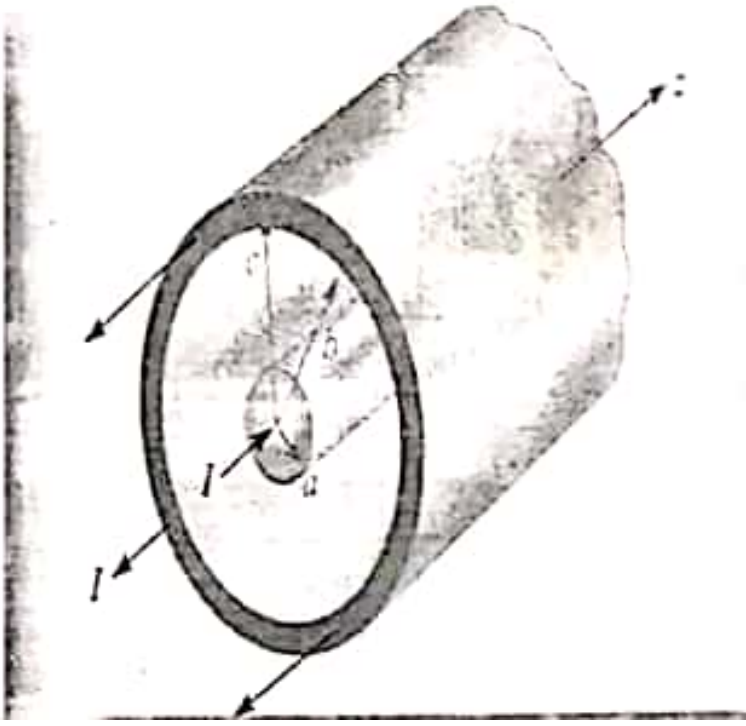
3-c- Using Laplace's equation, determine the potential distribution between the plates of parallel plate capacitor, the electric field intensity and the electric flux density between the plates, the surface charge density on one plate, and then find the capacitance.
Assume the potential of one plate is Vo and the potential of the other plate is zero and V is function of x only. (6 Marks)

مع أطيب الأمنيات بالنجاح والتفوق

Scanned by CamScanner

Faculty of Electronic Engineering General Department Second Year First term Final exam Data: 14-1-2018	Menoufia University	Subject: Electrostatic Fields Theory Time allowed, 3 Hours for two parts No. of Pages:2 Examiner: Dr. Amir Salah





Scanned by CamScanner

Faculty of Electronic Engineering General Department Second Year First term Final exam Data: 14-1-2018	Menoufia University	Subject: Electrostatic Fields Theory Time allowed, 3 Hours for two parts No. of Pages:2 Examiner: Dr. Amir Salah

Part 2 the Steady Magnetic Field

Question 1 (7 marks)

Consider a circular current loop of radius a in the x-y plane, which carries steady current **I**. We wish to find the magnetic field strength anywhere on the z axis. Consider Figure (1).

Question 2 (7 marks)

Consider the cross section of an infinitely long coaxial conductor, the inner conductor carrying a current **I** in **Z** direction and outer conductor carrying current **I** in **–Z** direction, the dimensions of the coaxial cable as shown in figure (2). Compute the magnetic field everywhere.

Question 3 (7 marks)

The magnetic field intensity is given in a certain region of space as

$$\mathbf{H} = \frac{x+2y}{z^2}\,\mathbf{a}_y + \frac{2}{z}\,\mathbf{a}_z \ \text{A/m}$$

(a) Find $\nabla \times \mathbf{H}$. (b) Find **J** at point (1,2,3).
(c) Use **J** to find the total current passing through the surface $z = 4,\ 1 \le x \le 2,\ 3 \le y \le 5$, in the $\mathbf{a}_z$ direction.

Question 4 (7 marks)

Consider the rectangular loop moving with velocity $\mathbf{u}=u_y\mathbf{a}_y$ in the field from an infinite length line current on the z axis. Assume the loop has a distributed resistance R_{dist}. Find an expression for the current in the loop including its direction. Consider figure (3).

Question 5 (7 marks)

Two parallel conducting plates of area $0.05\ m^2$ are separated by **2 mm** of a lossy dielectric for which $\varepsilon_r = 8.3$ and $\sigma = 8x10^{-4}$ S/m, given an applied voltage $v=10 \sin 10^7\ t$ Volt. Find the total RMS current.

P.T.O.

Scanned by CamScanner

Capacitance	Value in $pF \times 10^{-4}\,\mu m^2$ (Relative values in brackets)		
	5 μm	2 μm	1.2 μm
Gate to channel	4 (1.0)	8 (1.0)	16 (1.0)
Diffusion (active)	1 (0.25)	1.75 (0.22)	3.75 (0.23)
Polysilicon* to substrate	0.4 (0.1)	0.6 (0.075)	0.6 (0.038)
Metal 1 to substrate	0.3 (0.075)	0.33 (0.04)	0.33 (0.02)
Metal 2 to substrate	0.2 (0.05)	0.17 (0.02)	0.17 (0.01)
Metal 2 to metal 1	0.4 (0.1)	0.5 (0.06)	0.5 (0.03)
Metal 2 to polysilicon	0.3 (0.075)	0.3 (0.038)	0.3 (0.018)

Notes: Relative value = specified value/gate to channel value for that technology.
*Poly. 1 and Poly. 2 are similar (also silicides where used).

مع تمنياتي لكم بالنجاح والتوفيق

د./ احمد نبيه زكي راشد

Scanned by CamScanner

University	:	*Menoufia*		*Date*	: *10/1/2018*
Faculty	:	*Electronic Engineering*		*Time*	: *90 Minutes*
Department	:	*Electronics and Communications Engineering*		*No. of pages*	: *7*
Academic level	:	*Second Year*		*Full Mark*	: *35 Marks*
Course Name	:	*VLSI*		*Exam*	: *Final Exam*
Course Code	:	*ECE 222*		*Examiner*	: *Assoc. Prof. Ahmed Nabih Zaki Rashed*

- مراعاة ترتيب الاسئلة - الاجابة من الجزء الايمن الى الجزء الايسر - اجابة كل سؤال في صفحة مستقلة

Q1: Complete the following sentences with the correct answer (20 Marks):

a) MOS circuits are formed on four basic layers that are....., ..., ..., these layers are isolated from one another by .....or ..... Silicon dioxide.

b) An inverter driven directly from the output of another should have a $Z_{p.d.}|Z_{p.u.}$ ratio of ....., while an inverter driven through one or more pass transistors should have a $Z_{p.d.}|Z_{p.u.}$ ratio of.....

c) Design rules is the communication link between ..... and ....., whereas the stick diagram is used to .....the layer information through a .....

d) Basic considerations for design rules and layout are divided in to..... ....., and .....

e) Process line is determined by .....and .....

f) Bi-directional capability means that.....and a near CMOS technology employment is in.....

g) The type of diffusion layer determines the type of ....., and .....

