جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: نظم الاتصالات/1
زمن الامتحان: ساعتان
التاريخ: 2016/ 02/21

أسئلة امتحان الفصل الأول للعام الدراسي 2016/2015

Note: Answer all questions

Q1/

A. How can you obtain a DSB-SC signal? (10 marks)

B. A signal f(t) has energy E. Calculate the energy of the signal f(2t). (10 marks)

Q2/

A. Explain why the maximum efficiency transmission in AM with large carrier is 33.33%? (10 marks)

B. A telephone transmitter using AM has unmodulated carrier output power of 20 kW and can be modulated to a maximum depth of 80% by a sinusoidal modulating voltage without causing overloading. Find the value to which unmodulated carrier power may be increased without resulting in overloading if the maximum permitted modulation index is restricted to 60%. (20 marks)

Q3/

The noise figure of a receiver is 20 dB and it is fed by a low noise amplifier which has a gain of 40 dB and noise temperature of 80^{o} K. Calculate the overall noise temperature of the receiving system and the noise temperature of the receiver.

Assuming $T_0 = 300^{o}$ K (20 marks)

Q4/

A. For an LTIC system with the impulse response $h(t) = 6e^{-t}\,u(t)$, determine the system response to the input $f(t) = 2u(t)$ (15 marks)

B. Find the Fourier transform of the unit gate function

$$rect\ (t) \triangleq \begin{cases} 1 & |t| < \frac{1}{2} \\ 0 & |t| > \frac{1}{2} \end{cases}$$ (15 marks)

21/02/2016

رئيس القسم: ليث وجيه عبد الله

مدرس المادة: أحمد حسن هادي

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية نجف

القسم: قسم هندسة تقنيات الاتصالات
المرحلة: الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ساعتان
التاريخ:2016/02/23

امتحان الفصل الاول للعام الدراسي 2015 – 2016

Q1. A) Multiple Choice Questions: **(10 Marks)**

1. A 4-bit ripple counter consists of flip-flops that each have a propagation delay from clock to Q output of 20 ns. For the counter to recycle from 1111 to 0000, it takes a total of
(a) 20 ns (b) 40 ns (c) 60 ns (d) 80 ns

2. The terminal count of a modulus-31 binary counter is
(a) 11111 (b) 11110 (c) 00000 (d) 11101

3. The group of bits 0111 is serially shifted (right-most bit first) into an 4-bit parallel output shift register with an initial state of 1110. After three clock pulses, the register contains.
(a) 1111 (b) 1110 (c) 0111 (d) 0000

4. With a 1 MHz clock frequency, eight bits can be parallel entered into a shift register
(a) in 8 μs (b) in 4 μs (c) in 2 μs (d) in 1 μs

5. When an 8-bit serial in/serial out shift register is used for a 24 μs time delay, the clock frequency must be
(a) 41.67 kHz (b) 333 kHz (c) 125 kHz (d) 8 MHz

Q1. B) How to construct an asynchronous MOD-60 counter? **(10 Marks)**

Q2.A) Refer to Figure 1. List the states of the output indicators of the shift register after each clock pulse. **(10 Marks)**

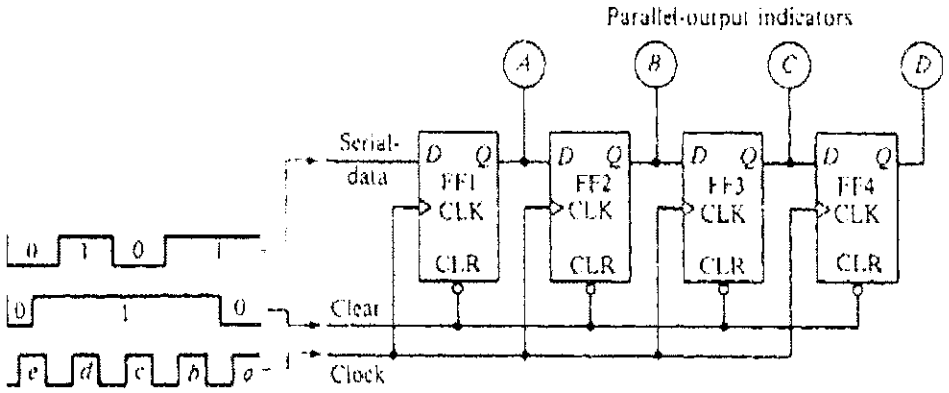


Figure 1

Q2.B) Develop a synchronous 2-bit up/down counter. The counter [illegible] when an UP /$\overline{DOWN}$ control input is 1 and count down when the control input [illegible]

(15 Marks)

Q3. A) Design a counter to produce the following decimal sequence.

2, 5, 1, 3, 6, 4, 2, 5, 1, 3... (15 Marks)

1. How many states does this counter have?
2. How many flip-flops are required to build this counter?
3. Draw the state diagram for this circuit.
4. If D flip-flops are to be used, write the excitation equation for the flip-flops inputs.
5. Draw the logic circuit for this counter.

Q3. B) Illustrate a 4-bit data movement for parallel in serial out shift registers and draw typical logic symbol. **(10 Marks)**

Q4. A) Implement the function F (a, b, c, d) = $\sum$ m (4, 5, 8, 9, 10, 11, 12, 13) using tow 2×4 decoders and two external OR gate. **(15 Marks)**

Q4. B) Design a four-input priority encoder using K-map, such that the input D_2 has the highest priority, D_1 has next highest priority, D_3 has the lowest priority.

(15 Marks)

23/02/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني /جامعة الفرات الاوسط التقنية
الكلية التقنية- نجف

القسم : هندسة الاتصالات و السير
المرحلة :الثانية
المادة: حاسبة
وقت الامتحان: ساعتان
التاريخ: ٢٤/ ٢ / ٢٠١٦ م

امتحان الفصل الاول للعام الدراسي 2015– 2016

Answer All Questions

Q1 :A: Give the correct representation in visual basic for the following equations: **(15 degree)**

1. $\cos(t) - \sin^2(3t)$.
2. $e^{4t}(1+\cos(8t))$.
3. $|z-x^8|+6$

Q1:B: Find the result for each of the followings: **(15 degree)**

1. Math.sqrt(81) + 2.
2. Math.truncate (456.467).
3. Math .round(267.37865 , 3)

****

Q2:A: Select the correct choice for the following statements: **(10 degree)**

1.Creates a box that can be used to retrieve one piece of information from a user.
A. MSGBOX B. INPUTBOX C. Dialog Box D.Label

2. The code statement, 7 > = 5, will have a resulting condition
A: no B: true C: false D : none

Q2:B: which of the following accepted as visual variable and which are not accepted **(5 degree)**

1.case 2.name6 3. Privatt 4. x 5.Dom

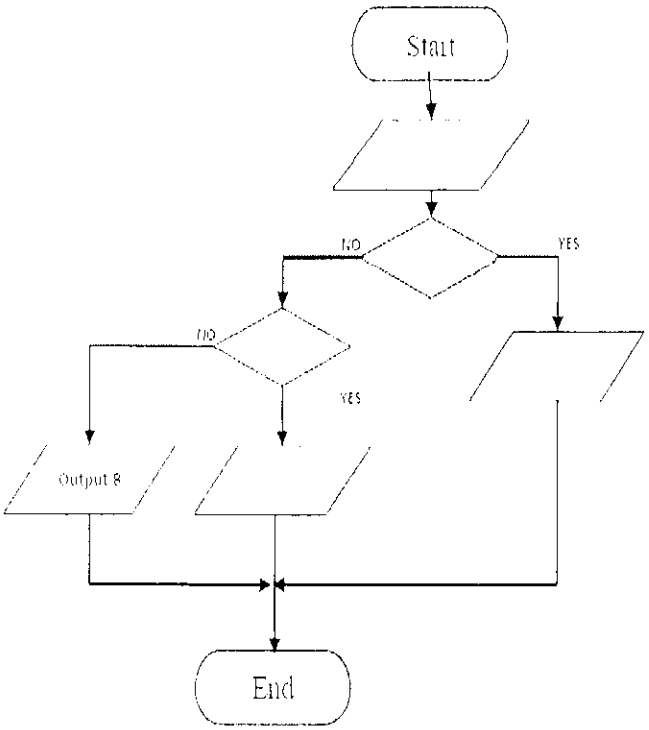
****

Q3:For each of the following sub program find the output: **(24 degree)**

```
1)  private sub button1_click()
Dim dblA as Double
Dim dblB as Double
Dim dblC as Double
Dim dblOutcome as Double
dblA = 45
dblB = 30
dblC = 3 * dblA/dblB
dblOutcome = 2 * dblC + 15
lable11.text= dblOutcome
End Sub
```

```
2) private sub button1_click()
Dim i, j, k, z As Integer
    z = 2
    For i = 1 To 2
      For j = 1 To 2
        For k = 1 To 2
          ListBox1.Items.Add(3 * i + z)
          z = z + 2
        Next k
      Next j
    Next i
    MsgBox(i)
    MsgBox(j)
    MsgBox(k)
End Sub
```

Q4: A :The flowchart below represent program to compare two number if they are equal or one greater than another number, redraw the flowchart with filling the empty shape with the correct statement below. (6 degree)



IS A=B

IS A > B

Output "equal"

Read A,B

Output A

Q4:B: Identify the syntax and logic ERROS in the following statements (10 degree

1. for i= -1 to 10
2. for j= 1 to - 4 step -3
3. for k= 10 to 1
4. for i = 2 to 6 step 2
5. for i= 5 step 3 to 10

****

Q5: write program that enter five numbers and find the average of even numbers and average of odd numbers and display the result in listbox (15 degree

****

بالتوفـــــيـق

مدرّس المادة

24/02/2016

رئيس القسم

ليث وجيه

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

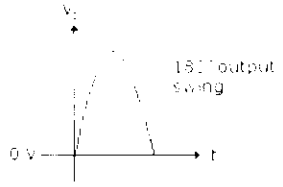
القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة دوائر الكترونية
زمن الامتحان: ساعتان
التاريخ: 2/ /2016

امتحان الفصل الأول- العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Note: figures in the back of question's paper

Q1/a) Choose the correct answer : **(10 Marks)**



1. Refer to the given figure. This is an example of the output swing for a class _____ amplifier.

A. a **B.** b **C.** c **D.** d

2.Which of the following describe(s) a power amplifier?

A. It can handle large power. **B.** It can handle large current.

C. It does not provide much voltage gain. **D.** All of the above

3. _____ is a head-to-tail arrangement of two or more op amp circuits.

A. a Schmitt trigger. **B.** A cascade connection.

C. a Sample & Hold Circuits. **D.** none of the above.

4.Refer to the given figure. A square-wave input is applied to this amplifier. The output voltage is most likely to be

A. a square wave. **B.** a sine wave.

C. a triangle wave. **D.** no output.

5. How many op-amps are required to implement this equation? V V

A. 2 **B.** 3 **C.** 4 **D.**1

Q1/b) Write true or false with an indication of the reason if false: **(15Marks)**

1.An op-amp integrator uses a capacitor as the feedback element.

2.A circuit in which output follows the input is called voltage follower.

3.A class C amplifier is a linear amplifier.

4.A class A amplifier conducts 180° of the cycle.

5.Class B amplifiers are usually zero-biased.

Q2/a) What is the input impedance as seen by the source V_a of the circuit in figure (1)? **(10Marks)**

b) calculate the output voltages V_2 &V_3 in the circuit in figure(2). **(15Marks)**

Q3/a) Derive the output voltage of integrator amplifier with drawing the circuit. **(10 Marks)**

b)Looking at the circuit in figure(3),what effect does R_L have on the value of V_o. **(15Marks)**

Q4/a) What is the output voltages value in figure (4)? **(10 Marks)**

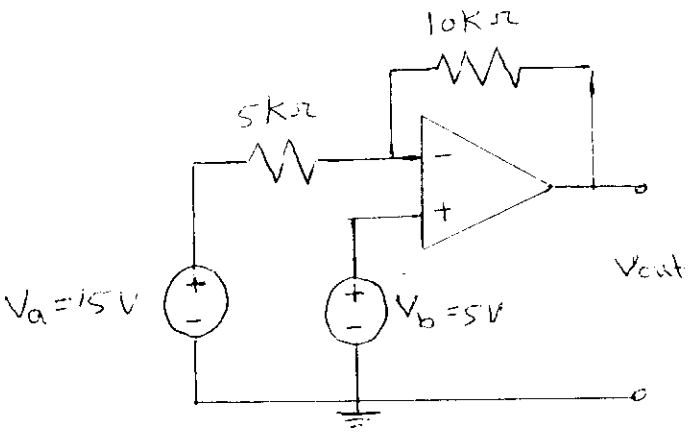
b)Design an OP-AMP circuit to have an output $V_o = 4V_1 + 2V_2$. **(15 Marks)**

GOOD LUCK

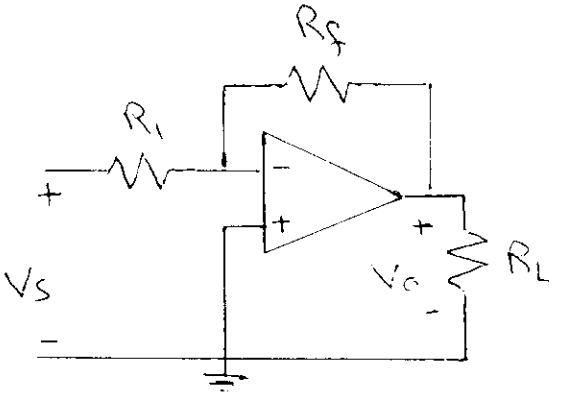
25/02/2016

رئيس القسم
ليث وجيه عبد الله

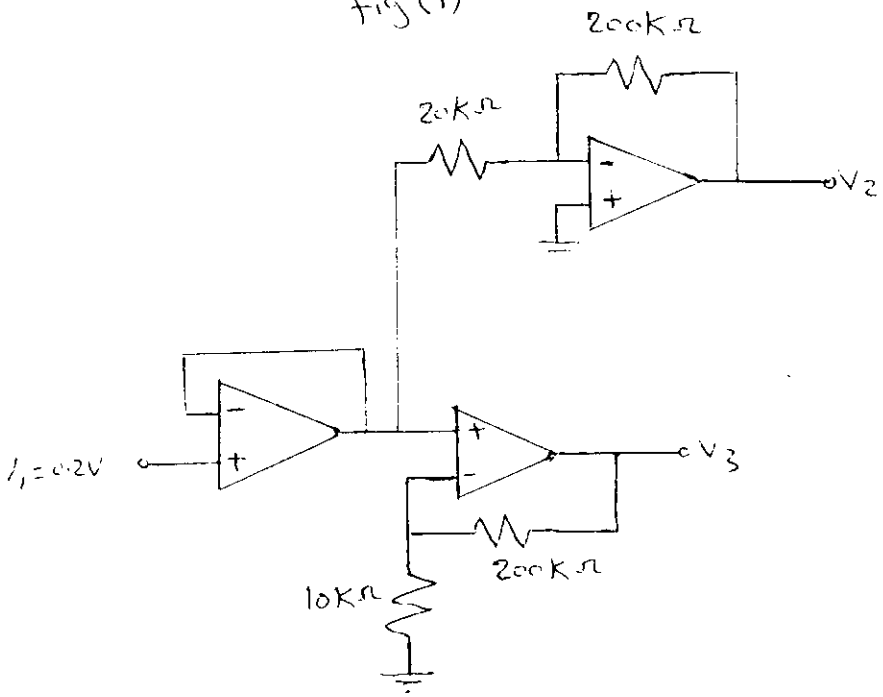
مدرسة المادة
روى شلال عنوز



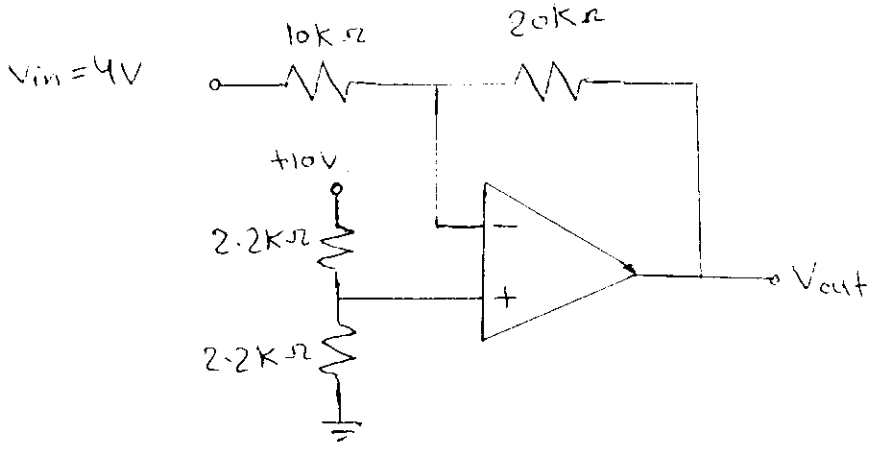
fig(1)



fig(3)



fig(2)



fig(4)

وزارة التعليم العالي والبحث العلمي

هيئة التعليم التقني

جامعة الفرات الاوسط التقنية

الكلية التقنية- نجف

الفسم : هندسه تقنيات الاتصالات

المرحلة : الثانية

المادة: مجالات كهرومغناطيسية

التاريخ : ٢٠١٦/٦/٨

امتحان الفصل الاول- العام الدراسي ٢٠١٥ - ٢٠١٦

Note: Attempt all questions. For each question 25%.