Scanned by CamScanner

تانى ترم اول

Menoufia University
Faculty of Electronic Engineering
2nd year.1st Term Exam.
Very large scale Integrated Circuit Technology
Time allowed: 3 hours

Prof.Dr. Hossam Ahmed

10-1-2018

ANSWER ALL QUESTIONS:

1- a) Remembersthe six processes for planar technologyofbipolar junction transistor (BPJ)?(Remember the points don't Explain).

b) Define lithography processes and explain the steps of Photo lithography processesuse the color in your explained drawingboxes?

2-For each of the two transistors cases (a,b) below, find the NMOS drain current I_D. Use the followingparameters:

$V_{T0} = 0.5V, \gamma = 0.2\ V^{1/2}$, $\lambda = 0.05\ V^{-1}$, $|2\phi_f| = 0.52V$; $k'_n = 80\ \mu A/V^2$, $(W/L)_n = 20$

a. V_D=3V, V_{Ga}=3V, V_{Sa}=1V, V_{Bl}=1V
b. V_D=3V, V_{Gb}=4V, V_{Sb}=1V, V_{Bl}=0 V

3- Calculate thresholdvoltage V_{to} at V_{SB}=0 for the polysilicon gate.
Given the following parameters, p-substrate $N_A = 10^{16}\ cm^{-3}$, polysilicon gate doping concentration $N_D = 10^{16}\ cm^{-3}$, intrinsic concentration of Si, ni =1.45 X $10^{10}\ cm^{-3}$, gate oxide thickness t_{ox} =500 Å, oxide charge density N_{ox} =4 X $10^{10} cm^{-2}$, and $\varphi_{F(Gate\ polysilicon)} = -0.55$ V.

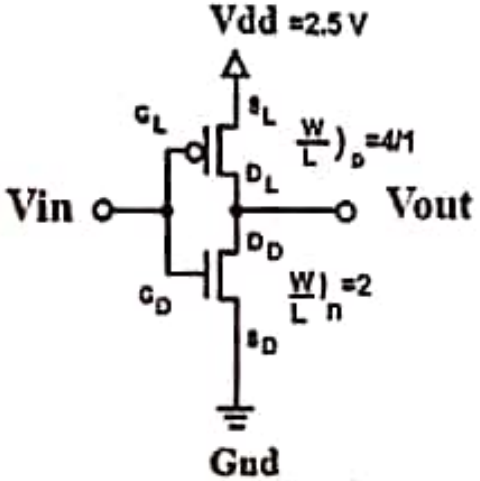
4- Consider a static CMOS inverter with the following parameters. Assume all transistors fabrication channel length L=0.25 um (to have λ scale),

V_{dd}=2.5V, V_{Tn}= 0.5V , V_{Tp}= 0.5V , λ= 0, kn= 100 μA/V², kp= 50 μA/V² ,

a-Calculate: VOH, VOL, VIL, VM By the help of define operation points on Current Voltage charactristic curve and voltage transfer curve?

b- Calculate Nominal Low Voltage

c-Draw the stick Diagram and the Layout Diagram?



Scanned by CamScanner

B – A voltage: $V(t) = 20\ \mathrm{Sin}(\omega t)$ is applied to a series RLC circuit. At the resonance frequency of the circuit, the maximum voltage across the capacitor is found to be 500 V. Moreover, the bandwidth is known to be 400 rad/sec and the impedance at resonance is 200 Ω. ***Find:***

1 – The resonance frequency.
2 – The values of L and C of the circuit.

C – A series RLC circuit consists of a 50 Ω resistance, 0.2H inductance and 10 μF capacitor with an applied voltage of 20 V. ***Find the following:***

1 – The resonant frequency. 2 – The Q factor of the circuit.
3 – The lower and upper frequency limits.
4 –The bandwidth of the circuit.

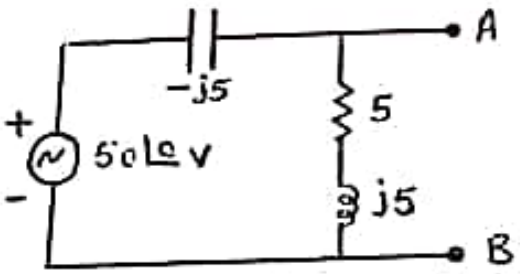


Fig. 1

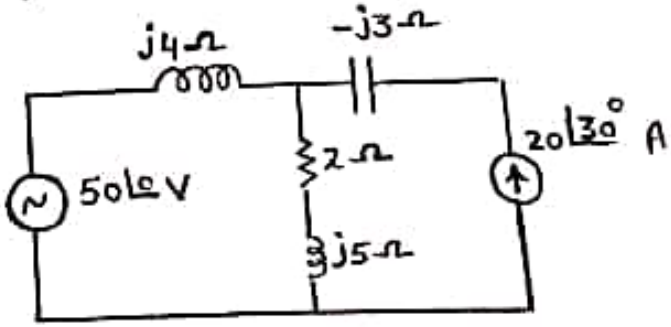


Fig. 2

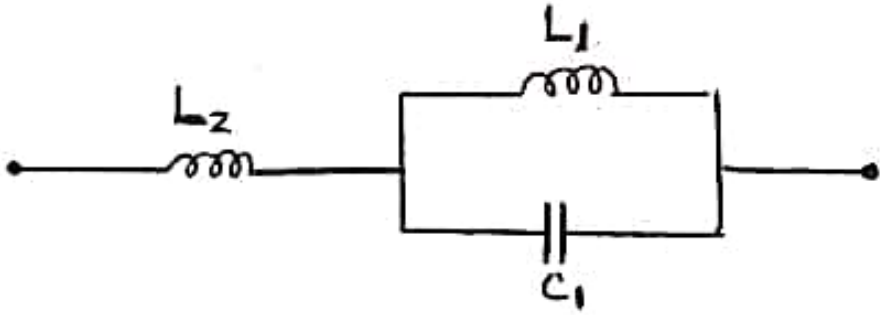


Fig. 3

Scanned by CamScanner

MENOUFIA UNIVERSITY
FACULTY OF ELECTRONIC ENG.
SUBJECT: Electric Circuit Theory (Part 1)
TIME: 3 HOUR Jan.2018 2nd YEAR

Answer the following questions: (35 MARKS)

Q.1 A – The voltage across a two terminal network is:

$V(t) = 100 \sin(wt - 30^\circ)$

While the current through the network is:

$i(t) = 6 \cos(wt + 30^\circ)$

Calculate the following:

a – Instantaneous power. b – Average power.
c – Reactive power. d – Apparent power.
E – Determine the circuit elements.
F – Construct the phasor and impedance diagram.

B – For the circuit shown on Fig.1. ***Find the following:***

1- The Norton equivalent circuit.
2- If $Z_1 = (5 - j5)$ is connected between the terminal A&B find the power delivered in R_1.

Q.2 A – For the circuit shown in Fig.2. ***Determine*** the voltage across the impedance $(2 + j5)\ \Omega$ using superposition method.

B – A 10 ohm resistor is connected in series with the following series connected generators:

$e_1(t) = 50 \sin(377t + 40^\circ)$
$e_2(t) = 40 \sin(1130t + 20^\circ)$
$e_3(t) = 80 \sin(150t)$

Determine the following:

1 – The frequency of the individual generator.
2 – The rss voltage across the resistor.
3 – The rss current through the resistor.
4 – The active power delivered to the resistor.
5 – The apparent power.

Q.3 A – For the circuit shown in Fig.3. ***Determine:*** The Series and parallel resonance frequency.

Scanned by CamScanner

MENOUFIA UNIVERSITY
FACULTY OF ELECTRONIC ENG.
SUBJECT: Electric Circuit Theory (Part 1)
TIME: 3 HOUR Jan.2018 2nd YEAR

Answer the following questions: **(35 MARKS)**

Q.1 A – The voltage across a two terminal network is:

$V(t) = 100 \sin(wt - 30^\circ)$

While the current through the network is:

$i(t) = 6 \cos(wt + 30^\circ)$

Calculate the following:

a – Instantaneous power. b – Average power.
c – Reactive power. d – Apparent power.
E – Determine the circuit elements.
F – Construct the phasor and impedance diagram.

B – For the circuit shown on Fig.1. ***Find the following:***

1- The Norton equivalent circuit.
2- If $Z_1 = (5 - j5)$ is connected between the terminal A&B find the power delivered in R_1.

Q.2 A – For the circuit shown in Fig.2. ***Determine*** the voltage across the impedance $(2 + j 5) \Omega$ using superposition method.

B – A 10 ohm resistor is connected in series with the following series connected generators:

$e_1(t) = 50 \sin(377 t + 40^\circ)$
$e_2(t) = 40 \sin(1130 t + 20^\circ)$
$e_3(t) = 80 \sin(150 t)$

Determine the following:

1 – The frequency of the individual generator.
2 – The rss voltage across the resistor.
3 – The rss current through the resistor.
4 – The active power delivered to the resistor.
5 – The apparent power.

Q.3 A – For the circuit shown in Fig.3. ***Determine:*** The Series and parallel resonance frequency.

Scanned by CamScanner

[2] Question Two (20 Marks):

A) Consider A switch in the circuit shown in Fig. (3) has been in position 1 for a long time. At $t = 0$, the switch moves from position 1 to position 2. Derive the expression for step response

a) $v_o(t)$ for $t \geq 0$. b) $i_o(t)$ for $t \geq 0$.

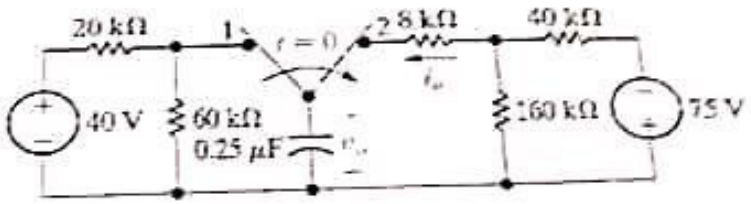


Fig. (3)

B) Given the circuit shown in Fig. (4), determine the output voltage

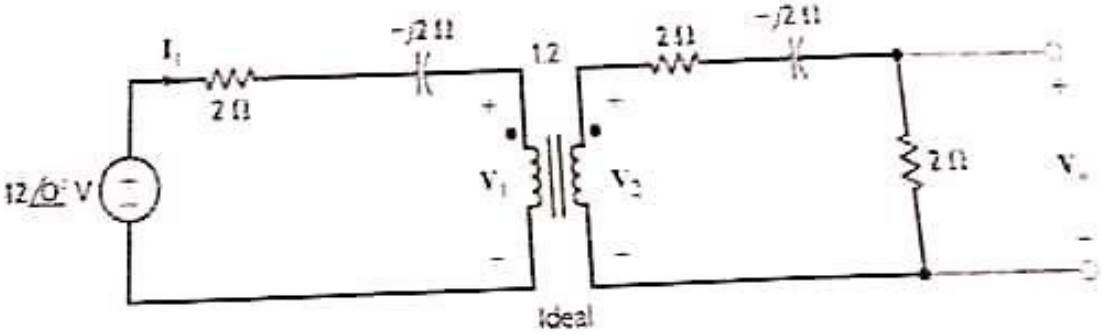


Fig. (4)

C) Derive the natural response of RLC circuit shown in Fig. (5) , for the overdampe voltage response.

1. Find the roots of the characteristic equation that governs the transi behavior of the voltage if R= 200 Ω, L= 50 mH, and C= 0.2 mF.

2. What value of *R* causes the response to be critically damped?

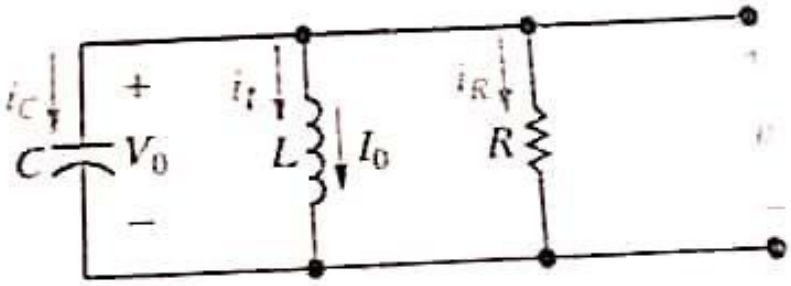


Fig. (5)

Scanned by CamScanner

الفرقة الثانية

Faculty of Electronic Engineering
Dept. Electrical Comm. Engineering
1st term
(2nd year)

Subject: Electric Circuits Theory
Final Exam (70 Mark)
Allowed Time: 3 Hour [both parts]
Date: 3/1/2018 (10 AM-1 PM)

Part (2)

Answer as much as you can

[1] Question One (15 Marks):

A) Consider that a switch in the circuit shown in Fig. (1) has been closed for a long time before it is opened at $t = 0$.

1. Derive the Natural Response of an *RL* Circuit

2. Calculate the percentage of the total energy stored in the 2 H inductor that is dissipated in the 10 Ω resistor.

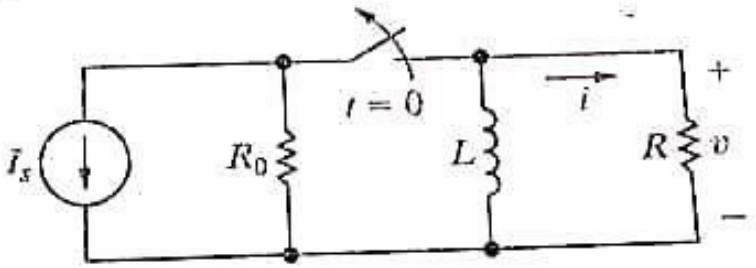


Fig. (1)

B) The coupled circuit in Fig. (2) has a coupling coefficient, $k = 1$. Determine the energy stored in the mutually coupled inductors at time $t = 5$ ms. $L_1 = 2.653$ mH and $L_2 = 10.61$ mH.