Q1: A- A vector field is specified as: $C = 24xy\,i + 12(x^2 + 2y)j + 18z^2\,k$. Assume there are two given points such as p(1.2.-1) and q(-2,1,3) then calculate:

I- C at p.
II- The unit vector in the direction of C at q.
III- The unit vector directed from q towards p.
IV- The equation of the surface on which $|C| = 60$. (10%)

Q1: B- Assume there is a electron at the center of coordinate system, let the electric field E_1 is 0.5 V/m when the time is $t_o = 0.05\ sec$. compute the quantity of the electric field E_1. if you know that the field varied according to the time, when $t_1 = 0.1\ sec$. Use E_1 and t_1 to compute the velocity of this electron at vacuum. (15%)

Q2:A- give the reason for 4-items of the following. (give the necessary draws or equations if you need).

1. $i \times i = 0\ while\ i \cdot i = 1$
2. The length of your receiver cable is not as important as we believe.
3. Using the flux concept, $\emptyset = \oint_s A.ds$. only the component of A perpendicular to the surface has a positive contribution to flux, as the tangential components only result in flow of vector A along the surface.
4. Using Stock's theorem concept, why the total result for all contours yielding no net line integral.
5. The electric field principle is only useful when there are a large number of charges present as each charge exerts a force on all the others. (12%)

Q2: B- Assume there are about 125 electrons accumulated at conducting surface, exactly at point such as p, compute the total electric field produced by these electrons. Let r = 0.025m. (13%)

Q3:A- There are three different types of charge distribution, list all these types, and explain in details any one of them. (15%)

Q3:B- Prove two of the following: (10%)

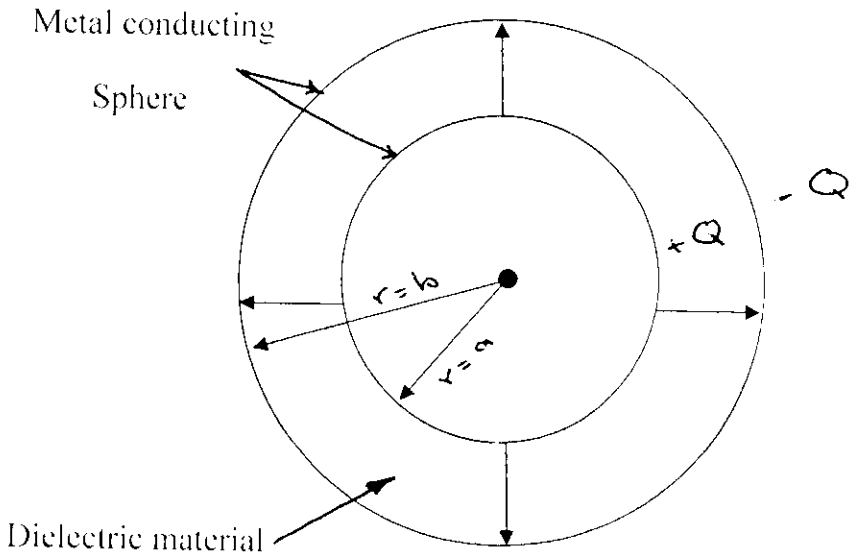
1. Divergence theorem.
2. $E_y = \begin{cases} {}^{\sigma_o}/_{2\varepsilon_o}, y > 0 \\ -{}^{\sigma_o}/_{2\varepsilon_o}, y < 0 \end{cases}$
3. $E = {}^{D_s}/_{\varepsilon_o}$

Q4:A- Figure (1) shown in your exam sheet explaining an important phenomena. describe this phenomena in details, support your answer with the required equations. (15%)

Q4: B- Fill in the blanks with the suitable definitions. Select only two. (10%)

i. Gauss's law stated that ..... .
ii. Coulomb's law shows that ..... .
iii. The Curl principle is used for ..... .

Fig. (1)



Good Luck for all students

28/02/2016

Teacher in charge

A. L. Hussam N. Anssary

Head of Dept.

A.L. Laith W. Abdullah

قسم الاتصالات
د/ ٢

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: مكائن كهربائية
زمن الامتحان: ساعتان
التاريخ: ٢٩ /٠٢ /٢٠١٥

امتحان الفصل الأول- العام الدراسي ٢٠١٥/٢٠١٦

First Course Examination 2015 - 2016

NOTE: Answer **Four** Questions. All questions have **same weight**.

Q1: Generators are usually classified according to the way in which their fields are exited. List all types. Definition and explain each one of them.(Answer must be included the figures for all types)

Q2: Ten measurements of the resistance of a resistor gave 101.2 Ω, 101.7 Ω, 101.3 Ω, 101.0 Ω, 101.5 Ω, 101.3 Ω,101.2 Ω, 101.4 Ω, 101.3 Ω, and 101.1 Ω. Assume that only random errors are present. Calculate

A) the arithmetic mean

B) the standard deviation of the reading

C) the probable error.

Q3: A long-shunt compound generator delivers a load current of 50A at 500V and has armature, series field, and shunt field resistances of 0.05ohm, 0.03ohm, and 250ohm respectively. Calculate the generator voltage and the armature current. Allow 1V per brush for contact drop.

Q4: The current passing through a resistor of 100 ± 0.2 Ω is 2.00 ± 0.01 A. Using the relationship $P = I^2R$, calculate the limiting error in the computed value of power dissipation.

Q5: In a 120V compound generator, the resistances of the armature, shunt field, and series windings are 0.06ohm, 25ohm, and 0.04ohm respectively. The load current is 100A at 120V. Find the induced e.m.f and the armature current when the machine is connected as (a) long-shunt and as (b) short-shunt. Neglect brush contact drop.

Good Lock

29/02/2016

Examiner — Abd. Grahman H. Kshash

Department Head — Laith Wajeeh

قسم الاتصالات

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الاوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/2
زمن الامتحان: ساعتان
التاريخ: 1 /3/ 2016

امتحان الفصل الأول- العام الدراسي 2016/2015

Answer All Questions

Q1// Solve all the following equations: (50)

a) $y^2\frac{dy}{dx} = cos^2 x$

b) $\frac{dy}{dx} = -\left(\frac{x^2 + y^2}{2xy}\right)$

c) $(3x^2y^4 + 2xy)dx + (2x^3y^3 - x^2)dy = 0$

d) $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 10y = 2x - 3 + 3e^x$

e) $x\frac{dy}{dx} + 3y = \frac{\sin y}{x^2}$

Q2 a) Find the volume of the region bounded above by the paraboloid $(Z = 2 - x^2 - y^2)$ and below by the paraboloid $(Z = x^2 + y^2)$. (15)

b) Evaluate $\int_0^1 \int_{2y}^{y} \cos(x^2)\, dxdy$ (10)

Q3 a) Find the volume of the upper region cut from the solid sphere where $\rho \le 1$ by the cone $\phi = \frac{\pi}{3}$. (15)

b) Evaluate $\int_{-1}^{1} \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dy\, dx$ (10)

Good Luck

01/03/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

قسم الاتصالات

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة: نظرية المعلومات
زمن الامتحان: ساعتان
التاريخ: ٢٠١٦/٠٣/٠٣

امتحان الفصل الأول- العام الدراسي ٢٠١٥/٢٠١٦

Part – A(40 MARKS)

- ***Each blank carries 5 marks.***
- **Fill the following blanks:**

1. The probability of selecting a month with **30** days is ---------- **(the solution must be** included **)**
2. A **4**-symbols alphabet have the codes are assigned to the symbols $\mathbf{a_1}$=110, $\mathbf{a_2}$=0, $\mathbf{a_3}$=10, $\mathbf{a_4}$=111. Decode bits stream1001101111001100110 the sequence of symbols ----------
3. The ----------of the code-word length is the numbers of non-zero elements.
4. Two dice are rolled and the numbers are added together. The probability of the total being **1** is --------
5. The standard matrix set code-word there are ---------- co-set.
6. Name the two source coding techniques are ---------- and ----------
7. If the base of logarithm function is 10 ,then I(x_i)has the units of ----------

Part – B (60 MARKS)

- ***Answer all the following questions:***

Q1:A:-Consider the linear block code with the code word defined: *(15 marks)*

$\mathbf{c = m_1 + m_2 + m_4 + m_5, m_1 + m_3 + m_4 + m_5, m_1 + m_2 + m_3 + m_5, m_1 + m_2 + m_3 + m_4, m_1, m_2, m_3, m_4, m_5}$.

a) Show the generator matrix.
b) Show the parity check matrix.
c) Find **n** ,**k** ,andfive only code words ?

Q1:B:- *The channel matrix of the random variables is given by:* *(10 marks)*

$$\begin{bmatrix} 0.9 & 0.1 \\ 0.2 & 0.8 \end{bmatrix}$$

Find:

a) The joint probabilities $P(x_1, y_2)$and $P(x_2, y_1)$when $P(x_1) - P(x_2) = 0.5$.
b) $P(y_1)$ and $p(y_2)$ when $P(x_1) - P(x_2) = 0.5$.

Q2:-*A zero memory source emits messages* $\mathbf{m_1}$ *and* $\mathbf{m_2}$ *with probabilities* ***0.8*** *and* ***0.2****respectively ,find the* ***Huffman*** *(binary code for this source as well as for its second and third order extension).Determine the code efficiencies in each case?* *(15 marks)*

Q3:A:-*Find the sample space for tossing 3 coins ,then find* ***P(exactly 2 heads)****?* *(8 marks)*

Q3:B:-*Show that a binary memoryless source* ***X*** *with two symbols are equiprobable . and plot the source entropy ?* *(12 marks)*

HoD:
Laith Wajeeh

Lecturer:
Hawraa F.Abd

جمهورية العراق

وزارة التعليم العالي و البحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات الاتصالات

المرحلة الثانية

أسئلة الفصل الأول للعام الدراسي

٢٠١٥-٢٠١٦

شعبة ضمان الجودة و الأداء الجامعي

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: نظم الاتصالات/1
زمن الامتحان: ساعتان
التاريخ: 2016/ 02/21

أسئلة امتحان الفصل الأول للعام الدراسي 2016/2015

Note: Answer all questions

Q1/

A. How can you obtain a DSB-SC signal? (10 marks)

B. A signal f(t) has energy E. Calculate the energy of the signal f(2t). (10 marks)

Q2/

A. Explain why the maximum efficiency transmission in AM with large carrier is 33.33%? (10 marks)

B. A telephone transmitter using AM has unmodulated carrier output power of 20 kW and can be modulated to a maximum depth of 80% by a sinusoidal modulating voltage without causing overloading. Find the value to which unmodulated carrier power may be increased without resulting in overloading if the maximum permitted modulation index is restricted to 60%. (20 marks)

Q3/

The noise figure of a receiver is 20 dB and it is fed by a low noise amplifier which has a gain of 40 dB and noise temperature of 80^{o} K. Calculate the overall noise temperature of the receiving system and the noise temperature of the receiver.

Assuming $T_0 = 300^{o}$ K (20 marks)

Q4/

A. For an LTIC system with the impulse response $h(t) = 6e^{-t}\,u(t)$, determine the system response to the input $f(t) = 2u(t)$ (15 marks)

B. Find the Fourier transform of the unit gate function

$$rect\ (t) \triangleq \begin{cases} 1 & |t| < \frac{1}{2} \\ 0 & |t| > \frac{1}{2} \end{cases}$$ (15 marks)

21/02/2016

رئيس القسم: ليث وجيه عبد الله

مدرس المادة: أحمد حسن هادي

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية نجف

القسم: قسم هندسة تقنيات الاتصالات
المرحلة: الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ساعتان
التاريخ:2016/02/23

امتحان الفصل الاول للعام الدراسي 2015 – 2016

Q1. A) Multiple Choice Questions: **(10 Marks)**

1. A 4-bit ripple counter consists of flip-flops that each have a propagation delay from clock to Q output of 20 ns. For the counter to recycle from 1111 to 0000, it takes a total of
(a) 20 ns (b) 40 ns (c) 60 ns (d) 80 ns

2. The terminal count of a modulus-31 binary counter is
(a) 11111 (b) 11110 (c) 00000 (d) 11101

3. The group of bits 0111 is serially shifted (right-most bit first) into an 4-bit parallel output shift register with an initial state of 1110. After three clock pulses, the register contains.
(a) 1111 (b) 1110 (c) 0111 (d) 0000

4. With a 1 MHz clock frequency, eight bits can be parallel entered into a shift register
(a) in 8 μs (b) in 4 μs (c) in 2 μs (d) in 1 μs

5. When an 8-bit serial in/serial out shift register is used for a 24 μs time delay, the clock frequency must be
(a) 41.67 kHz (b) 333 kHz (c) 125 kHz (d) 8 MHz

Q1. B) How to construct an asynchronous MOD-60 counter? **(10 Marks)**

Q2.A) Refer to Figure 1. List the states of the output indicators of the shift register after each clock pulse. **(10 Marks)**

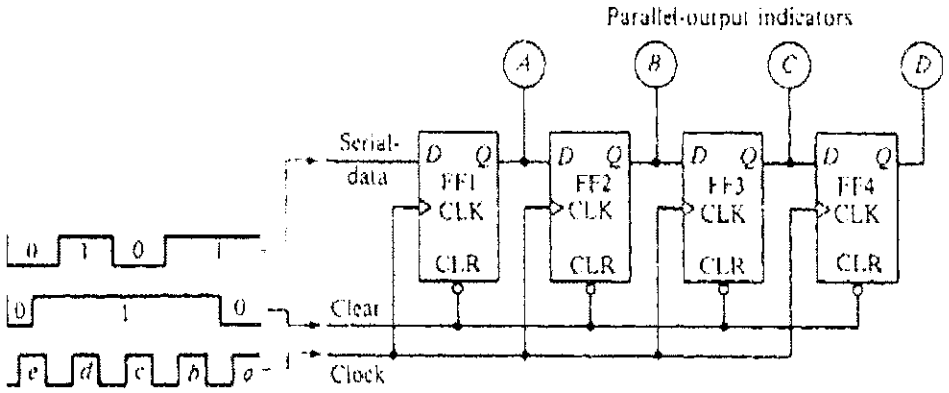


Figure 1

Q2.B) Develop a synchronous 2-bit up/down counter. The counter [illegible] when an UP /$\overline{DOWN}$ control input is 1 and count down when the control input [illegible]

(15 Marks)

Q3. A) Design a counter to produce the following decimal sequence.

2, 5, 1, 3, 6, 4, 2, 5, 1, 3... (15 Marks)

1. How many states does this counter have?
2. How many flip-flops are required to build this counter?
3. Draw the state diagram for this circuit.
4. If D flip-flops are to be used, write the excitation equation for the flip-flops inputs.
5. Draw the logic circuit for this counter.

Q3. B) Illustrate a 4-bit data movement for parallel in serial out shift registers and draw typical logic symbol. **(10 Marks)**

Q4. A) Implement the function F (a, b, c, d) = $\sum$ m (4, 5, 8, 9, 10, 11, 12, 13) using tow 2×4 decoders and two external OR gate. **(15 Marks)**

Q4. B) Design a four-input priority encoder using K-map, such that the input D_2 has the highest priority, D_1 has next highest priority, D_3 has the lowest priority.