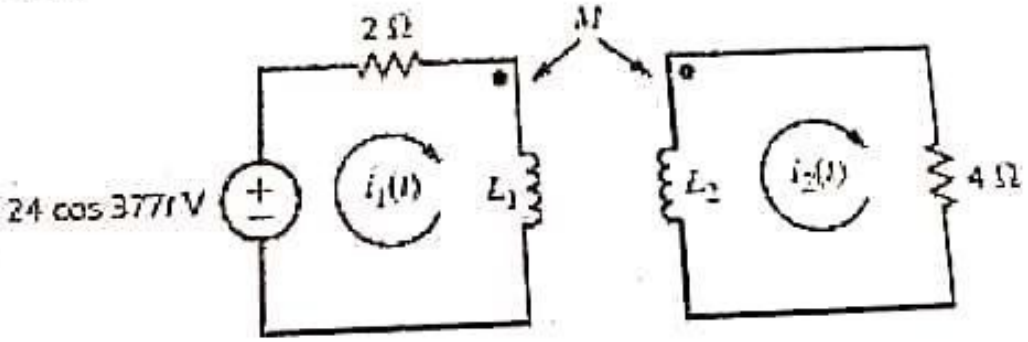


Fig. (2)

C) Compare between the Series and Parallel Connections of Coupled inductors.

Scanned by CamScanner

Figure 1: 74ALS138

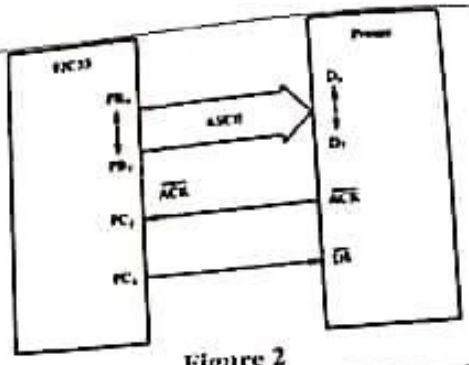
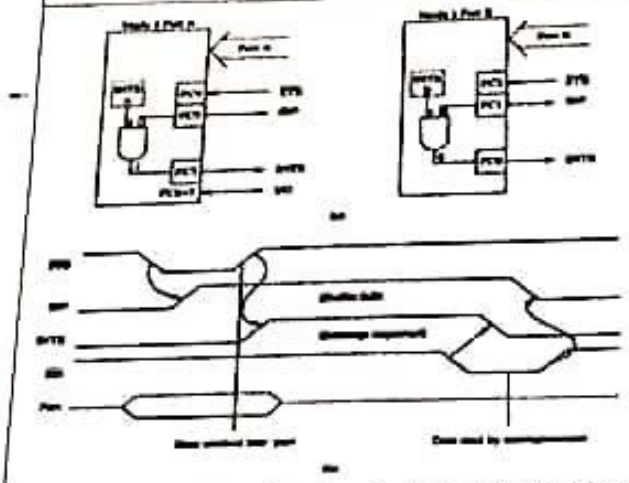
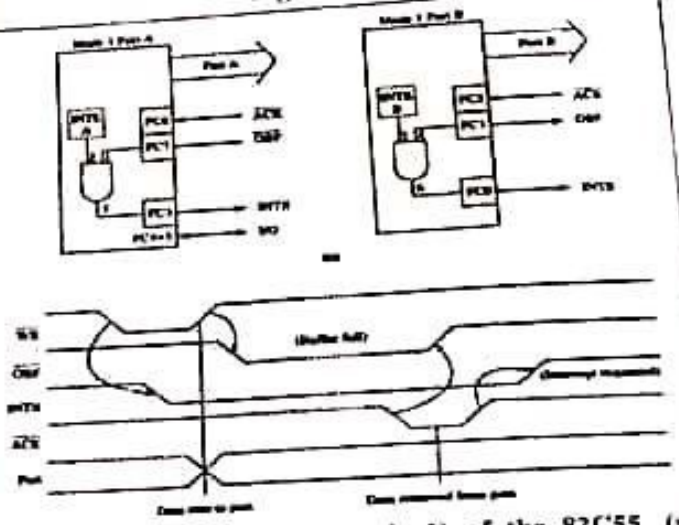


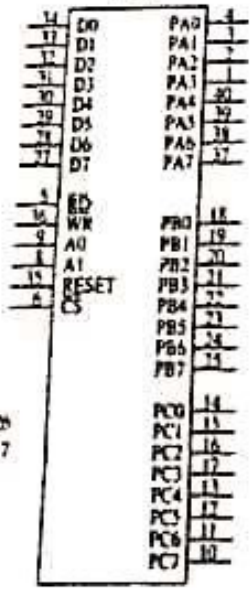
Figure 2



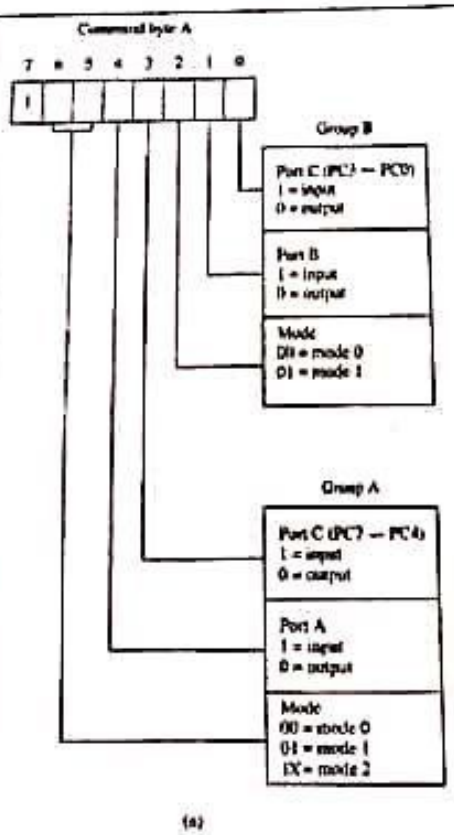
Strobed input operation (mode 1) of the 82C55. (a) Internal structure, and (b) timing diagram.



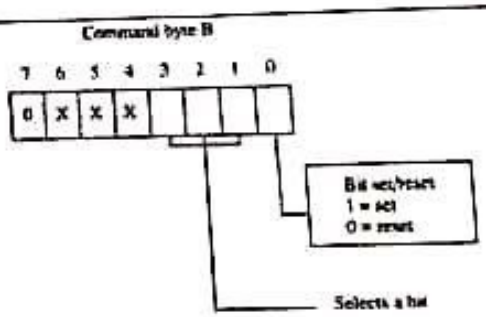
Strobed output operation (mode 1) of the 82C55. (a) Internal structure, and (b) timing diagram.



The pin-out of the 82C55 peripheral interface adapter (PPI).



(a)



(b)

A_1	A_0	Function
0	0	Port A
0	1	Port B
1	0	Port C
1	1	Command Register

The command byte of the command register in the 82C55. (a) Programs ports A, B, and C (b) Sets or resets the bit indicated in the select a bit field.

Scanned by CamScanner

(b) Develop an I/O port decoder, using a 74LS138 (3-to-8 decoder in Figure 1), that generates low-bank I/O strobes, for a 16-bit microprocessor, for the following 8-bit I/O port addresses: 20H, 22H, 24H, 26H, 28H, 2AH, 2CH, and 2FH.

Fifth Question **36 Min/ 12 Marks**

Complete each of the following statements:

[1] The main tasks of the microprocessor for the computer system are ..... , ... , ...

[2] The power of a microprocessor is .....

[3] Multiple cores represent a solution of the .....

[4] The interconnection between the microprocessor and both the memory and I/O systems are done through .....

[5] The ..... flag is tested by the DAA and DAS instructions.

[6] The ..... , ... and ..... registers address data within the stack segment.

[7] In real mode, the only conventional memory system can be addressed from ..... to .....

[8] In real mode, the starting and ending addresses of a segment located by the segment register value AB00H are ..... and ..... respectively.

[9] In real mode, if CS = 1400H and EIP = 1200H, the microprocessor fetches its next instruction from memory location .....

[10] If the contents of DS = 1100H, BX = 0200H, LIST = 0250H, and SI = 0500H, the address accessed by the execution of the MOV CL, LIST [BX + SI] instruction is .....

[11] Assume that a Pentium 4 descriptor contains a base address of 10000000H, a limit of 001FFXXXH, and the G bit of 1. What starting and ending locations are addressed by this descriptor?

[12] The largest possible backward of the unconditional short jump is .....

[13] If the contents of CS = 0701H, SS = 0801H, SI = 0100H and IP = 0108H the address of the next instruction is .....

[14] If the contents of DS = 1200H, BX = 0100H, and SI = 0250H, the address accessed by the execution of the MOV [SI+100H], EAX instruction is .....

[15] If the contents of DS = 1300H, SS = 1400H, BP = 1500H, and SI = 0100H, the address accessed by the execution of the MOV AL, [BP + SI – 200H] instruction is .....

[16] If the contents of EAX = 00001000H, EBX = 00002000H, and DS = 0010H, the address accessed by the execution of the MOV DH, [EBX + 4*EAX + 1000H] instruction is .....

[17] The ..... instruction saves EFLAGs and the ..... instruction pops all 32-bit registers.

[18] Assume that the contents of SP = 07FEH, SS = 0300H, AH = 6AH, and AL = B3H. When the PUSH AX instruction is executed, the contents of AL and AH stored at addresses ..... , and ..... respectively.

With My Best Wishes

P.T.O

Scanned by CamScanner

(b) Identify the choice that best completes the statement or answers the question.

[1] The ..... contains lines that select the memory or I/O and cause them to perform a read or write operation.

a) external bus b) data bus c) control bus d) address bus

[2] The interaction between the microprocessor and I/O devices is done through .....

a) ports b) buses c) registers d) flags

[3] ..... can be used as indexed registers in real addressing mode.

a) BX, SI, DI b) SI, DI, DS c) AX, SI, DI d) AX, BX, CX

[4] If AL register contains the ASCII code of an uppercase letter, the letter can be converted to lowercase by .....

a) ADD AL, 30H b) AND AL, 0010 0000 c) OR AL, 0010 0000 d) SUB AL, 30H

[5] Which directive(s) are used when defining both signed and unsigned 64-bit integers?

a) QWORD and SQWORD b) QWORD c) DWORD d) DWORD and SDWORD

[6] If the current value of CS:IP is 0702:2345 and a jump to address 0702:2323 is executed then the jump is .....

a) a short jump. b) a far jump. c) an illegal jump. d) a forward jump.

[7] If CX =1234H and BX=75FDH, the value stored in CX after the execution of the **TEST CX, BX** instruction is .....

a) 77FDH b) 1234H c) 75FDH d) 1032H

[8] The **TEST** instruction is most similar to ..... instruction.

a) AND b) OR c) XOR d) NOT

[9] An arithmetic instruction always modifies the .....

a) index register. b) stack pointer. c) program counter. d) status register.

Third Question

36 Min/ 12 Marks

(a) What is the difference between **Isolated I/O** and **Memory-mapped I/O** methods of interfacing I/O peripherals to the microprocessor?

(b) Write assembly instructions that divide the unsigned byte contents of memory location NUMB by the unsigned contents of memory location NUMB1. Assume that the quotient is stored in location ANSQ and the remainder is stored in location ANSR.

(c) Using the REPNE, JCXZ or JNE, and SCASB instructions, write assembly instructions that search in a table of 100H bytes for 0AH value. Assume that the table of data is called **TABLE** and its offset address is in **SI** register.

Fourth Question

36 Min/ 12 Marks

(a) Write an assembly procedure that programs the 82C55 to work in mode 1 and to show port B synchronization between the printer and 82C55 as shown in Figure 2. $\overline{DS}$ (data strobe) strobes data into the printer, and $\overline{ACK}$ output from printer to acknowledge the receipt of the ASCII character. Consider the four addresses of the 82C55 are 31H, 32H, 33H, and 34H respectively.

Note: you do not have to draw the interface circuit, just write the assembly code.

P.T.O.

Scanned by CamScanner

الفرقة الثانية

Menoufia University, Faculty of Electronic Engineering,
Computer Science & Engineering Department
Second Year- First Semester
Microprocessors & Applications (CSE 217)
Examiners: Dr. Salah Eldin Shaban

Final Written Term Exam
Date: 17/01/2018
Time: Three Hours
Total Mark: 60 Marks
No. of Pages: Four

Answer All the Following Five Questions

Your answers must be written from left to right in your answer sheet and each answer must be in its order.

First Question

36 Min/ 12 Marks

Put √ for a correct statement and × for a wrong one and then correct it:

[1] The EDX is automatically used for multiplication, division, and some of the adjustment instructions.
[2] The EBX holds the count for various instructions and can hold the offset address of memory data.
[3] The EBP points to the next instruction in a program and can be modified with a jump or a call instruction.
[4] Overflows occur when signed numbers are added or subtracted.
[5] The IOPL flag is used in real mode operation to select the privilege level for I/O devices.
[6] The auxiliary carry flag activates if a word or double words is addressed on a non-word or non-double words boundary.
[7] The DX register is the default offset for extra segment register in string instructions.
[8] Segments cannot be moved over any area of memory to access data or code.
[9] In real mode, a far jump accesses any location within the first 1M byte by changing both CS and IP.
[10] The REP prefix is used to repeat any string transfer instruction by the contents of CX times.
[11] The MOV ES, ABH instruction is illegal.
[12] The MOV [BX], [DI] instruction is legal.
[13] The MOV DS, SS instruction is legal.
[14] The invisible registers are used to access and specify addresses of global and local descriptor tables.
[15] In global descriptor table, the descriptor size is 6 bytes:
[16] The direction, interrupt, and trap flags are used for mathematical operations.
[17] As a near procedure is called, the contents of IP and CS are pushed onto the stack and then the program branches to the procedure.
[18] 16-bits are input to AX from I/O port p8 after the execution of instruction OUT AX, p8.
[19] The LDS EDI, LIST instruction loads DS and EDI with the 32-bit contents of data segment memory location LIST.
[20] The instruction MOV BX, OFFSET LIST performs the same function as the instruction LEA BX, OFFSET LIST.