(15 Marks)

23/02/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني /جامعة الفرات الاوسط التقنية
الكلية التقنية- نجف

القسم : هندسة الاتصالات و السير
المرحلة :الثانية
المادة: حاسبة
وقت الامتحان: ساعتان
التاريخ: ٢٤/ ٢ / ٢٠١٦ م

امتحان الفصل الاول للعام الدراسي 2015– 2016

Answer All Questions

Q1 :A: Give the correct representation in visual basic for the following equations: **(15 degree)**

1. $\cos(t) - \sin^2(3t)$.
2. $e^{4t}(1+\cos(8t))$.
3. $|z-x^8|+6$

Q1:B: Find the result for each of the followings: **(15 degree)**

1. Math.sqrt(81) + 2.
2. Math.truncate (456.467).
3. Math .round(267.37865 , 3)

****

Q2:A: Select the correct choice for the following statements: **(10 degree)**

1.Creates a box that can be used to retrieve one piece of information from a user.
A. MSGBOX B. INPUTBOX C. Dialog Box D.Label

2. The code statement, 7 > = 5, will have a resulting condition
A: no B: true C: false D : none

Q2:B: which of the following accepted as visual variable and which are not accepted **(5 degree)**

1.case 2.name6 3. Privatt 4. x 5.Dom

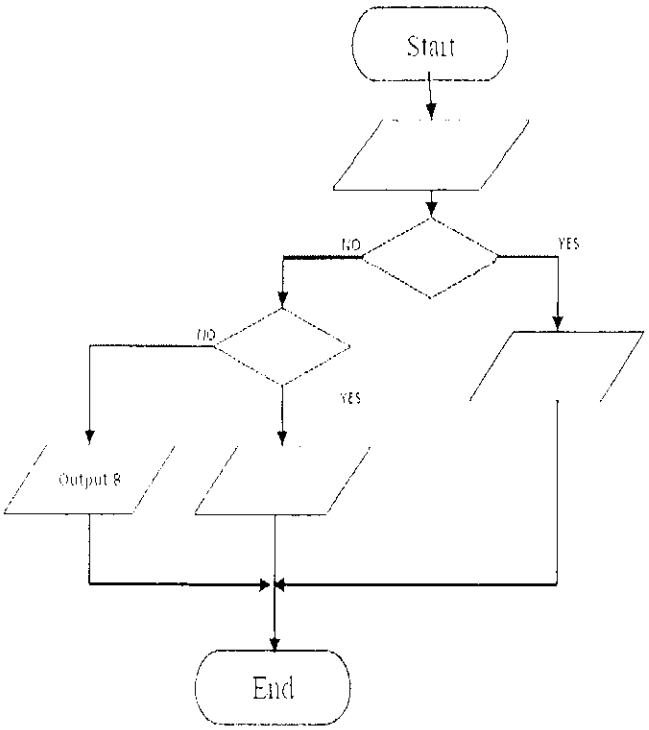
****

Q3:For each of the following sub program find the output: **(24 degree)**

```
1)  private sub button1_click()
Dim dblA as Double
Dim dblB as Double
Dim dblC as Double
Dim dblOutcome as Double
dblA = 45
dblB = 30
dblC = 3 * dblA/dblB
dblOutcome = 2 * dblC + 15
lable11.text= dblOutcome
End Sub
```

```
2) private sub button1_click()
Dim i, j, k, z As Integer
    z = 2
    For i = 1 To 2
      For j = 1 To 2
        For k = 1 To 2
          ListBox1.Items.Add(3 * i + z)
          z = z + 2
        Next k
      Next j
    Next i
    MsgBox(i)
    MsgBox(j)
    MsgBox(k)
End Sub
```

Q4: A :The flowchart below represent program to compare two number if they are equal or one greater than another number, redraw the flowchart with filling the empty shape with the correct statement below. (6 degree)



IS A=B

IS A > B

Output "equal"

Read A,B

Output A

Q4:B: Identify the syntax and logic ERROS in the following statements (10 degree

1. for i= -1 to 10
2. for j= 1 to - 4 step -3
3. for k= 10 to 1
4. for i = 2 to 6 step 2
5. for i= 5 step 3 to 10

****

Q5: write program that enter five numbers and find the average of even numbers and average of odd numbers and display the result in listbox (15 degree

****

بالتوفـــــيـق

مدرّس المادة

24/02/2016

رئيس القسم

ليث وجيه

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

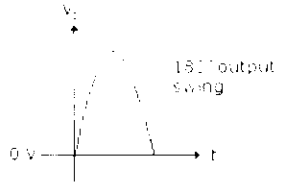
القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة دوائر الكترونية
زمن الامتحان: ساعتان
التاريخ: 2/ /2016

امتحان الفصل الأول- العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Note: figures in the back of question's paper

Q1/a) Choose the correct answer : **(10 Marks)**



1. Refer to the given figure. This is an example of the output swing for a class _____ amplifier.

A. a **B.** b **C.** c **D.** d

2.Which of the following describe(s) a power amplifier?

A. It can handle large power. **B.** It can handle large current.

C. It does not provide much voltage gain. **D.** All of the above

3. _____ is a head-to-tail arrangement of two or more op amp circuits.

A. a Schmitt trigger. **B.** A cascade connection.

C. a Sample & Hold Circuits. **D.** none of the above.

4.Refer to the given figure. A square-wave input is applied to this amplifier. The output voltage is most likely to be

A. a square wave. **B.** a sine wave.

C. a triangle wave. **D.** no output.

5. How many op-amps are required to implement this equation? V V

A. 2 **B.** 3 **C.** 4 **D.**1

Q1/b) Write true or false with an indication of the reason if false: **(15Marks)**

1.An op-amp integrator uses a capacitor as the feedback element.

2.A circuit in which output follows the input is called voltage follower.

3.A class C amplifier is a linear amplifier.

4.A class A amplifier conducts 180° of the cycle.

5.Class B amplifiers are usually zero-biased.

Q2/a) What is the input impedance as seen by the source V_a of the circuit in figure (1)? **(10Marks)**

b) calculate the output voltages V_2 &V_3 in the circuit in figure(2). **(15Marks)**

Q3/a) Derive the output voltage of integrator amplifier with drawing the circuit. **(10 Marks)**

b)Looking at the circuit in figure(3),what effect does R_L have on the value of V_o. **(15Marks)**

Q4/a) What is the output voltages value in figure (4)? **(10 Marks)**

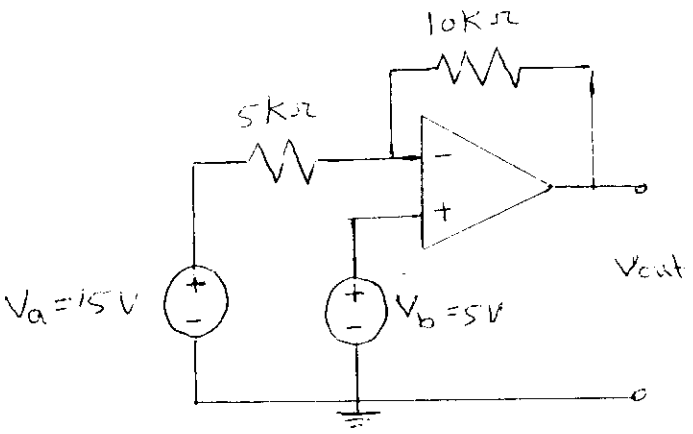
b)Design an OP-AMP circuit to have an output $V_o = 4V_1 + 2V_2$. **(15 Marks)**

GOOD LUCK

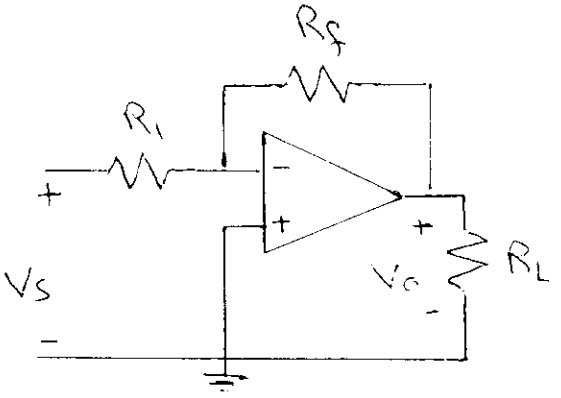
25/02/2016

رئيس القسم
ليث وجيه عبد الله

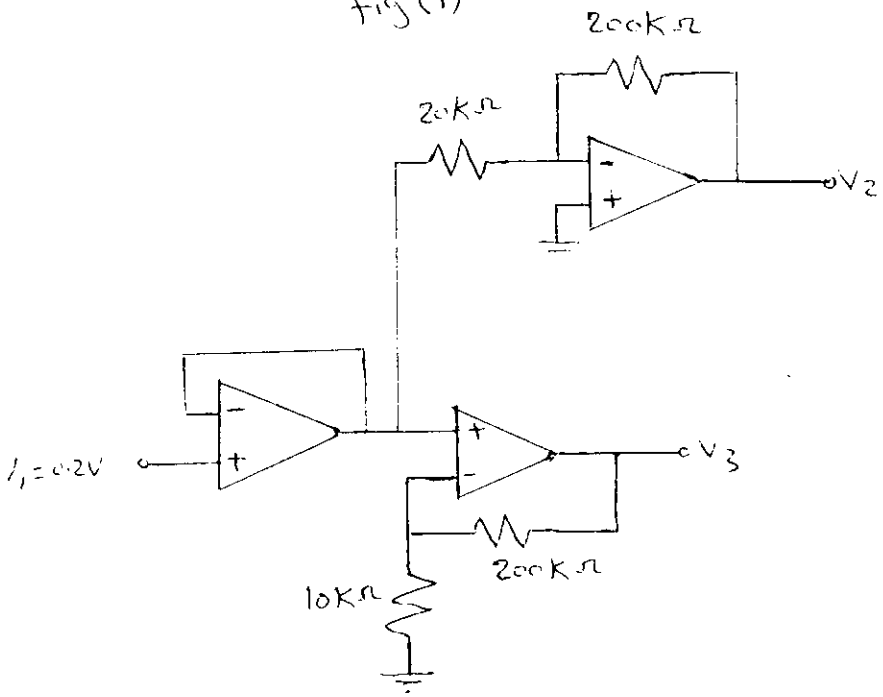
مدرسة المادة
روى شلال عنوز



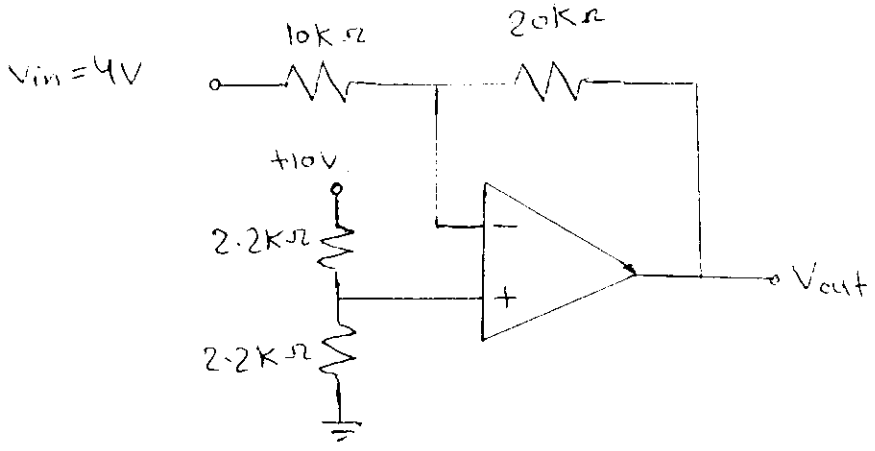
fig(1)



fig(3)



fig(2)



fig(4)

وزارة التعليم العالي والبحث العلمي

هيئة التعليم التقني

جامعة الفرات الاوسط التقنية

الكلية التقنية- نجف

الفسم : هندسه تقنيات الاتصالات

المرحلة : الثانية

المادة: مجالات كهرومغناطيسية

التاريخ : ٢٠١٦/٦/٨

امتحان الفصل الاول- العام الدراسي ٢٠١٥ - ٢٠١٦

Note: Attempt all questions. For each question 25%.

Q1: A- A vector field is specified as: $C = 24xy\,i + 12(x^2 + 2y)j + 18z^2\,k$. Assume there are two given points such as p(1.2.-1) and q(-2,1,3) then calculate:

I- C at p.
II- The unit vector in the direction of C at q.
III- The unit vector directed from q towards p.
IV- The equation of the surface on which $|C| = 60$. (10%)

Q1: B- Assume there is a electron at the center of coordinate system, let the electric field E_1 is 0.5 V/m when the time is $t_o = 0.05\ sec$. compute the quantity of the electric field E_1. if you know that the field varied according to the time, when $t_1 = 0.1\ sec$. Use E_1 and t_1 to compute the velocity of this electron at vacuum. (15%)

Q2:A- give the reason for 4-items of the following. (give the necessary draws or equations if you need).

1. $i \times i = 0\ while\ i \cdot i = 1$
2. The length of your receiver cable is not as important as we believe.
3. Using the flux concept, $\emptyset = \oint_s A.ds$. only the component of A perpendicular to the surface has a positive contribution to flux, as the tangential components only result in flow of vector A along the surface.
4. Using Stock's theorem concept, why the total result for all contours yielding no net line integral.
5. The electric field principle is only useful when there are a large number of charges present as each charge exerts a force on all the others. (12%)

Q2: B- Assume there are about 125 electrons accumulated at conducting surface, exactly at point such as p, compute the total electric field produced by these electrons. Let r = 0.025m. (13%)

Q3:A- There are three different types of charge distribution, list all these types, and explain in details any one of them. (15%)

Q3:B- Prove two of the following: (10%)

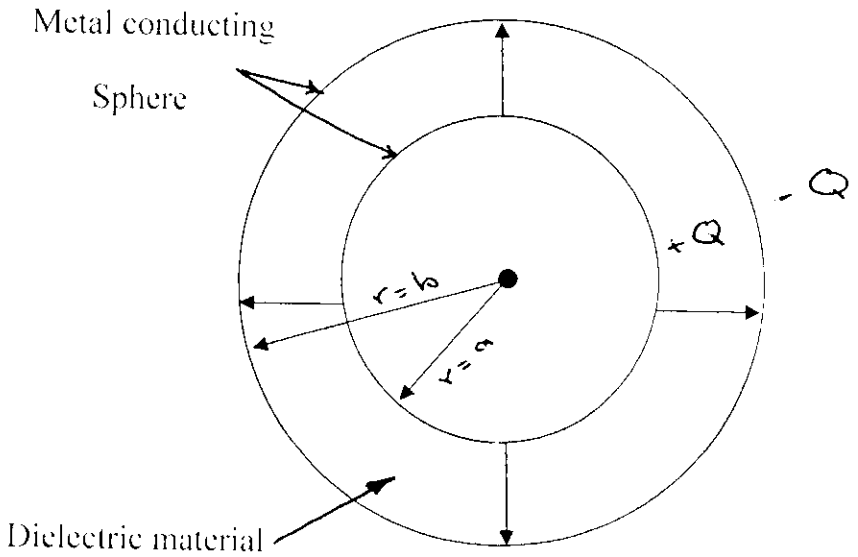
1. Divergence theorem.
2. $E_y = \begin{cases} {}^{\sigma_o}/_{2\varepsilon_o}, y > 0 \\ -{}^{\sigma_o}/_{2\varepsilon_o}, y < 0 \end{cases}$
3. $E = {}^{D_s}/_{\varepsilon_o}$

Q4:A- Figure (1) shown in your exam sheet explaining an important phenomena. describe this phenomena in details, support your answer with the required equations. (15%)

Q4: B- Fill in the blanks with the suitable definitions. Select only two. (10%)

i. Gauss's law stated that ..... .
ii. Coulomb's law shows that ..... .
iii. The Curl principle is used for ..... .

Fig. (1)



Good Luck for all students

28/02/2016

Teacher in charge

A. L. Hussam N. Anssary

Head of Dept.

A.L. Laith W. Abdullah

قسم الاتصالات
د/ح

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: مكائن كهربائية
زمن الامتحان: ساعتان
التاريخ: ٢٩/ ٠٢/ ٢٠١٥

امتحان الفصل الأول- العام الدراسي ٢٠١٥/٢٠١٦

First Course Examination 2015 - 2016

NOTE: Answer **Four** Questions. All questions have **same weight**.

Q1: Generators are usually classified according to the way in which their fields are exited. List all types. Definition and explain each one of them.(Answer must be included the figures for all types)

Q2: Ten measurements of the resistance of a resistor gave 101.2 Ω, 101.7 Ω, 101.3 Ω, 101.0 Ω, 101.5 Ω, 101.3 Ω,101.2 Ω, 101.4 Ω, 101.3 Ω, and 101.1 Ω. Assume that only random errors are present. Calculate

A) the arithmetic mean

B) the standard deviation of the reading

C) the probable error.

Q3: A long-shunt compound generator delivers a load current of 50A at 500V and has armature, series field, and shunt field resistances of 0.05ohm, 0.03ohm, and 250ohm respectively. Calculate the generator voltage and the armature current. Allow 1V per brush for contact drop.

Q4: The current passing through a resistor of 100 ± 0.2 Ω is 2.00 ± 0.01 A. Using the relationship $P = I^2R$, calculate the limiting error in the computed value of power dissipation.

Q5: In a 120V compound generator, the resistances of the armature, shunt field, and series windings are 0.06ohm, 25ohm, and 0.04ohm respectively. The load current is 100A at 120V. Find the induced e.m.f and the armature current when the machine is connected as (a) long-shunt and as (b) short-shunt. Neglect brush contact drop.

Good Lock

Examiner
Abd. Grahman H. Kshash

29/02/2016

Department Head
Laith Wajeeh

قسم الاتصالات

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الاوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/2
زمن الامتحان: ساعتان
التاريخ: 1 /3/ 2016

امتحان الفصل الأول- العام الدراسي 2016/2015

Answer All Questions

Q1// Solve all the following equations: (50)

a) $y^2\frac{dy}{dx} = cos^2 x$

b) $\frac{dy}{dx} = -\left(\frac{x^2 + y^2}{2xy}\right)$

c) $(3x^2y^4 + 2xy)dx + (2x^3y^3 - x^2)dy = 0$

d) $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 10y = 2x - 3 + 3e^x$

e) $x\frac{dy}{dx} + 3y = \frac{\sin y}{x^2}$

Q2 a) Find the volume of the region bounded above by the paraboloid $(Z = 2 - x^2 - y^2)$ and below by the paraboloid $(Z = x^2 + y^2)$. (15)

b) Evaluate $\int_0^1 \int_{2y}^{y} \cos(x^2)\, dxdy$ (10)

Q3 a) Find the volume of the upper region cut from the solid sphere where $\rho \le 1$ by the cone $\phi = \frac{\pi}{3}$. (15)

b) Evaluate $\int_{-1}^{1} \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dy\, dx$ (10)

Good Luck

01/03/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

قسم الاتصالات

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة: نظرية المعلومات
زمن الامتحان: ساعتان
التاريخ: ٢٠١٦/٠٣/٠٣

امتحان الفصل الأول- العام الدراسي ٢٠١٥/٢٠١٦

Part – A(40 MARKS)

- ***Each blank carries 5 marks.***
- **Fill the following blanks:**

1. The probability of selecting a month with **30** days is ---------- **(the solution must be** included **)**
2. A **4**-symbols alphabet have the codes are assigned to the symbols $\mathbf{a_1}$=110, $\mathbf{a_2}$=0, $\mathbf{a_3}$=10, $\mathbf{a_4}$=111. Decode bits stream1001101111001100110 the sequence of symbols ----------
3. The ----------of the code-word length is the numbers of non-zero elements.
4. Two dice are rolled and the numbers are added together. The probability of the total being **1** is --------
5. The standard matrix set code-word there are ---------- co-set.
6. Name the two source coding techniques are ---------- and ----------
7. If the base of logarithm function is 10 ,then I(x_i)has the units of ----------

Part – B (60 MARKS)

- ***Answer all the following questions:***

Q1:A:-Consider the linear block code with the code word defined: *(15 marks)*

$\mathbf{c = m_1 + m_2 + m_4 + m_5, m_1 + m_3 + m_4 + m_5, m_1 + m_2 + m_3 + m_5, m_1 + m_2 + m_3 + m_4, m_1, m_2, m_3, m_4, m_5}$.

a) Show the generator matrix.
b) Show the parity check matrix.
c) Find **n** ,**k** ,andfive only code words ?