Second Question

36 Min/ 12 Marks

(a) Write instruction(s) to perform each of the following tasks:

[1] Multiply AX by 5.
[2] Three different instructions that will clear the contents of register CL.
[3] Jump to label 'L1' if AX is negative.
[4] Set the right most five bits of DI without changing the remaining bits of DI.

P.T.O.

Scanned by CamScanner

B – A voltage: $V(t) = 20\ \mathrm{Sin}(\omega t)$ is applied to a series RLC circuit. At the resonance frequency of the circuit, the maximum voltage across the capacitor is found to be 500 V. Moreover, the bandwidth is known to be 400 rad/sec and the impedance at resonance is 200 Ω. ***Find:***

1 – The resonance frequency.

2 – The values of L and C of the circuit.

C – A series RLC circuit consists of a 50 Ω resistance, 0.2H inductance and 10 μF capacitor with an applied voltage of 20 V. ***Find the following:***

1 – The resonant frequency. 2 – The Q factor of the circuit.

3 – The lower and upper frequency limits.

4 –The bandwidth of the circuit.

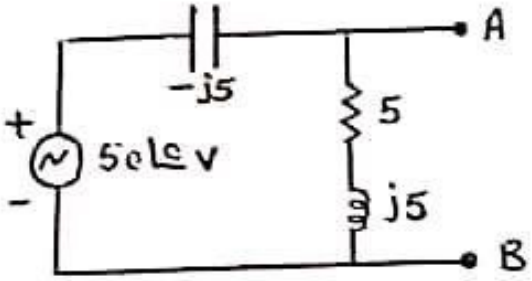


Fig. 1

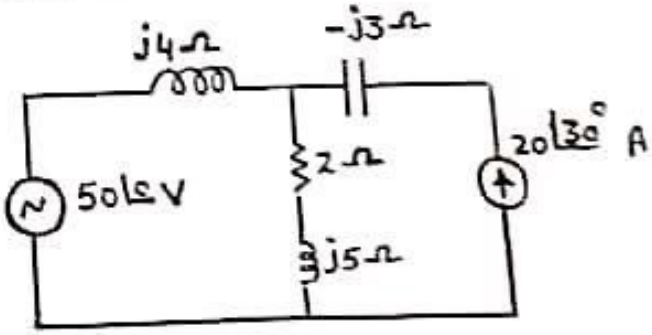


Fig. 2

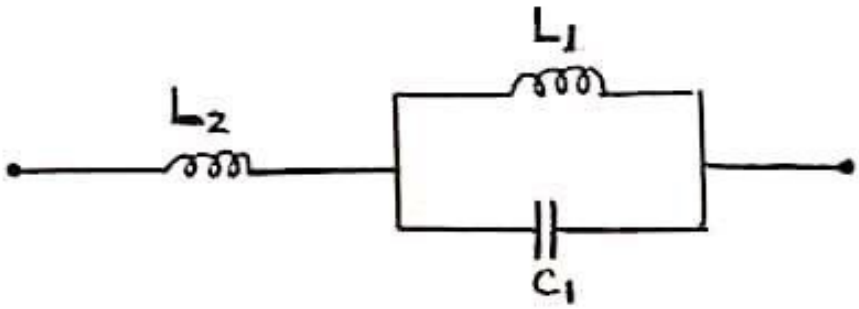


Fig. 3

Scanned by CamScanner

MENOUFIA UNIVERSITY
FACULTY OF ELECTRONIC ENG.
SUBJECT: Electric Circuit Theory (Part 1)
TIME: 3 HOUR Jan.2018 2nd YEAR

Answer the following questions: (35 MARKS)

Q.1 A – The voltage across a two terminal network is:

$$V(t) = 100 \sin (wt - 30^\circ)$$

While the current through the network is:

$$i(t) = 6 \cos(wt + 30^\circ)$$

Calculate the following:

a – Instantaneous power. b – Average power.
c – Reactive power. d – Apparent power.
E – Determine the circuit elements.
F – Construct the phasor and impedance diagram.

B – For the circuit shown on Fig.1. ***Find the following:***

1- The Norton equivalent circuit.
2- If $Z_1 = (5 - j5)$ is connected between the terminal A&B find the power delivered in R_1.

Q.2 A – For the circuit shown in Fig.2. ***Determine*** the voltage across the impedance $(2 + j5)\ \Omega$ using superposition method.

B – A 10 ohm resistor is connected in series with the following series connected generators:

$$e_1(t) = 50 \sin (377\, t + 40^\circ)$$
$$e_2(t) = 40 \sin (1130\, t + 20^\circ)$$
$$e_3(t) = 80 \sin (150\, t)$$

Determine the following:

1 – The frequency of the individual generator.
2 – The rss voltage across the resistor.
3 – The rss current through the resistor.
4 – The active power delivered to the resistor.
5 – The apparent power.

Q.3 A – For the circuit shown in Fig.3. ***Determine:*** The Series and parallel resonance frequency.

Scanned by CamScanner

Question 3. [15 Marks]:

a) Determine the unit step response of $G_1(s) = \frac{2}{2+s}$ and $G_2 = \frac{0.25}{0.25+0.6s+s^2}$

b) A unity feedback control system whose open loop transfer function is given by: $G_0 = \frac{K}{s(s+1)(s+2)}$. Find the range of "K" for a stable system according to Routh's criterion. Determine the system steady state error for a ramp input r (t) =0.1t.

Question 4. [10 Marks]:

Linearize the system shown in Fig. 4 around the stationary working point us and ys and then draw the block diagram of the linearized model. What kind of elements is the transfer function of the linearized model.

Question 5. [15 Marks]:

a) Regarding the system shown in Fig. 5, determine the state space model of the system i.e. determine the matrices A, B, C, D of: $\frac{dx}{dt} = Ax + Bu, y = Cx + Du, with: u = \begin{bmatrix} P1 \\ q2 \end{bmatrix}$ and y = $\begin{bmatrix} q1 \\ p2 \end{bmatrix}$.

b) Consider a unity feedback control system with closed loop transfer function Gcl= $\frac{C}{R} = \frac{ks+b}{s^2+as+b}$. Determine the open loop transfer function Go(s). Show that the steady-state error in the unit-ramp response is given by ess = $\frac{1}{kv} = \frac{a-k}{b}$.