Q1:B:- *The channel matrix of the random variables is given by:* *(10 marks)*

$$\begin{bmatrix} 0.9 & 0.1 \\ 0.2 & 0.8 \end{bmatrix}$$

Find:

a) The joint probabilities $P(x_1, y_2)$and $P(x_2, y_1)$when $P(x_1) - P(x_2) = 0.5$.
b) $P(y_1)$ and $p(y_2)$ when $P(x_1) - P(x_2) = 0.5$.

Q2:-*A zero memory source emits messages* $\mathbf{m_1}$ *and* $\mathbf{m_2}$ *with probabilities* ***0.8*** *and* ***0.2****respectively ,find the* ***Huffman*** *(binary code for this source as well as for its second and third order extension).Determine the code efficiencies in each case?* *(15 marks)*

Q3:A:-*Find the sample space for tossing 3 coins ,then find* ***P(exactly 2 heads)****?* *(8 marks)*

Q3:B:-*Show that a binary memoryless source* ***X*** *with two symbols are equiprobable . and plot the source entropy ?* *(12 marks)*

HoD:
Laith Wajeeh

Lecturer:
Hawraa F.Abd

قسم الاتصالات
ك / ٢

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية نجف

امتحان الفصل الثاني للعام الدراسي 2015 – 2016

القسم: قسم هندسة تقنيات الاتصالات
المرحلة: الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ساعتان
التاريخ: 2016/05/9

Q1) Multiple Choice Questions: **[10 Marks]**

1. **According to the sampling theorem, the sampling frequency should be**
   (a) Less than half the highest signal frequency
   (b) Greater than twice the highest signal frequency
   (c) Less than half the lowest signal frequency
   (d) Greater than the lowest signal frequency
2. **In an *R/2R* DAC, there are**
   (a) Four values of resistors
   (b) One resistor value
   (c) Two resistor values
   (d) A number of resistor values equal to the number of inputs
3. **The bit capacity of a memory that has 1024 addresses and can store one byte at each address is**
   (a) 1024 (b) 8192 (c) 8 (d) 4096
4. **A memory with 256 addresses has**
   (a) 256 address lines (b) 6 address lines
   (c) 1 address line (d) 8 address lines
5. **Optical storage devices employ**
   (a) Ultraviolet light (b) Electromagnetic fields
   (c) Optical couplers (d) Lasers

Q2) Implement the switching function **[20 Marks]**

$$F(x, w, y, z) = \sum m(0,1,2,3,4,9,13,14,15)$$

a. Using two 8-to-1 multiplexers with an active low enable, plus an OR gate.
b. Using one 8-to-1 multiplexers assume (x) as input multiplexed.

Q3) What is the difference between Static Random Access Memory (SRAM) and Dynamic Random Access Memory (DRAM)? **[10 Marks]**

Q4) Obtain the state diagram and state table for the circuit in Figure 1 [illegible] Marks

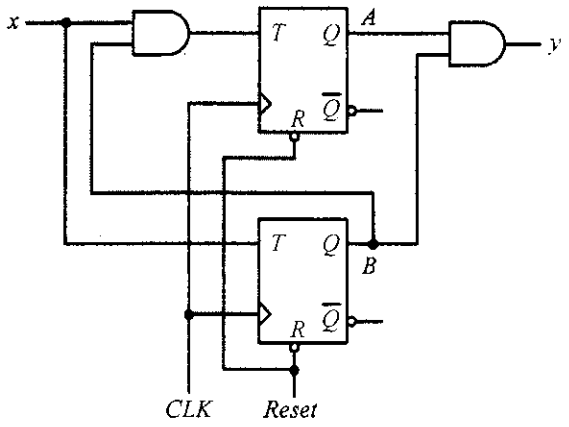
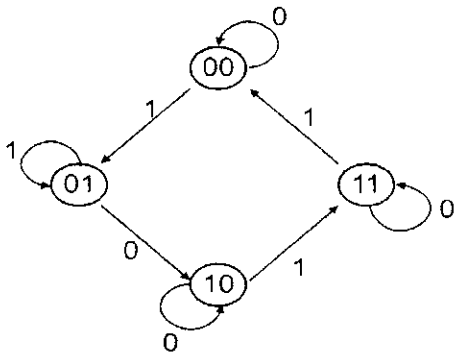


Figure 1

Q5) Given the following state diagram, design the sequential circuit using D flip-flops.

[20 Marks]



Q6) Determine the output of the DAC in Figure 2 if the sequence of 4-bit numbers are 1011,1111 applied to the inputs. The data inputs have a low value of 0 V and a high value of + 5V. **[20 Marks]**

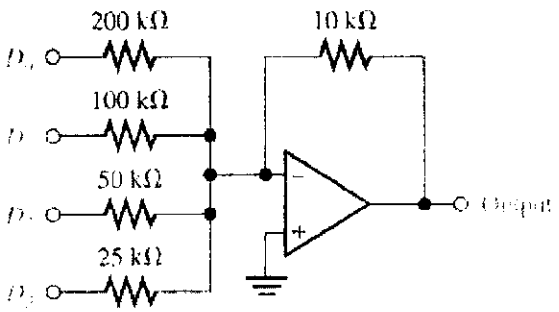


Figure 2

9/05/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

قسم الاتصالات
ت/ ت

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: دوائر الكترونية
زمن الامتحان: ساعتان
التاريخ: 2016/05/03

امتحان الفصل الثاني - العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Note: figures in the back of question's paper

Q1/a) Choose the correct answer: **(10 Marks)**

1. Crossover distortion behavior is characteristic of
A. Class A output stage. **B.** Class B output stage. **C.** Class C output stage. **D.** Common base output.

2. In a negative feedback amplifier using voltage-series feedback .
A. Ri decreases and Ro decreases.
B. Ri decreases and Ro increases.
C. Ri increases and Ro decreases.
D. Ri increases and Ro increases.

3. The voltage gain of an amplifier without feedback is 3000. Calculate the voltage gain of the amplifier if negative voltage feedback is introduced in the circuit. Given that feedback fraction = 0.01.
A. 97.
B. 100.
C. 300.
D. 50.

4. Relaxation oscillators are generally used to _____ for such applications as blinking lights.
A. produce low frequency signals.
B. clock signals.
C. voltage controlled.
D. produce square and triangle waves.

5. _____ in this type the capacitor is both charged and discharged slowly through a resistor, so the output waveform consists of two parts, an increasing ramp and a decreasing ramp.
A. fly back oscillator. **B.** Saw tooth oscillator. **C.** Tri-tet oscillator. **D.** Astable multivibrator oscillator

Q1/b) Write true or false with an indication of the reason if false: **(15Marks)**

1. A low-frequency oscillator (LFO) is an electronic oscillator that generates a frequency below ≈20 Hz.
2. An RF oscillator produces signals in the radio frequency (RF) range of about 100 Hz to 100 MHz .
3. Negative feedback in amplifier design Reduce the effect of noise.
4. If the feedback fraction of an amplifier is0.01, then voltage gain with negative voltage feedback is approximately 1000.
5. Negative feedback is employed in amplifiers.

Q2/a) A crystal has L = 3H, C_S = 0.05 pF, R = 2 kΩ and Cp = 10 pF. Calculate the series-resonant and parallel-resonant frequencies of the crystal. **(10Marks)**

b) With a negative voltage feedback, an amplifier gives an output of 10 V with an input of 0.5 V. When feedback is removed, it requires 0.25 V input for the same output. Calculate (i) gain without feedback (ii) feedback fraction β. **(15Marks)**

Q3/a) Derivative the input and output impedances for shunt-shunt feedback with drawing the circuit. **(10Marks)**

b) A basic Class C-amplifier is shown in fig. (1). the operating frequency is 3MHZ. Calculate the resonant frequency. If width of pulses (56.6ns), find the conduction angle also. **(15Marks)**

Q4/a) Calculate maximum ac output power and the power dissipation of the transistors in the push-pull amplifier shown in fig. (2). **(10 Marks)**

b) Calculate maximum ac output power in the amplifier shown in fig. (3) (Assume VBE = 0). **(15 Marks)**

GOOD LUCK

رئيس القسم
ليث وجيه عبد الله

مدرسة المادة
روى شلال عنوز

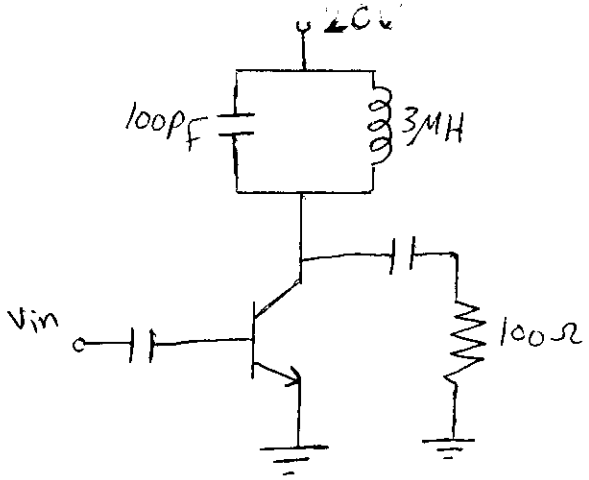
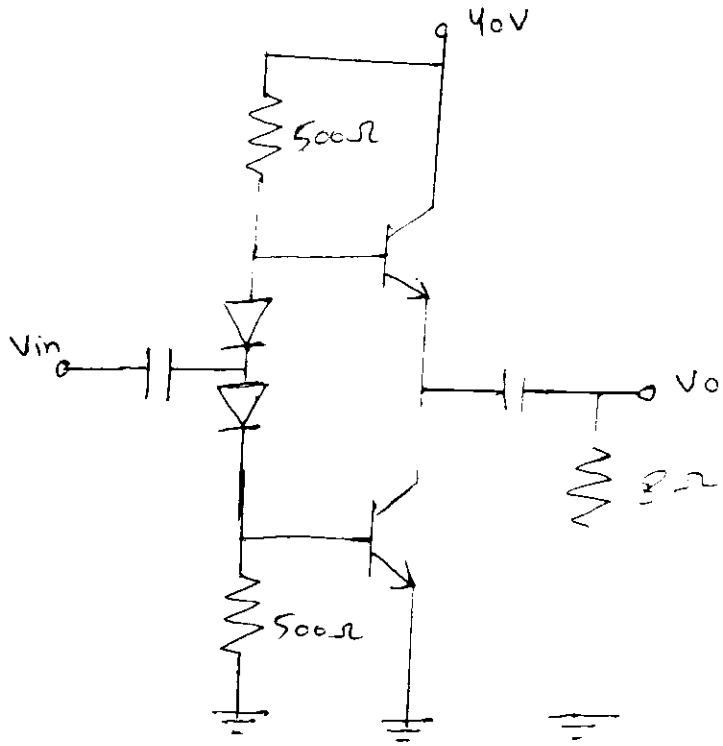


fig.(1)



fig(2)

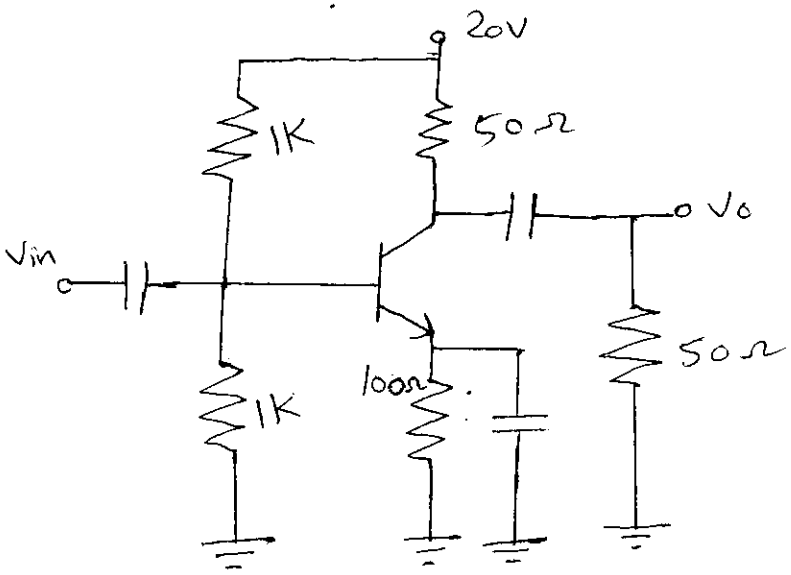


fig.(3)

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الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/٢
زمن الامتحان: ساعتان
التاريخ: 2016/05/02

إمتحان الفصل الثاني- العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Q1// Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point (2,-1,2). (15)

Q2// Show that the vector filed defined by $f = (x^2 + xy^2)i + (y^2 + x^2y)j$ is conservative and find the scalar potential. Hence evaluate $\int F.dR$ from (0,1) to(1,2). (20)

Q3// Evaluate $\iint A.n\,ds$ over the entire surface S of the region bounded by the cylinder $x^2 + z^2 = 9$, x=0,y=0,z=0 and y=8. If A=6zi +(2x+y)j –xk. (25)

Q4 Find Taylor series for f(x)=$\sqrt{x}$. where $x_0 = 4$ (20)

Q5// Solve the equation $\frac{dy}{dx} = -xy$. y(0)=1.Using the first five non-zero terms. (20)

Good Luck

02/05/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

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هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
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القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة :نظرية المعلومات
زمن الامتحان: ساعتان
التاريخ: ٢٠١٦/ ٠٤/ ٣٠

امتحان الفصل الثاني - العام الدراسي ٢٠١٥/٢٠١٦

Answer all questions

Q1:A:-Define of the following terms: ***(i)*** *constraint length* ***(ii)*** *metric* ***(25 MARKS)***

Q1:B:- A (15.5) cyclic code has g(x) $1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$

a) *Draw a syndrome calculator circuit for this code.*
b) *Find the code polynomials for the message polynomial* $1 + x^3 + x^4$. *(in a systematic form).*
c) *Is* $c(x) = 1 + x^4 + x^6 - x^8 - x^{14}$ *a code polynomial in this system?*

Q2:- ***fig.(1)*** *may generated convolutional code with n-moddulo-2 adders .an i\p multiplexer and an o\p multiplexer and the message bits sequence two bits at a time.* ***(25 MARKS)***

a) *Find the encoder memory and the rate efficiency of the code.*
b) *Find generators polynomial for each o\p bit.*

Q3:A:- When a binary code is said to be a cyclic code? ***(25 MARKS)***

Q3:B:- consider ***fig.(2)*** *the central portion of trellis diagram for the convolutional encoder, Draw state and tree diagrams and determine output digits sequence for the data digits (10111).*

Q4:-Given that : $1 + x^7 = (1 + x)(1 + x + x^3)(1 + x^2 + x^3)$ ***(25 MARKS)***

a) List all the valid code for the (7,5) cyclic code.
b) For the (7,3) cyclic code with $h(x) = 1 + x^2 + x^3$,construct systematic generator matrix.
c) Design division encoder for (7,4) cyclic code ,use encoder to find cw for message 0101.