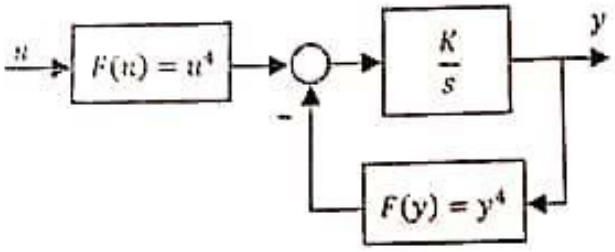


Fig. 4

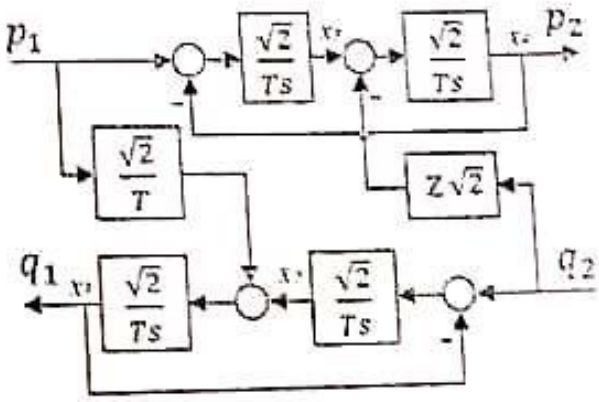


Fig. 5

Best wishes

Scanned by CamScanner

University:	Electronic Engineering	Academic Year:	2017-2018
Faculty:	Industrial Elec. &	Exam:	Final Exam
Department:	Control	Date:	December 31st, 2017
Academic level:	2nd Year	Time Allowed	3 Hours
Course Name:	Control Engineering	No. of Pages	2
Course Code:	ACE 215	No. of Questions:	5

ANSWER THE FOLLOWING QUESTIONS

Question 1. [15 Marks]

a. Distinguish between On-Off control and Proportional control.

b. Deduce the regulation of glucose in the bloodstream as an example of feedback

c. Reduce the block diagram shown in Fig. 1 to calculate $\frac{C(s)}{R(s)}$.

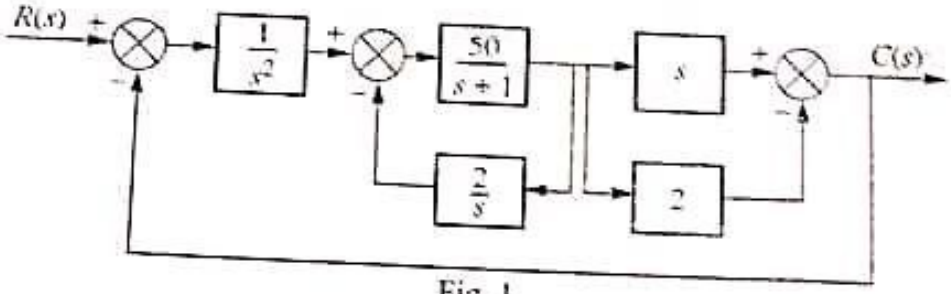


Fig. 1

Question 2. [15 Marks]

a) For the circuit shown in Fig.2:

- Derive the voltage transfer function $\frac{V_o(s)}{V_i(s)}$.
- Calculate the circuit output due to a unit-step change at the input side.

b) For the mechanical system shown in Fig. 3, obtain the transfer function, $G(s) = \frac{\theta_1(s)}{T(s)}$.

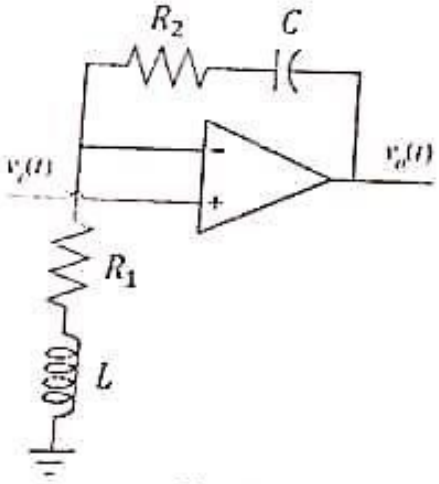


Fig. 2

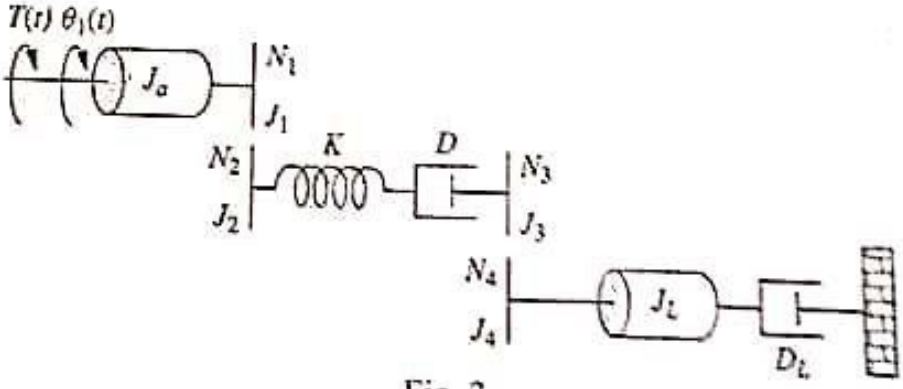


Fig. 3

Scanned by CamScanner

(i) 5 kΩ setting and
(ii) 10 kΩ setting.

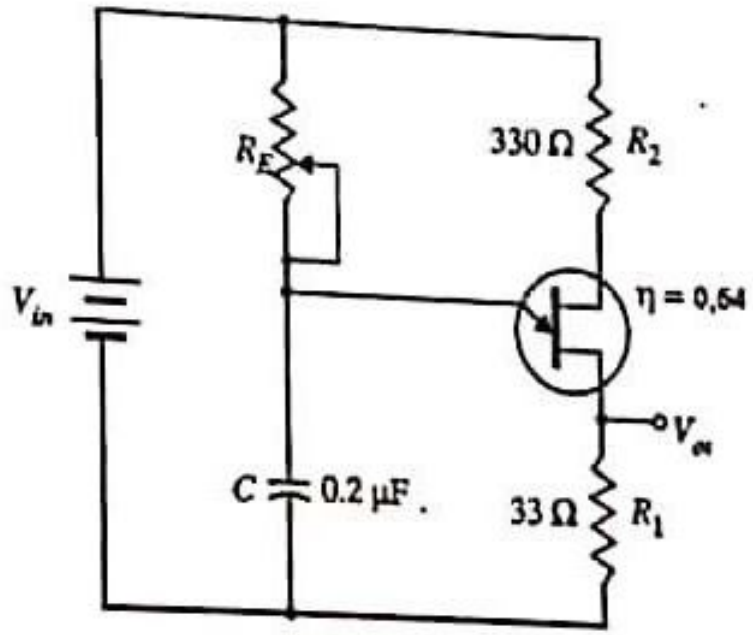


Figure 2

[10 Marks]

Part – 2:

Question-3: **For the circuit shown in Figure 3, if the supply voltage is 120 V, 60 Hz, the load is 100 + j188.5 Ω. If the firing delay angle of the thyristor T is selected to be 45°, and the conduction angles is 200°. Assume SCR to be ideal.**

(a) Sketch the supply voltage, triggering signal of T, thyristor current and load voltage, waveforms,

(b) Derive an expression for the output (inductive load) current,

(c) Determine the average (DC) load voltage,

(d) Find the normalized DC output load voltage,

(e) What is the problem of this circuit? Explain with drawing the circuit diagram how to modify the circuit to overcome it?

Scanned by CamScanner

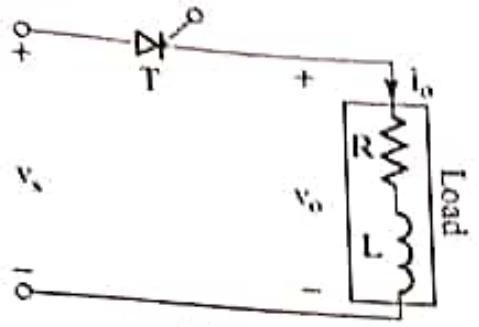


Figure 3

[15 Marks]

Question–4: For the circuit shown in Figure 4, the input AC supply voltage is 230 V, 50 Hz and a resistive load of 20 Ω. If a trigger firing angle of 45° is to be used to control the output voltage:

(a) Sketch the supply voltage, triggering signals, load voltage and current waveforms.