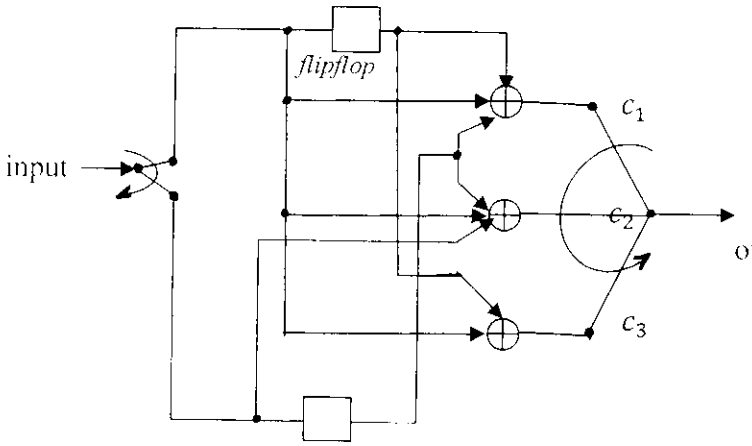

Fig.(1)

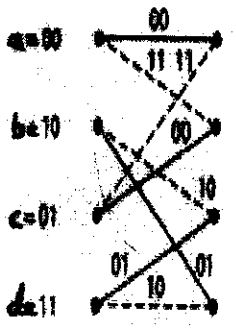

Fig.(2)

30/04/2016

H.O.D.
Laith Wajeeh

Lecturer:

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الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: مكائن كهربائية
زمن الامتحان: ساعتان
التاريخ: ٢٨ /٠٤/ ٢٠١٦

امتحان الفصل الثاني- العام الدراسي ٢٠١٥/٢٠١٦

NOTE: *Answer All Questions.*

Q1: Choose the correct answer for following ***[45 M]***

1) A machine operating as motor may go into regenerative braking mode if its speed becomes
   a. Sufficiently high to make back emf greater than supply voltage
   b. Sufficiently low to make back emf greater than supply voltage
   c. Sufficiently high to make back emf half of the supply voltage
   d. Sufficiently low to make back emf half of the supply voltage
2) In the biomedical instruments like artificial heart pumps, the commonly used motor is
   a. Permanent magnet d.c. motor b. Brushless d.c. motor c. Ward-Leonard system d. Series motor
3) Permanent magnet d.c. motors are extensively used in
   a. Automobiles b. Heaters c. Air conditioners d. All of these
4) The speed of permanent magnet d.c. motor cannot be controlled by
   a. Flux control method b. Rheostat control method c. Electronic circuits d. None of these
7) The torque constant (K_m), of a permanent magnet d.c. motor is 0.25 V sec / radian and armature resistance is 2 ohm. If the applied armature voltage is 90 V, then its zero speed torque is
   a. 10.45 N-m b. 11.25 N-m c. 13.65 N-m d. 15.56 N-m
6) If a resistance is added in series with the field winding of d.c. shunt motor, then its
   a. Both speed and torque decreases b. Both speed and torque increases
   c. Speed decreases, torque increases d. Speed increases, torque decreases
7) Which method is suitable for the speed control, below and above the normal rated speed of d.c. shunt motor?
   a. Flux control method b. Rheostatic control method c. Voltage control method d. All of these
8) With the increase in temperature, the speed of series and shunt motor will
   a. Increase, decrease b. Decrease, increase c. Increase, increase d. Decrease, decrease
9) Speed of d.c. shunt motors are controlled by
   a. Flux control method b. Rheostatic control method c. Voltage control method d. All of these

10) In electric traction, which type of motor is generally used?

a. Shunt motor b. Series motor c. Cumulative compound motor d. Differential compound motor

11) In a differential compound d.c. motor, with increase in load, speed

a. Increases b. Decreases c. Remains same d. None of these

12) D.C. series motors are used in electric traction. What happens to the speed and current of d.c motor if there is sudden slight drop in the mains voltage?

a. Speed decreases and current also decreases b. Speed decreases and current increases

c. Speed increases and current decreases d. Speed decreases and current remains same

13) If a d.c. series motor is started on very light load or on no load then

a. It will run at dangerously high speed which may damage the motor mechanically

b. It will run at very low speed c. Load does not effect the speed of d.c. series motor d. None of these

14) Which motor is not suitable for the application of centrifugal pumps?

a. Shunt motor b. Series motor c. Cumulative compound motor d. Differential compound motor

15) Speed of d.c. shunt motors are controlled by

a. Flux control method b. Rheostatic control method c. Voltage control method d. All of these

Q2: A magnetic circuit of uniform cross-sectional area has two air-gaps of 0.5 and 1 mm respectively in series. The exciting winding provides an MMF of 1200 Amp-turns. Estimate the MMF across each of the air-gaps, and the flux density. ***[25 M]***

Q3: The rotor of a d.c. motor had an original diameter of 30 cm and an air-gap under the poles of 2 mm. During refurbishment the rotor diameter was accidentally reground and was then undersized by 0.5 mm. Estimate by how much the Weld MMF would have to be increased to restore normal performance. How might the extra MMF be provided? ***[30 M]***

-Good Luck

Examiner

Abdelrahman Mohamed 7-2

28/04/2016

Department Head

Laith Najeeb

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية- نجف

القسم : قسم الاتصالات / السيارات
المرحلة :الثانية
المادة: حاسبة
وقت الامتحان:ساعتان
التاريخ:

امتحان الفصل الثاني للعام الدراسي ٢٠١٥ – ٢٠١٦

Answer All Questions

Q1: A: What is the result of execution of the following functions: **(10 degree)**

1. math.Sqrt(64).
2. 7 * math.Pow(3, 3).
3. (math.Round(676.37)) / 2.
4. math.max (5, 90) + 3.
5. math. min(575, 8) + 4.

B: Define the following :

1.Packet 2.ARP 3.Band Width 4.Digital signature 5.firewall **(20 degree)**

****

Q2: Give *only one line of code* that can do the following : **(20 degree)**

1. Change the dimension of matrix (**Dim x(4,7) as integer**) to have **8 row**.
2. Define **vector** with **6 element**.
3. Print in list box the following on **same line** (**Visual DotNet 2008**)
4. Change **text** color of **Button** to **Red**
5. Enable **textbox** to write **many lines**.

****

Q3: A:Give the correct representation in visual basic for the following equations: **(15 degree)**

1. $\cos(t^2)$.
2. $(1+\sin(3t))$.
3. $5\tan(t) + e^t$.
4. $|23 + x|$.
5. $4x + 9y$.

B: Trace the following program and give the content of listbox2. **(5 degree)**

```
Private Sub Button1_Click()
        Dim i, y(5) As Integer
        Dim x(5) As Integer = [5  5  6  6  7  7]
        For i = 5 To 0 Step -1
            ListBox2.Items.Add(x(i))
        Next
End Sub
```

Q4:A: Fill blanks with the missing codes for the following programs: (18 degree)

1. This program display the elements of main digonal.

```
Private Sub Button1_Click()

   Dim x1(,) As Integer = {{5, 0, 0}, {0, 10, 0}, {0, 0, 15}}
        For i = 0 To -------A------
            For j = 0 To ------B------
                If ------C---- Then
                    ListBox1.Items.Add(x1(i, j))
                End If
            Next
        Next
    End Sub
```

2. This program find the maximum number in matrix.

```
Private Sub Button1_Click()

   Dim x(2, 2) as integer = { {10,20,30},{40,50,60),{70,80,90} }
   Dim  i, j, max As Integer
        max = ----D-------
        For i = 0 To 2
            For j = 0 To 2
                If x(i, j) -----E---- max Then
                    max = -------F-----
                End If

        Next
        MsgBox(max)
    End Sub
```

B :write program that find the multiplication of the following matrices x(3,4) and y(4,8). (12 degree)

****

بالتوفـــــيـق

مدرس المادة
م.م.علياء عبد الحسين

27/04/2016
رئيس القسم:

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: نظم الاتصالات/١
زمن الامتحان: ساعتان
التاريخ: ٢٠١٦/ ٠٤/٢٦

أسئلة امتحان الفصل الثاني للعام الدراسي ٢٠١٥/٢٠١٦

Note: Answer all questions

Q1/

A. Explain what is meant by time-division multiplexing (TDM)? (8 marks)

B. Three 4 kHz speech channels are ideally samples and time multiplexed. Determine the required channel bandwidth. (12 marks)

Q2/

A. Draw the block diagram of generation of signals using balanced modulators: (a) NBPM; (b) NBFM. (15 marks)

B. A 100 MHz carrier wave has a peak voltage of 5 volts. The carrier is frequency modulated (FM) by a sinusoidal modulating signal or waveform of frequency 2 kHz such that the frequency deviation Δf is 75 kHz. The modulated waveform passes through zero and is increasing at $t = 0$. Determine the expression for the modulated carrier waveform. (15 marks)

Q3/

A. What is analog pulse modulation? (8 marks)

B. A discrete-time amplifier uses a sampling interval $T = 25\ \mu s$. What is the highest frequency of a signal that can be processed with this amplifier without aliasing? (12 marks)

Q4/

A. In a frequency modulated voltage, the maximum modulating frequency is 15 kHz and the maximum frequency deviation is 75 kHz. Determine the theoretical bandwidth of the FM signal if the significant sideband pairs extend upto 8^{th}. (10 marks)

B. A given modulated signal has maximum frequency deviation of 50 Hz for an input sinusoid of unit amplitude and a frequency of 120 Hz. Find the required frequency multiplication factor *n* to produce a maximum frequency deviation of 20 kHz when the input sinusoid has unit amplitude and a frequency of 240 Hz and the angle modulation used is *(i)* PM and *(ii)* FM. (20 marks)

26/04/2016
رئيس القسم: ليث وجيه

مدرس المادة: أحمد حسن هادي

وزارة التعليم العالي والبحث العلمي

جامعة الفرات الاوسط التقنية

الكلية الهندسية التقنية- نجف

امتحان الفصل الثاني- العام الدراسي ٢٠١٥ / ٢٠١٦

القسم : هندسة تقنيات الاتصالات

المرحلة : ثانية

المادة: مجالات كهرومغناطيسية

وقت الامتحان: ساعتان

التاريخ: 2016/ 04/24

Note: Attempt all questions.

Q1: Compute the angle that is generated from the normal vector of the charge velocity and the magnetic flux density (B) if you know that the charge moved with a velocity of (0.15C) meter per second. Assume that the charge is electron moved on the surface of a conductor and proton attracts this electron. Assume also that the current is about 2 mAmp generated along 5 cm length of this conductor. The distance from the point desired to compute the magnetic field to the conductor is 4cm. Assume the case under test is in vacuum. (34 marks)

Q2: A- Derive a form to show the Gauss's concepts of the differential form. (17 marks)

Q2: B- What is Ampere's law of the magnetic field? Derive an expression for this principle.(16 marks)

Q3: Derive an expression of the magnetic curl concept. Then compute the electric momentum of a point charge if you know that θ =45 where R=R=3.5cm. Assume the electric momentum is generate from two negative point charge such as electron located at R=5 cm and R= 7cm respectively. Give a believable explanation for the negative sign if appear in your solution. (33 marks)

Good Luck for All.

Teacher in charge

Hussam Noman Al-Anssary

24/04/2016

Head of Dept.

Laith Wajeeh A.

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جامعة الفرات الأوسط التقنية
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قسم هندسة تقنيات الاتصالات

المرحلة الثانية

أسئلة الفصل الثاني للعام الدراسي

٢٠١٥-٢٠١٦

شعبة ضمان الجودة و الأداء الجامعي

قسم الاتصالات
ك / ٢

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية نجف

امتحان الفصل الثاني للعام الدراسي 2015 – 2016

القسم: قسم هندسة تقنيات الاتصالات
المرحلة: الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ساعتان
التاريخ: 2016/05/9

Q1) Multiple Choice Questions: **[10 Marks]**

1. **According to the sampling theorem, the sampling frequency should be**
   (a) Less than half the highest signal frequency
   (b) Greater than twice the highest signal frequency
   (c) Less than half the lowest signal frequency
   (d) Greater than the lowest signal frequency
2. **In an *R/2R* DAC, there are**
   (a) Four values of resistors
   (b) One resistor value
   (c) Two resistor values
   (d) A number of resistor values equal to the number of inputs
3. **The bit capacity of a memory that has 1024 addresses and can store one byte at each address is**
   (a) 1024 (b) 8192 (c) 8 (d) 4096
4. **A memory with 256 addresses has**
   (a) 256 address lines (b) 6 address lines
   (c) 1 address line (d) 8 address lines
5. **Optical storage devices employ**
   (a) Ultraviolet light (b) Electromagnetic fields
   (c) Optical couplers (d) Lasers

Q2) Implement the switching function **[20 Marks]**

$$F(x, w, y, z) = \sum m(0,1,2,3,4,9,13,14,15)$$

a. Using two 8-to-1 multiplexers with an active low enable, plus an OR gate.
b. Using one 8-to-1 multiplexers assume (x) as input multiplexed.

Q3) What is the difference between Static Random Access Memory (SRAM) and Dynamic Random Access Memory (DRAM)? **[10 Marks]**

Q4) Obtain the state diagram and state table for the circuit in Figure 1 [illegible] Marks

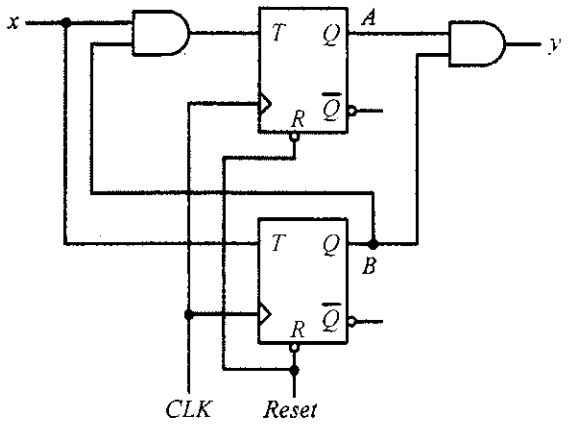
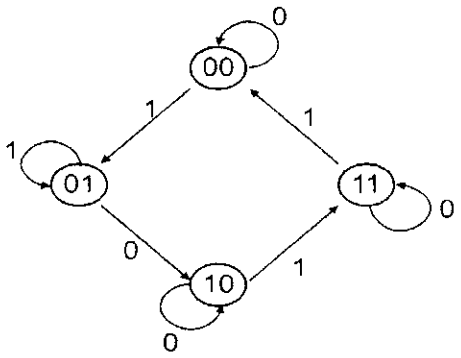


Figure 1

Q5) Given the following state diagram, design the sequential circuit using D flip-flops.

[20 Marks]



Q6) Determine the output of the DAC in Figure 2 if the sequence of 4-bit numbers are 1011,1111 applied to the inputs. The data inputs have a low value of 0 V and a high value of + 5V. **[20 Marks]**

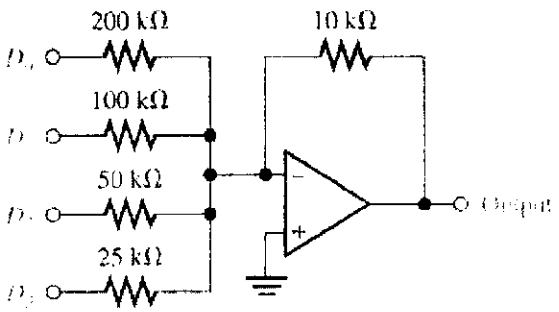


Figure 2

9/05/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

قسم الاتصالات
ت/ ت

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: دوائر الكترونية
زمن الامتحان: ساعتان
التاريخ: 2016/05/03

امتحان الفصل الثاني - العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Note: figures in the back of question's paper

Q1/a) Choose the correct answer: **(10 Marks)**

1. Crossover distortion behavior is characteristic of
A. Class A output stage. **B.** Class B output stage. **C.** Class C output stage. **D.** Common base output.

2. In a negative feedback amplifier using voltage-series feedback .
A. Ri decreases and Ro decreases.
B. Ri decreases and Ro increases.
C. Ri increases and Ro decreases.
D. Ri increases and Ro increases.

3. The voltage gain of an amplifier without feedback is 3000. Calculate the voltage gain of the amplifier if negative voltage feedback is introduced in the circuit. Given that feedback fraction = 0.01.
A. 97.
B. 100.
C. 300.
D. 50.

4. Relaxation oscillators are generally used to _____ for such applications as blinking lights.
A. produce low frequency signals.
B. clock signals.
C. voltage controlled.
D. produce square and triangle waves.

5. _____ in this type the capacitor is both charged and discharged slowly through a resistor, so the output waveform consists of two parts, an increasing ramp and a decreasing ramp.
A. fly back oscillator. **B.** Saw tooth oscillator. **C.** Tri-tet oscillator. **D.** Astable multivibrator oscillator

Q1/b) Write true or false with an indication of the reason if false: **(15Marks)**

1. A low-frequency oscillator (LFO) is an electronic oscillator that generates a frequency below ≈20 Hz.
2. An RF oscillator produces signals in the radio frequency (RF) range of about 100 Hz to 100 MHz .
3. Negative feedback in amplifier design Reduce the effect of noise.
4. If the feedback fraction of an amplifier is0.01, then voltage gain with negative voltage feedback is approximately 1000.
5. Negative feedback is employed in amplifiers.