(b) Determine the RMS output voltage.

(c) Determine the output AC power delivered to the load.

(d) Determine the input power factor.

(e) Find the average and RMS thyristor currents.

(f) What is the problem of this circuit? Explain with drawing the circuit diagram how to modify the circuit to overcome this problem?

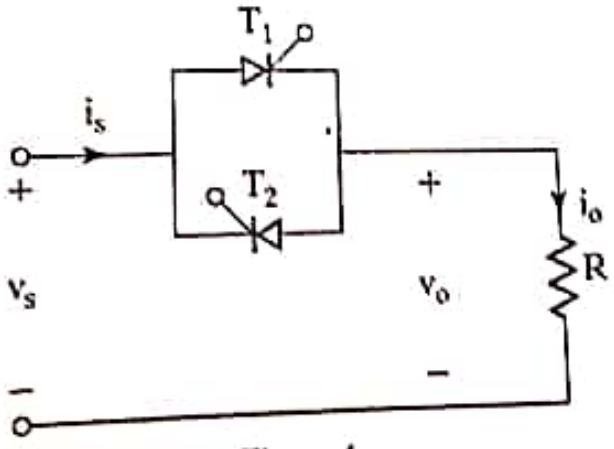


Figure 4

[20 Marks]

With best wishes

Scanned by CamScanner

Answer the following questions:

Part – I:

Question-1: a) *Put True (√) or False (×) signs for the following expressions:* [10 Marks]

a) GTO, is an example of semi controlled switch,
b) A diac can conduct current in two directions,
c) In normal operation of SCR, the supply voltage is generally much less than breakover voltage,
d) High operating temperature may triggering SCR,
e) Static dv/dt is a measure of the ability of thyristor to retain a conducting state under the influence of a voltage transient,
f) PRV is the maximum reverse voltage (cathode positive w.r.t. anode) that can be applied to an SCR without conducting in the reverse direction,
g) An ideal switch exhibits a power dissipation,
h) Snubber circuit can limit the rate-of-rise (dv/dt) of voltages across the semiconductor device at device turn OFF,
i) Snubber circuit can increase voltage or current spikes,
j) In normal operation of SCR, it is turned ON from the OFF state, anode current should be reduced to holding current.

---

b) Determine the value of R_1 in Figure 1 shown below, that will ensure proper turn-on and turn-off of the UJT. The characteristic of the UJT exhibits the following values: $\eta = 0.5$, $V_v = 1$ V, $I_v = 10$ mA, $I_p = 20$ μA, and $V_p = 14$ V.

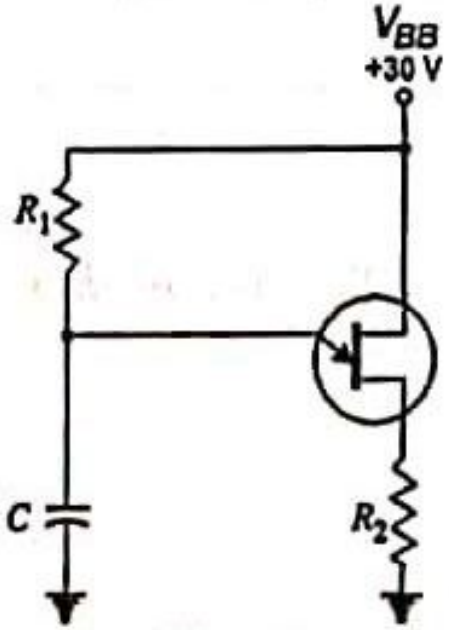


Figure 1 [5 Marks]

Scanned by CamScanner

الفرقه الثانيه

Faculty of Electronic Engineering
Dept. Electrical Comm. Engineering
1st term
(2nd year)

Subject: Electric Circuits Theory
Final Exam (70 Mark)
Allowed Time: 3 Hour [both parts]
Date: 3/1/2018 (10 AM-1 PM)

Part (2)

Answer as much as you can

[1] Question One (15 Marks):

A) Consider that a switch in the circuit shown in Fig. (1) has been closed for a long time before it is opened at t = 0.

1. Derive the Natural Response of an *RL* Circuit

2. Calculate the percentage of the total energy stored in the 2 H inductor that is dissipated in the 10 Ω resistor.

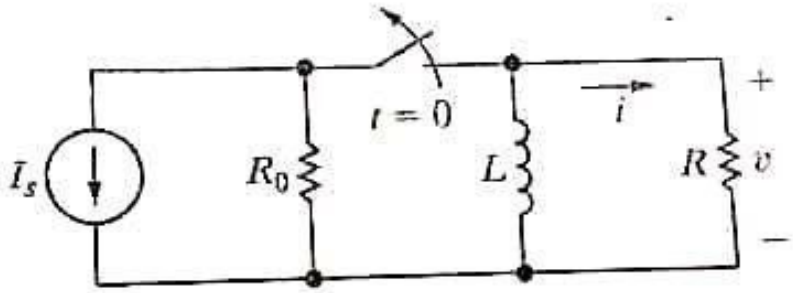


Fig. (1)

B) The coupled circuit in Fig. (2) has a coupling coefficient, $k = 1$. Determine the energy stored in the mutually coupled inductors at time $t = 5$ ms. $L_1 = 2.653$ mH and $L_2 = 10.61$ mH.

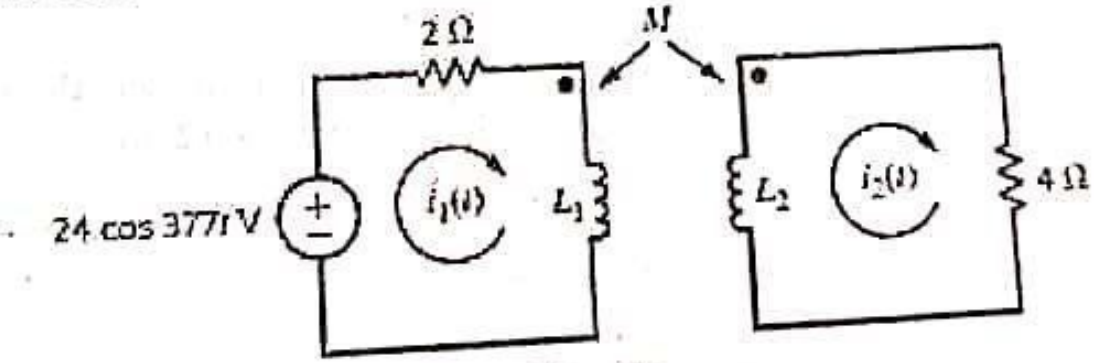


Fig. (2)

C) Compare between the Series and Parallel Connections of Coupled inductors.

Scanned by CamScanner