Q2/a) A crystal has L = 3H, C_S = 0.05 pF, R = 2 kΩ and Cp = 10 pF. Calculate the series-resonant and parallel-resonant frequencies of the crystal. **(10Marks)**

b) With a negative voltage feedback, an amplifier gives an output of 10 V with an input of 0.5 V. When feedback is removed, it requires 0.25 V input for the same output. Calculate (i) gain without feedback (ii) feedback fraction β. **(15Marks)**

Q3/a) Derivative the input and output impedances for shunt-shunt feedback with drawing the circuit. **(10Marks)**

b) A basic Class C-amplifier is shown in fig. (1). the operating frequency is 3MHZ. Calculate the resonant frequency. If width of pulses (56.6ns), find the conduction angle also. **(15Marks)**

Q4/a) Calculate maximum ac output power and the power dissipation of the transistors in the push-pull amplifier shown in fig. (2). **(10 Marks)**

b) Calculate maximum ac output power in the amplifier shown in fig. (3) (Assume VBE = 0). **(15 Marks)**

GOOD LUCK

رئيس القسم
ليث وجيه عبد الله

مدرسة المادة
روى شلال عنوز

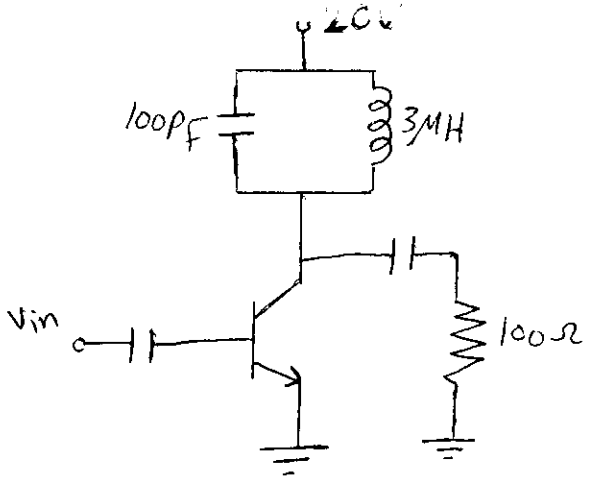
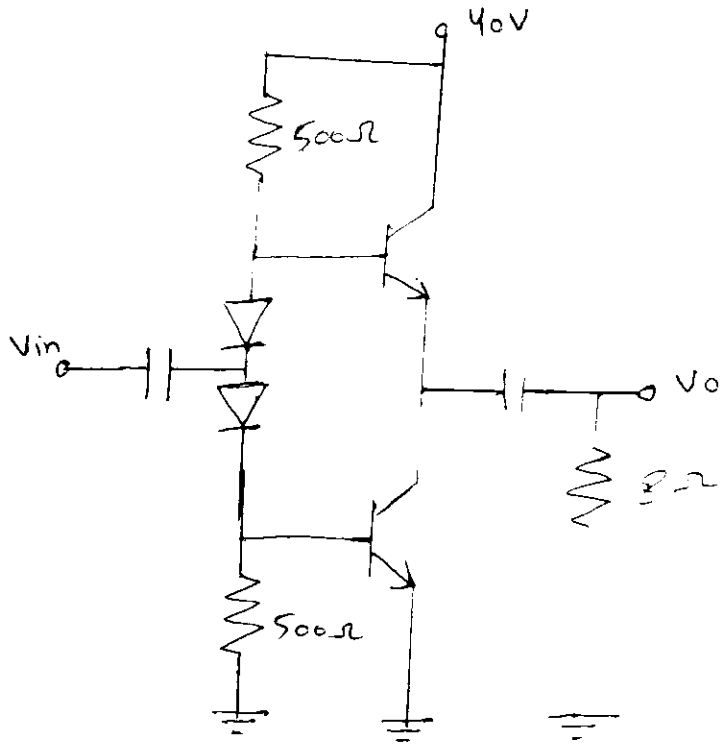


fig.(1)



fig(2)

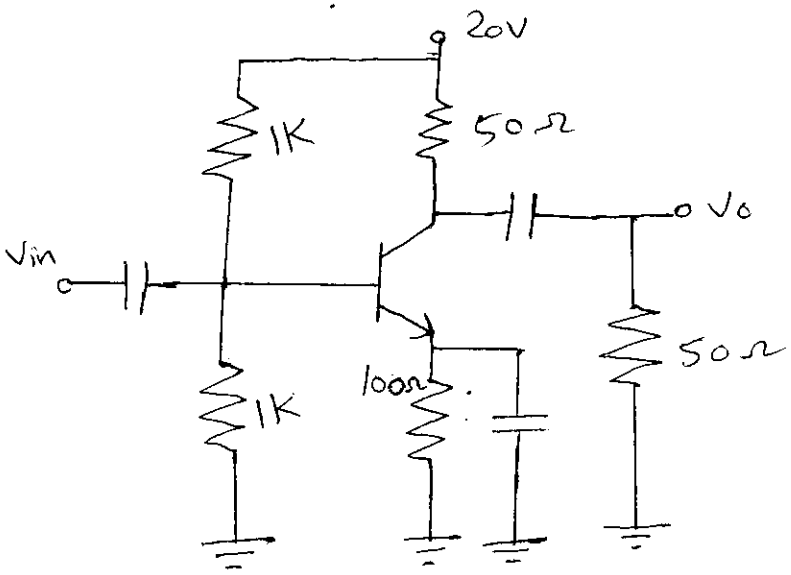


fig.(3)

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الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/٢
زمن الامتحان: ساعتان
التاريخ: 2016/05/02

إمتحان الفصل الثاني- العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Q1// Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point (2,-1,2). (15)

Q2// Show that the vector filed defined by $f = (x^2 + xy^2)i + (y^2 + x^2y)j$ is conservative and find the scalar potential. Hence evaluate $\int F.dR$ from (0,1) to(1,2). (20)

Q3// Evaluate $\iint A.n\,ds$ over the entire surface S of the region bounded by the cylinder $x^2 + z^2 = 9$, x=0,y=0,z=0 and y=8. If A=6zi +(2x+y)j –xk. (25)

Q4 Find Taylor series for f(x)=$\sqrt{x}$. where $x_0 = 4$ (20)

Q5// Solve the equation $\frac{dy}{dx} = -xy$. y(0)=1.Using the first five non-zero terms. (20)

Good Luck

02/05/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة :نظرية المعلومات
زمن الامتحان: ساعتان
التاريخ: ٢٠١٦/ ٠٤/ ٣٠

امتحان الفصل الثاني - العام الدراسي ٢٠١٥/٢٠١٦

Answer all questions

Q1:A:-Define of the following terms: ***(i)*** *constraint length* ***(ii)*** *metric* ***(25 MARKS)***

Q1:B:- A (15.5) cyclic code has g(x) $1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$

a) *Draw a syndrome calculator circuit for this code.*
b) *Find the code polynomials for the message polynomial* $1 + x^3 + x^4$. *(in a systematic form).*
c) *Is* $c(x) = 1 + x^4 + x^6 - x^8 - x^{14}$ *a code polynomial in this system?*

Q2:- ***fig.(1)*** *may generated convolutional code with n-moddulo-2 adders .an i\p multiplexer and an o\p multiplexer and the message bits sequence two bits at a time.* ***(25 MARKS)***

a) *Find the encoder memory and the rate efficiency of the code.*
b) *Find generators polynomial for each o\p bit.*

Q3:A:- When a binary code is said to be a cyclic code? ***(25 MARKS)***

Q3:B:- consider ***fig.(2)*** *the central portion of trellis diagram for the convolutional encoder, Draw state and tree diagrams and determine output digits sequence for the data digits (10111).*

Q4:-Given that : $1 + x^7 = (1 + x)(1 + x + x^3)(1 + x^2 + x^3)$ ***(25 MARKS)***

a) List all the valid code for the (7,5) cyclic code.
b) For the (7,3) cyclic code with $h(x) = 1 + x^2 + x^3$,construct systematic generator matrix.
c) Design division encoder for (7,4) cyclic code ,use encoder to find cw for message 0101.

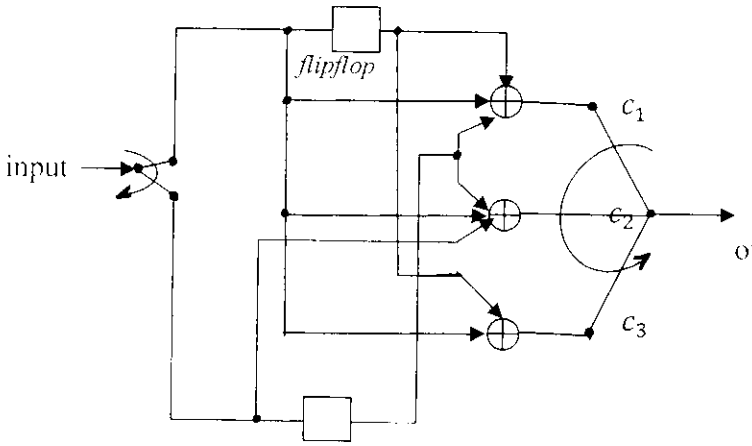

Fig.(1)

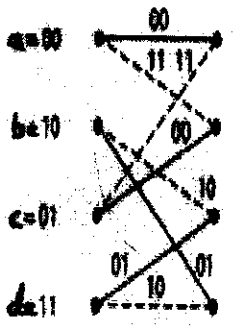

Fig.(2)

30/04/2016

H.O.D.
Laith Wajeeh

Lecturer:

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الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: مكائن كهربائية
زمن الامتحان: ساعتان
التاريخ: ٢٨ /٠٤/ ٢٠١٦

امتحان الفصل الثاني- العام الدراسي ٢٠١٥/٢٠١٦

NOTE: *Answer All Questions.*

Q1: Choose the correct answer for following ***[45 M]***

1) A machine operating as motor may go into regenerative braking mode if its speed becomes
   a. Sufficiently high to make back emf greater than supply voltage
   b. Sufficiently low to make back emf greater than supply voltage
   c. Sufficiently high to make back emf half of the supply voltage
   d. Sufficiently low to make back emf half of the supply voltage
2) In the biomedical instruments like artificial heart pumps, the commonly used motor is
   a. Permanent magnet d.c. motor b. Brushless d.c. motor c. Ward-Leonard system d. Series motor
3) Permanent magnet d.c. motors are extensively used in
   a. Automobiles b. Heaters c. Air conditioners d. All of these
4) The speed of permanent magnet d.c. motor cannot be controlled by
   a. Flux control method b. Rheostat control method c. Electronic circuits d. None of these
7) The torque constant (K_m), of a permanent magnet d.c. motor is 0.25 V sec / radian and armature resistance is 2 ohm. If the applied armature voltage is 90 V, then its zero speed torque is
   a. 10.45 N-m b. 11.25 N-m c. 13.65 N-m d. 15.56 N-m
6) If a resistance is added in series with the field winding of d.c. shunt motor, then its
   a. Both speed and torque decreases b. Both speed and torque increases
   c. Speed decreases, torque increases d. Speed increases, torque decreases
7) Which method is suitable for the speed control, below and above the normal rated speed of d.c. shunt motor?
   a. Flux control method b. Rheostatic control method c. Voltage control method d. All of these
8) With the increase in temperature, the speed of series and shunt motor will
   a. Increase, decrease b. Decrease, increase c. Increase, increase d. Decrease, decrease
9) Speed of d.c. shunt motors are controlled by
   a. Flux control method b. Rheostatic control method c. Voltage control method d. All of these

10) In electric traction, which type of motor is generally used?

a. Shunt motor b. Series motor c. Cumulative compound motor d. Differential compound motor

11) In a differential compound d.c. motor, with increase in load, speed

a. Increases b. Decreases c. Remains same d. None of these

12) D.C. series motors are used in electric traction. What happens to the speed and current of d.c motor if there is sudden slight drop in the mains voltage?

a. Speed decreases and current also decreases b. Speed decreases and current increases

c. Speed increases and current decreases d. Speed decreases and current remains same

13) If a d.c. series motor is started on very light load or on no load then

a. It will run at dangerously high speed which may damage the motor mechanically

b. It will run at very low speed c. Load does not effect the speed of d.c. series motor d. None of these

14) Which motor is not suitable for the application of centrifugal pumps?

a. Shunt motor b. Series motor c. Cumulative compound motor d. Differential compound motor

15) Speed of d.c. shunt motors are controlled by

a. Flux control method b. Rheostatic control method c. Voltage control method d. All of these

Q2: A magnetic circuit of uniform cross-sectional area has two air-gaps of 0.5 and 1 mm respectively in series. The exciting winding provides an MMF of 1200 Amp-turns. Estimate the MMF across each of the air-gaps, and the flux density. ***[25 M]***

Q3: The rotor of a d.c. motor had an original diameter of 30 cm and an air-gap under the poles of 2 mm. During refurbishment the rotor diameter was accidentally reground and was then undersized by 0.5 mm. Estimate by how much the Weld MMF would have to be increased to restore normal performance. How might the extra MMF be provided? ***[30 M]***

-Good Luck

Examiner

Abdelrahman Mohamed 7-2

28/04/2016

Department Head

Laith Najeeb

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية- نجف

القسم : قسم الاتصالات / السيارات
المرحلة :الثانية
المادة: حاسبة
وقت الامتحان:ساعتان
التاريخ:

امتحان الفصل الثاني للعام الدراسي ٢٠١٥ – ٢٠١٦

Answer All Questions

Q1: A: What is the result of execution of the following functions: **(10 degree)**

1. math.Sqrt(64).
2. 7 * math.Pow(3, 3).
3. (math.Round(676.37)) / 2.
4. math.max (5, 90) + 3.
5. math. min(575, 8) + 4.

B: Define the following :

1.Packet 2.ARP 3.Band Width 4.Digital signature 5.firewall **(20 degree)**

****

Q2: Give *only one line of code* that can do the following : **(20 degree)**

1. Change the dimension of matrix (**Dim x(4,7) as integer**) to have **8 row**.
2. Define **vector** with **6 element**.
3. Print in list box the following on **same line** (**Visual DotNet 2008**)
4. Change **text** color of **Button** to **Red**
5. Enable **textbox** to write **many lines**.

****

Q3: A:Give the correct representation in visual basic for the following equations: **(15 degree)**

1. $\cos(t^2)$.
2. $(1+\sin(3t))$.
3. $5\tan(t) + e^t$.
4. $|23 + x|$.
5. $4x + 9y$.

B: Trace the following program and give the content of listbox2. **(5 degree)**

```
Private Sub Button1_Click()
        Dim i, y(5) As Integer
        Dim x(5) As Integer = [5  5  6  6  7  7]
        For i = 5 To 0 Step -1
            ListBox2.Items.Add(x(i))
        Next
End Sub
```

Q4:A: Fill blanks with the missing codes for the following programs: (18 degree)

1. This program display the elements of main digonal.

```
Private Sub Button1_Click()

   Dim x1(,) As Integer = {{5, 0, 0}, {0, 10, 0}, {0, 0, 15}}
        For i = 0 To -------A------
            For j = 0 To ------B------
                If ------C---- Then
                    ListBox1.Items.Add(x1(i, j))
                End If
            Next
        Next
    End Sub
```

2. This program find the maximum number in matrix.

```
Private Sub Button1_Click()

   Dim x(2, 2) as integer = { {10,20,30},{40,50,60),{70,80,90} }
   Dim  i, j, max As Integer
        max = ----D-------
        For i = 0 To 2
            For j = 0 To 2
                If x(i, j) -----E---- max Then
                    max = -------F-----
                End If

        Next
        MsgBox(max)
    End Sub
```

B :write program that find the multiplication of the following matrices x(3,4) and y(4,8). (12 degree)

****

بالتوفـــــيـق

مدرس المادة
م.م.علياء عبد الحسين

27/04/2016
رئيس القسم:

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: نظم الاتصالات/١
زمن الامتحان: ساعتان
التاريخ: ٢٠١٦/ ٠٤/٢٦

أسئلة امتحان الفصل الثاني للعام الدراسي ٢٠١٥/٢٠١٦

Note: Answer all questions

Q1/

A. Explain what is meant by time-division multiplexing (TDM)? (8 marks)

B. Three 4 kHz speech channels are ideally samples and time multiplexed. Determine the required channel bandwidth. (12 marks)

Q2/

A. Draw the block diagram of generation of signals using balanced modulators: (a) NBPM; (b) NBFM. (15 marks)

B. A 100 MHz carrier wave has a peak voltage of 5 volts. The carrier is frequency modulated (FM) by a sinusoidal modulating signal or waveform of frequency 2 kHz such that the frequency deviation Δf is 75 kHz. The modulated waveform passes through zero and is increasing at $t = 0$. Determine the expression for the modulated carrier waveform. (15 marks)

Q3/

A. What is analog pulse modulation? (8 marks)

B. A discrete-time amplifier uses a sampling interval $T = 25\ \mu s$. What is the highest frequency of a signal that can be processed with this amplifier without aliasing? (12 marks)

Q4/

A. In a frequency modulated voltage, the maximum modulating frequency is 15 kHz and the maximum frequency deviation is 75 kHz. Determine the theoretical bandwidth of the FM signal if the significant sideband pairs extend upto 8^{th}. (10 marks)

B. A given modulated signal has maximum frequency deviation of 50 Hz for an input sinusoid of unit amplitude and a frequency of 120 Hz. Find the required frequency multiplication factor *n* to produce a maximum frequency deviation of 20 kHz when the input sinusoid has unit amplitude and a frequency of 240 Hz and the angle modulation used is *(i)* PM and *(ii)* FM. (20 marks)

26/04/2016
رئيس القسم: ليث وجيه

مدرس المادة: أحمد حسن هادي

وزارة التعليم العالي والبحث العلمي

جامعة الفرات الاوسط التقنية

الكلية الهندسية التقنية- نجف

امتحان الفصل الثاني- العام الدراسي ٢٠١٥ / ٢٠١٦

القسم : هندسة تقنيات الاتصالات

المرحلة : ثانية

المادة: مجالات كهرومغناطيسية

وقت الامتحان: ساعتان

التاريخ: 2016/ 04/24

Note: Attempt all questions.

Q1: Compute the angle that is generated from the normal vector of the charge velocity and the magnetic flux density (B) if you know that the charge moved with a velocity of (0.15C) meter per second. Assume that the charge is electron moved on the surface of a conductor and proton attracts this electron. Assume also that the current is about 2 mAmp generated along 5 cm length of this conductor. The distance from the point desired to compute the magnetic field to the conductor is 4cm. Assume the case under test is in vacuum. (34 marks)

Q2: A- Derive a form to show the Gauss's concepts of the differential form. (17 marks)

Q2: B- What is Ampere's law of the magnetic field? Derive an expression for this principle.(16 marks)

Q3: Derive an expression of the magnetic curl concept. Then compute the electric momentum of a point charge if you know that θ =45 where R=R=3.5cm. Assume the electric momentum is generate from two negative point charge such as electron located at R=5 cm and R= 7cm respectively. Give a believable explanation for the negative sign if appear in your solution. (33 marks)

Good Luck for All.

Teacher in charge

Hussam Noman Al-Anssary

24/04/2016

Head of Dept.

Laith Wajeeh A.

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية/ نجف
الهندسة

القسم : قسم الاتصالات / السيارات
المرحلة :الثانية
المادة: حاسبة
وقت الامتحان :ثلاث ساعات
التاريخ: ٢٠١٦/٥/٢٦

الامتحان النهائي للعام الدراسي 2015 – 2016

Answer All Questions

Q1:Select the correct choice for the following statements: (Answer 5 only) (20 degree)

1. **Assume txtName is a textbox control, which of the following is a valid assignment statement?**
   A. txtName = 'Jones' B. txtName.Caption = 'Jones'
   C. txtName.Text = "Jones" D. txtName.Text = 'Jones'

2. **How do we declare a variable?**
   A. Using Integer command B. Using DIM command
   C. Using A and B command in the Public Class D. using private sub

3. **Creates a box that can be used to retrieve one piece of information from a user.**
   A. MSGBOX B. INPUTBOX C. Dialog Box D.Label

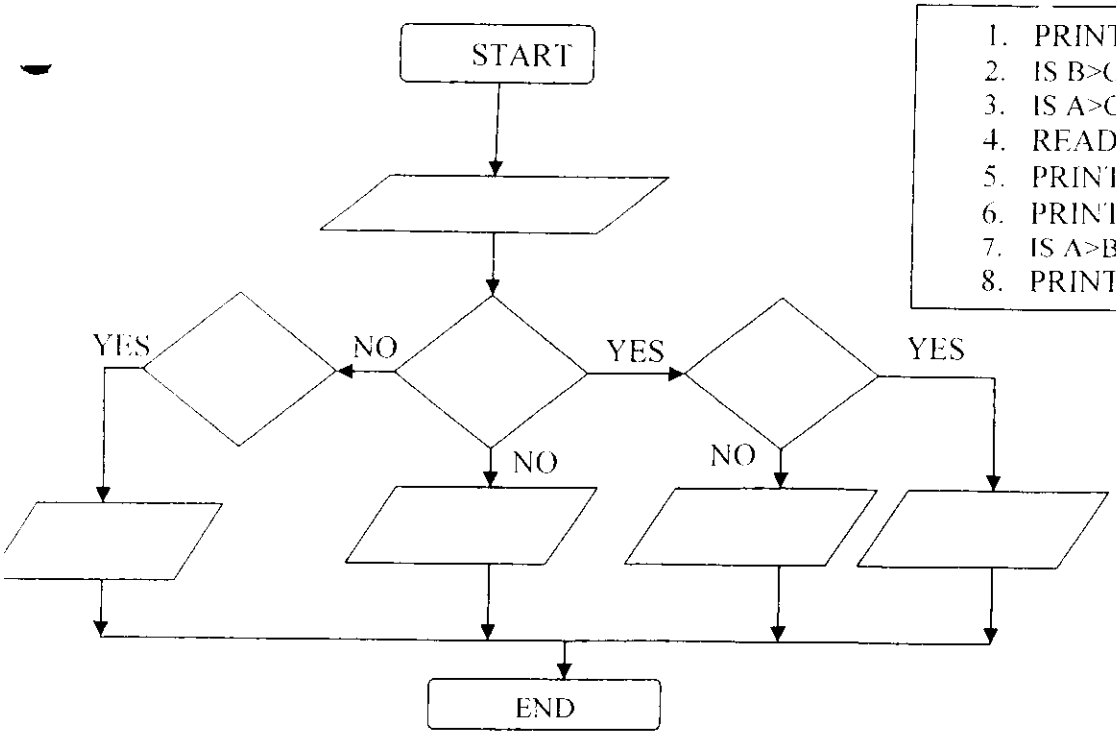
4. **The code statement, 27 < = 15, will have a resulting condition**
   A: no B: true C: false D : none

5. **It can contain 0 to 2 billion Unicode characters.**
   A. Byte B. Char C.Single D. String

6. **When you click the Visible arrow in the Properties window, the following is displayed**
   A: Yes, No B: True, False C: 1,0 D. Enable, Disable

Q2: Complete the flowchart to find the largest of three numbers A,B, and C from the following statement. **(16 degree)**

1. PRINT B
2. IS B>C
3. IS A>C
4. READ A, B, C
5. PRINT C
6. PRINT A
7. IS A>B
8. PRINT C



Q3: Answer by True or False and correct the False statement **(10 degree)**

1. The variable with name (TXTName) is valid
2. MsgBox(Math.Sqrt(64)) will give 8 as result
3. This code is a correct declaration to declare variable (dim x as integer =2)
4. MsgBox(Math.Round(676.378654)) will give 676 as result
5. To set the button color to red we use this code (button1.backcolor = color.red)

Q4:Give the correct representation in visual basic for the following equations: **(15 degree)**

1. $\cos(t^3) - 5$
2. $\tan(t+3)$.
3. $56 - \sin(90)$.
4. $\cos(t) + \sin(t)$.
5. $e^t - 12$.

Q5:**In internet there are many terms used;define the followings:** **(24 degree)**

1. Bandwidth
2. IP
3. ISDL
4. Mbps
5. FTP
6. HTTP

Q6:DO **only one** of the following :

(15 degree)

1. Write complete program to **Insert new column in matrix x(2, 2).**
2. Write complete program to **Print the second and third coulmn of matrix x(3, 3) in listbox1.**

بالتوفـــــيق

مدرس المادة:

رئيس القسم: 26/05/2016

وزارة التعليم العالي والبحث العلمي

هيئة التعليم التقني

جامعة الفرات الاوسط التقنية

الكلية الهندسية التقنية- نجف

الامتحان النهائي – العام الدراسي ٢٠١٥ / ٢٠١٦

القسم : هندسة تقنيات الاتصالات

المرحلة : الثانية

المادة: مجالات كهرومغناطيسية

زمن الامتحان: ثلاث ساعات

التاريخ: 2016 / 05 / 24

Notes:

1. ***Attempt four questions only. For each question 25 marks.***
2. ***The last question should be answered.***

Q1:A- Select the correct choice. **Select one only** **(10 marks)**

1. According to the line integral principle, the line integral of the gradient of the function from the origin to the point P is .....

a. same at all path, b. same at half path and differ at other points. c. differ from point to point. d. not any one from the above.

2. Using the flux principle, if there is no source for the vector fields (A) where the flux (ϕ) can be given by ($\phi = \oint_s A.ds$) then (ϕ) can equal to zero at:

a. At the case when the flux is larger than the surface contribution of any contour at that surface.
b. At the case when there is no source.
c. At the case when the flux is smaller than the surface contribution of any contour at that surface.
d. None of the above.

Q1:B- Assume there is a point charge (such as electron) affected by a magnetic force of 2N then compute the electric flux if you know that the charge velocity is about 0.12C, and the electric current generated in associating with the magnetic field (H) is (I = 0.02 mA). Assume that ($\rho = 0.002\,\pi^{-1}\ charge\ per\ unit\ length$). Assume also the angle generated by the charge under test is 45°. The case is under vacuum. **(15 marks)**

Q2:A- Compare according to Maxwell's equations between: (**Answer one only**)

1. The curl of magnetic field and that of the electric field.
2. The divergence of the electric field and this of the magnetic field. **(12 marks)**

Q2:B- Derive an expression to show the electric field of dipole. **(13 marks)**

Q3:A- The total results of adding the contribution for all the contours is defined as Stock's theorem. Which convert the line integral formula to several types of useful formula. One of these is: (**Derive if it is possible**) **(15 marks)**

a. $\int A.dl = \int_A^S (\nabla \times S) dA$, b. $\int A.dJ = \int (\nabla \times A) dl$,

c. $\oint_L A.dl = \int_S (\nabla \times A)\, dS$, d. None of the above.

Q3:B- Assume you should move a charge from point A to point B. Discuss briefly all the conditions that you may facing. **(10 marks)**

Q4:A- Using the definition of the dot product. The interior angle of the triangle at A and B defined by three points A (1,3,-2) , B(-2, 4, 5) and C(0, -2, 1) should be one of the following: **(15 marks)**

a. 65. 28° and 45.9°. b. 56.28° and 49.5° c. 64.82° and 59.4° d. none of the above

Q4:B- Usually there are three types of the generation of the charges. List all these types. Then discuss briefly the conclusions that we can obtain from the case when the work had done over a charge became at a time positive and at second time negative. **(10 marks)**

Q5: This question should be answered.

If two points where a point charge moving along the line in between such as (A) and (B). Assume that the electric field generated between two points is (0.5 $C.m^{-2}$) at point (A) and (0.7 $C.m^{-2}$) at point (B). Assume also the charge is electron in vacuum. compute the magnitude of the potential difference generated between these two points. Give a suitable explanation for the –ve sign if it was appear in your solution. **(25 marks)**

Good Luck 4 All

Signed
Examiner
A.L. Hussam N. Al-Anssary

24/05/2016
Head of Dept.
A.L. Laith W. Abdullah

Note: Answer all questions

Q1/

The antenna current of an AM transmitter is 8 A if only the carrier is sent, but it increases to 8.93 A if the carrier is modulated by a single sinusoidal wave. Determine the percentage modulation. Also find the antenna current if the percent of modulation changes to 0.8. **(20 marks)**

Q2/

A. How PM generated using FM? Explain. **(8 marks)**

B. Find the overall noise figure of a three stage cascaded amplifier, each stage having a power gain of 10 dB and noise figure of 6 dB. **(12 marks)**

Q3/

In an FM system, the audio frequency is 1 kHz and audio voltage is 2 volts. The deviation is 4 kHz. If the AF voltage is now increased to 8 volts and its frequency dropped to 500 Hz, find the modulation index in each case and the corresponding bandwidth using Carson's rule. **(20 marks)**

Q4/

A. What are the disadvantages of pulse position modulation (PPM)? **(8 marks)**

B. For a pulse-amplitude modulated (PAM) transmission of voice signal having maximum frequency equal to $f_m = 3$ kHz, calculate the transmission bandwidth. It is given that the sampling frequency $f_s = 8$ kHz and the pulse duration $\tau = 0.1$ Ts.

(12 marks)

Q5/ Answer two branches only:

A. Calculate the percent power saving for the SSB signal if the AM wave is modulated to a depth of (*a*) 100% and (*b*) 50%. **(10 marks)**

B. By using continuous-time convolution integral, find out the response of the system to unit-step input signal. Impulse response is given as

$$h(t) = \frac{R}{L} e^{-tR/L} .u(t).$$

(10 marks)

C. Find the Fourier transform of the signal

$$x(t) = e^{-at}\ u(t),\ \ a > 0.$$

(10 marks)

29/05/2016

رئيس القسم: ليث وجيه عبد الله

مدرس المادة: أحمد حسن هادي

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/٢
زمن الامتحان: ٣ساعات
التاريخ: ٢١ /٥/2016

الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦

Q1// Solve the following equations: (30M)

1) $\frac{dy}{dx} = \frac{2x\ln x + x}{\sin y + y\cos y}$

2) $y^2 - (xy + x^2)\frac{dy}{dx} = 0$

3) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = e^x \cos x$

Q2// (choose only two). (30 M)

a)Find the volume of the region in the first octant bounded by the planes (x+z=1) and (y+2z=2)

b) $\int_0^2 \int_{\frac{x}{2}}^2 \frac{dydx}{y^4+1}$

c) $\int_0^{2\pi} \int_0^{\pi} \int_0^{(1-\cos\emptyset)} \rho^2 \sin\emptyset \, d\rho d\emptyset d\theta$

Q3// a)If $A = x^2yi - 2xzj + 2yzk$. Find curl curl A. (30M)

b)Using Green's theorem .evaluate $\oint((y - \sin x)dx + \cos x\, dy)$ where C is the plane triangle enclosed by the lines y=0. $y = 0, x = \frac{\pi}{2}, y = \frac{2}{\pi}x$.

c)Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point (1,-2,1).

Q4// Find Taylors series for $\dot{y} = 2y + 3e^x$, y(0)=0. (10M)

Good Luck

31/05/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

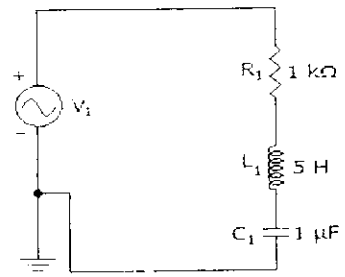
القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: دوائر الكترونية
زمن الامتحان: ٣ ساعات
التاريخ: 2016/06/02

الامتحان النهائي - العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Q1/Choose the correct answer with the solutions if need: **(30 Marks)**

1. What is the resonance frequency?



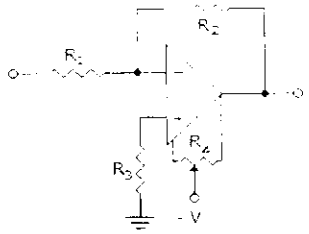
A. 31.8 Hz **B.** 71 Hz **C.** 7.1 kHz **D.** 31.8 kHz

2. Maximum efficiency produced by Class B amplifier is_____
A. 60% **B.**50% **C.**79% **D.** 180%

3. If the voltage gain of an amplifier without feedback is 20 and with negative voltage feedback it is 12. then feedback fraction is_____
A. 5/3 **B.**3/5 **C.** 1/5 **D.** 0.033

4. ___ _____ transforms digital signals into analog form.
A.digital to analog converter **B.** inverter **C.** comparator **D.** analog to digital converter

5. Refer to this figure. The purpose of R4 is_____



A. for bias current compensation. **B.** for input offset voltage compensation.
C. to set input impedance. **D.** to set input impedance and voltage gain.

6. A 2-transistor class B power amplifier is commonly called _____amplifier.
A. Dual **B.** Push-pull **C.** Symmetrical **D.** Differential

7. fly back oscillator is type of _____
A. harmonic oscillator **B.** feedback oscillator **C.** negative resistance oscillator **D.** relaxation oscillator

8. _____ is typically used in analog-to-digital converters to eliminate variations in input signal that can corrupt the conversion process.
A. Sample and hold **B.** digital-to-analog converter **C.** Schmitt trigger **D.** none of the above

9. If the output of an amplifier is 10 V and100 mV from the output is fed back to the input, then feedback fraction is_____
A.10 **B.**0.1 **C.**0.01 **D.** 0.15

10. When negative voltage feedback is applied to an amplifier, its voltage gain
A. is increased **B.** is reduced **C.** remains the same **D.** none of the above

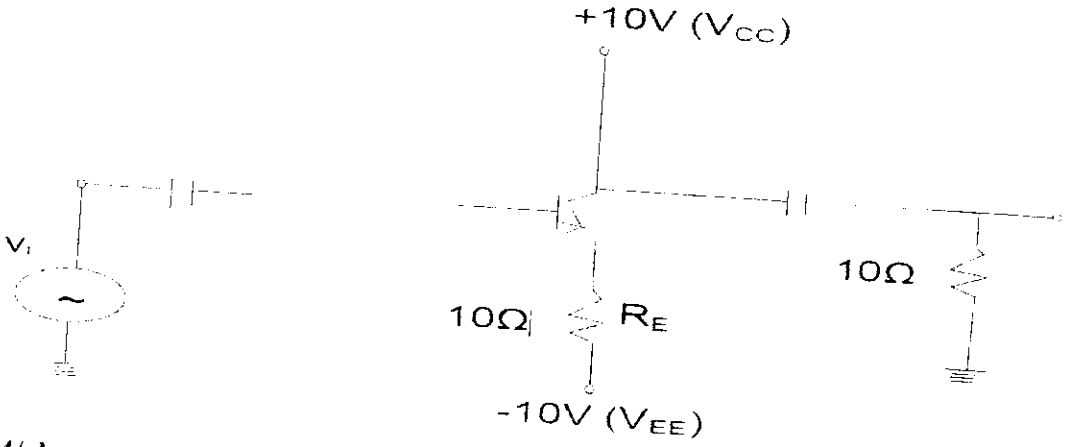
Q2/ a) Derivative the input and output impedances for shunt-series feedback with drawing the circuit. **(10Marks)**

b) The overall gain of an amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input. **(10Marks)**

Q3/ a) A 3-stage RC Phase Shift Oscillator is required to produce an oscillation frequency of 6.5 kHz. If 1nF capacitors are used in the feedback circuit, determining resistors and the value of the feedback resistor required to sustain oscillations. Also draw the circuit. **(15 Marks)**

b) Calculate maximum ac output power and efficiency of the amplifier shown in fig.below? (VBE =0)

(15Marks)



Q4/choose only one of the following:

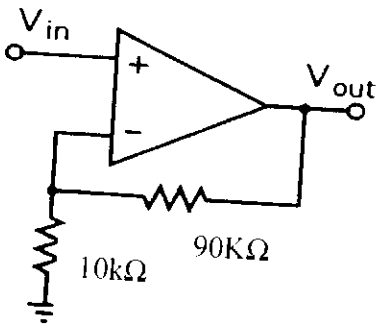
a) fig. below is circuit of a negative voltage feedback amplifier. If without feedback, Av = 10,000, Zin = 10 kΩ, Zout = 100 Ω, find:

(i) Feedback fraction

(ii) gain with feedback

(iii) Input impedance with feedback

(iv) output impedance with feedback.



b) Determine the output voltage of an op-amp for input voltages of V1=150μV, V2=140μV. The amplifier has a differential gain of Ad=4000 and the value of CMMR is 100. **(20Marks)**

(20 Marks)

02/06/2016

رئيس القسم

ليث وجيه عبد الله

GOOD LUCK

مدرسة المادة

رؤى شلال عنوز

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة: نظرية المعلومات
زمن الامتحان: ثلاث ساعات
التاريخ: ٢٠١٦/٦/ .

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

الامتحان النهائي - العام الدراسي ٢٠١٥/٢٠١٦

➢ ***Answer four questions only // please read the questions carefully.***

Q1:A:- *Is the following valid generator polynomial* $x + x^2$ *,why?* ***(9 MARKS)***

Q1:B:- *The two experiments A and B have the joint probability matrix is given by:*

$$\begin{bmatrix} 0.1 & 0.25 \\ 0 & 0.2 \\ 0.25 & 0.2 \end{bmatrix}$$

Find P(A),P(B),P(A/B) and P(B/A). ***(16 MARKS)***

Q2:A:- *Let as consider the throw of two coin .what is the probability two faces appears H provided that H appears from first attempt?* ***(15 MARKS)***

Q2:B:- *What is different between the Convolutional and linear codes?* ***(10 MARKS)***

Q3:- *Develop the* ***Shannon code*** *for the following set of messages:* ***(25 MARKS)***
p(A) =[0.3 0.2 0.15 0.12 0.1 0.08 0.05] , Using ***ternary coding*** *to find Code efficiency ,and p(0) at the encoder output?*

Q4:- *for the Convolutional encoder in fig .(1) ,Draw the trellis diagram if the message bits(11010) and decode the received bits are 01 00 01 00 10 using viterbis algorithm.* ***(25 MARKS)***

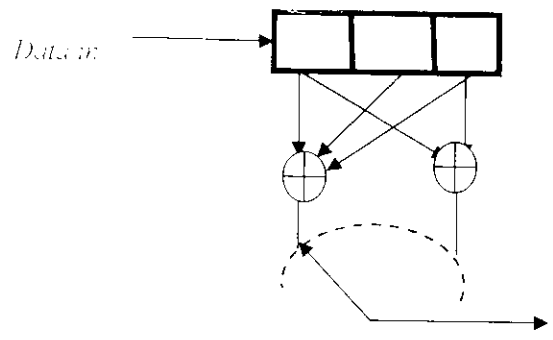


fig .(1)

Q5:-*Fill the following blanks:* ***(the solution must be required to get full marks)*** ***(25 MARKS)***

1. To find amount of information gained from a die is thrown if the number (4) will appear ---------- -
2. If code words used are (000,101,110,011),then the H.D. between the words is ----------
3. Consider a linear block code (6, 3) where n,d_{min} and code rate respectively are ----------
4. To find efficiency of a fixed length code used to encode messages obtained from throwing Adie once ----------
5- The probability of selecting a month with **31** days is ----------

---

05/06/2016

HoD:
Laith Wajeeh

Lecturer:
Hawraa F.Abd

القسم : قسم هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ثلاث ساعات
التاريخ: 2016/06/05

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الأوسط التقنية
الكلية التقنية/ نجف

الامتحان النهائي للعام الدراسي 2015 – 2016

Q1.A) Multiple Choice Questions: **(10 Marks)**

1. A 4-bit synchronous counter uses flip-flops with propagation delay times of 15 ns each. The maximum possible time required for change of state will be
(A) 15 ns **(B) 30 ns** **(C) 45 ns** **(D) 60 ns**

2. The group of bits 1001 is serially shifted (right-most bit first) into an 4-bit parallel output shift register with an initial state of 1011. After three clock pulses, the register contains.
(A) 1111 **(B) 0011** **(C) 1100** **(D) 0000**

3. How many select lines will a 16 to 1 multiplexer will have
(A) 4 **(B) 3** **(C) 5** **(D) 1**

4. Which of the memory is volatile memory
(A) ROM **(B) RAM** **(C) PROM** **(D) EEPROM**

5. A memory with 512 addresses has
(A) 256 address lines **(B) 7 address line** **(C) 1 address line** **(D) 9 address line**

Q1. B) Illustrate a 4-bit data movement for parallel in serial out shift registers and draw typical logic symbol. **(10 Marks)**

Q2) Answer **ONE** of the followings,

1) Develop a synchronous 2-bit up/down counter by using D flip-flop. The counter should count when an UP /$\overline{DOWN}$ control input is 1 and count down when the control input is 0. **(10 Marks)**

2) Design a counter to produce the following decimal sequence. **(10 Marks)**

0, 1, 3, 2, 6, 0, 1, 3 ...

1. How many states does this counter have?
2. How many flip-flops are required to build this counter?
3. Draw the state diagram for this circuit.
4. If T flip-flops are to be used, write the excitation equation for the flip-flops inputs.
5. Draw the logic circuit for this counter.

Q3.A) Design a four-input priority encoder using K-map, such that the input D_3 has the highest priority, D_2 has next highest priority, D_0 has the lowest priority. **(10 Marks)**

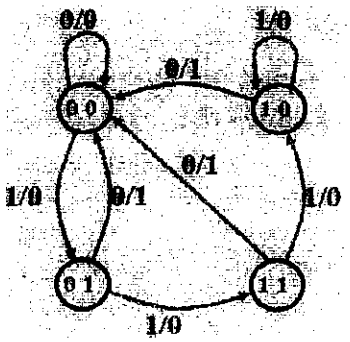
Q3.B) Implement the function F (a, b, c, d) = $\sum$ m (0, 1, 2, 3, 4, 5, 12, 13) using tow 2×4 decoders and two external OR gate. **(15 Marks)**

Q4.A) Implement the switching function **(15 Marks)**

$$F(a,b,c,d) = \sum m(0,1,2,5,9,11,13,15)$$

a. Using two 8-to-1 multiplexers with an active high enable, plus an OR gate.
b. Using one 8-to-1 multiplexers assume (a) as input multiplexed.

Q4.B) Given the following state diagram, design the sequential circuit using D flip-flops.

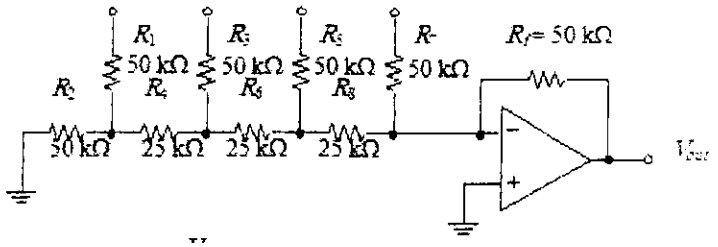


(10 Marks)

Q5.A) Answer **ONE** of the following

1. Draw logic circuit of a typical SRAM latch memory cell. **(10 Marks)**
2. What are the main differences between RAM & ROM. **(10 Marks)**

Q5. B) An R-2R ladder (DAC) the sequence of 4-bit binary numbers 1011 are applied to the inputs as shown in Figure below. If a HIGH = +5.0 V and a LOW = 0 V, what is V_{out}? **(10 Marks)**



10/06/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

Ministry Of High Education And Scientific Research
Alfurat Al-Awsat Technical University
Technical College / Najaf
Depart. / The Technical Communication Engineering

Class: 2nd
Subject: Electrical Machines
Time of Exam: (3) Hours
Date : ٩ / ٦ / 2016

Final Examination 2015 – 2016

NOTE: Answer All Questions.

Q1: A belt-driven 100kW, shunt generator running at 360 (r.p.m) on 220V bus bars continuous to run as a motor when the belt breaks, then taking 10kW. What will be its speed? Given armature resistance 0.025Ω, field resistance 60Ω and contact drop under each brush 1 volt. Ignore armature reaction. **[30 M]**

Q2: A 220V dc series motor is running at speed 800(r.p.m), and draws 100A. Calculate at what speed the motor will run when developing half the tourqe. Total resistance of the armature and field is 0.1Ω. Assume that the magnetic circuit is unsaturated. **[20 M]**

Q3: A train is driven by a DC machine with independent electrical excitation. At a speed of 1500 rpm, the following magnetization characteristic has been measured.

E_A [volt]	50	420	780	950	1120	1180	1260
I_f [ampere]	0	4.0	8.0	10.0	12.8	14.4	28.8

(A) Answer **TWO** of the following **[14 M]**

(1) Sketch the equivalent circuit of the DC machine.
(2) Why is a voltage induced in the armature when the excitation current is zero?
(3) Why does the induced voltage at high excitation currents not increase proportional to the excitation current?

(B) Answer **TWO** of the following **[16 M]**

The machine runs at 1500 rpm and the train has a speed of 20 m/s. The armature terminal voltage is 790 V. The current is 50 A. The armature resistance is 0.2Ω.

(1) Calculate the product of the motor constant and the pole flux KΦ in this operation point.
(2) Calculate the torque.
(3) In a train application, how does the load torque change as a function of speed?

Q4: Choose the correct answer for **TEN** of the following **[20 M]**

1. A machine operating as motor may go into regenerative braking mode if its speed becomes
   a. Sufficiently high to make back emf greater than supply voltage
   b. Sufficiently low to make back emf greater than supply voltage
   c. Sufficiently high to make back emf half of the supply voltage
   d. Sufficiently low to make back emf half of the supply voltage
2. In the biomedical instruments like artificial heart pumps, the commonly used motor is
   a. Permanent magnet d.c. motor
   b. Brushless d.c. motor
   c. Ward-Leonard system
   d. Series motor

3. Permanent magnet d.c. motors are extensively used in
   a. Automobiles b. Heaters c. Air conditioners d. All of these
4. The speed of permanent magnet d.c. motor cannot be controlled by
   a. Flux control method b. Rheostat control method
   c. Electronic circuits d. None of these
5. The torque constant (K_m), of a permanent magnet d.c. motor is 0.25 V sec / radian and armature resistance is 2 ohm. If the applied armature voltage is 90 V, then its zero speed torque is
   a. 10.45 N-m b. 11.25 N-m c. 13.65 N-m d. 15.56 N-m
6. If a resistance is added in series with the field winding of d.c. shunt motor, then its
   a. Both speed and torque decreases b. Both speed and torque increases
   c. Speed decreases, torque increases d. Speed increases, torque decreases
7. Which method is suitable for the speed control, below and above the normal rated speed of d.c. shunt motor?
   a. Flux control method b. Rheostatic control method
   c. Voltage control method d. All of these
8. With the increase in temperature, the speed of series and shunt motor will
   a. Increase, decrease b. Decrease, increase c. Increase, increase
   d. Decrease, decrease
9. Speed of d.c. shunt motors are controlled by
   a. Flux control method b. Rheostatic control method
   c. Voltage control method d. All of these
10. In electric traction, which type of motor is generally used?
    a. Shunt motor b. Series motor c. Cumulative compound motor
    d. Differential compound motor
11. In a differential compound d.c. motor, with increase in load, speed
    a. Increases b. Decreases c. Remains same d. None of these
12. D.C. series motors are used in electric traction. What happens to the speed and current of d.c motor if there is sudden slight drop in the mains voltage?
    a. Speed decreases and current also decreases b. Speed decreases and current increases
    c. Speed increases and current decreases d. Speed decreases and current remains same
13. If a d.c. series motor is started on very light load or on no load then
    a. It will run at dangerously high speed which may damage the motor mechanically
    b. It will run at very low speed
    c. Load does not effect the speed of d.c. series motor d. None of these
14. Which motor is not suitable for the application of centrifugal pumps?
    a. Shunt motor b. Series motor c. Cumulative compound motor
    d. Differential compound motor

Good Lock

Examiner
Abdulrahman M. Khash

2-2

09/06/2016
Department Head
Laith Najeeb

جمهورية العراق

وزارة التعليم العالي و البحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات الاتصالات

المرحلة الثانية

أسئلة الامتحان النهائي للعام الدراسي

٢٠١٥-٢٠١٦

الدور الأول

شعبة ضمان الجودة و الأداء الجامعي

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية/ نجف
الهندسة

القسم : قسم الاتصالات / السيارات
المرحلة :الثانية
المادة: حاسبة
وقت الامتحان :ثلاث ساعات
التاريخ: ٢٠١٦/٥/٢٦

الامتحان النهائي للعام الدراسي 2015 – 2016

Answer All Questions

Q1:Select the correct choice for the following statements: (Answer 5 only) (20 degree)

1. **Assume txtName is a textbox control, which of the following is a valid assignment statement?**
   A. txtName = 'Jones' B. txtName.Caption = 'Jones'
   C. txtName.Text = "Jones" D. txtName.Text = 'Jones'

2. **How do we declare a variable?**
   A. Using Integer command B. Using DIM command
   C. Using A and B command in the Public Class D. using private sub

3. **Creates a box that can be used to retrieve one piece of information from a user.**
   A. MSGBOX B. INPUTBOX C. Dialog Box D.Label

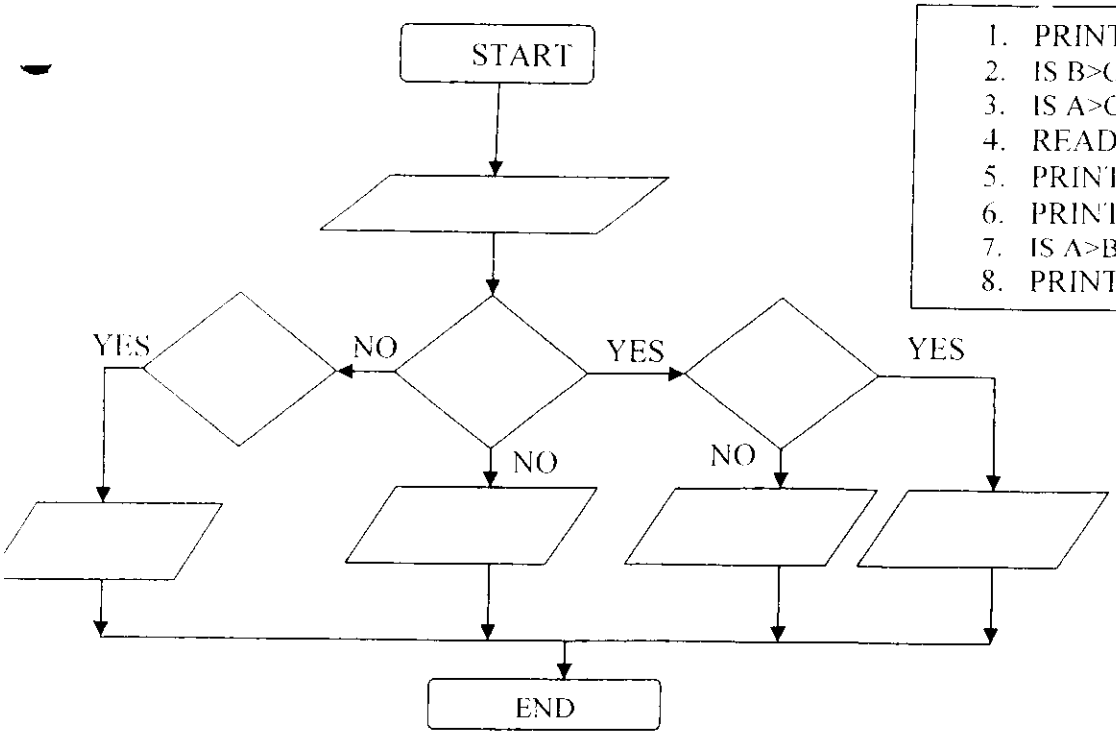
4. **The code statement, 27 < = 15, will have a resulting condition**
   A: no B: true C: false D : none

5. **It can contain 0 to 2 billion Unicode characters.**
   A. Byte B. Char C.Single D. String

6. **When you click the Visible arrow in the Properties window, the following is displayed**
   A: Yes, No B: True, False C: 1,0 D. Enable, Disable

Q2: Complete the flowchart to find the largest of three numbers A,B, and C from the following statement. **(16 degree)**

1. PRINT B
2. IS B>C
3. IS A>C
4. READ A, B, C
5. PRINT C
6. PRINT A
7. IS A>B
8. PRINT C



Q3: Answer by True or False and correct the False statement **(10 degree)**

1. The variable with name (TXTName) is valid
2. MsgBox(Math.Sqrt(64)) will give 8 as result
3. This code is a correct declaration to declare variable (dim x as integer =2)
4. MsgBox(Math.Round(676.378654)) will give 676 as result
5. To set the button color to red we use this code (button1.backcolor = color.red)

Q4:Give the correct representation in visual basic for the following equations: **(15 degree)**

1. $\cos(t^3) - 5$
2. $\tan(t+3)$.
3. $56 - \sin(90)$.
4. $\cos(t) + \sin(t)$.
5. $e^t - 12$.

Q5:**In internet there are many terms used;define the followings:** **(24 degree)**

1. Bandwidth
2. IP
3. ISDL
4. Mbps
5. FTP
6. HTTP

Q6:DO **only one** of the following :

(15 degree)

1. Write complete program to **Insert new column in matrix x(2, 2).**
2. Write complete program to **Print the second and third coulmn of matrix x(3, 3) in listbox1.**

بالتوفـــــيق

مدرس المادة:

رئيس القسم: 26/05/2016

وزارة التعليم العالي والبحث العلمي

هيئة التعليم التقني

جامعة الفرات الاوسط التقنية

الكلية الهندسية التقنية- نجف

الامتحان النهائي – العام الدراسي ٢٠١٥ / ٢٠١٦

القسم : هندسة تقنيات الاتصالات

المرحلة : الثانية

المادة: مجالات كهرومغناطيسية

زمن الامتحان: ثلاث ساعات

التاريخ: 2016 / 05 / 24

Notes:

1. ***Attempt four questions only. For each question 25 marks.***
2. ***The last question should be answered.***

Q1:A- Select the correct choice. **Select one only** **(10 marks)**

1. According to the line integral principle, the line integral of the gradient of the function from the origin to the point P is .....

a. same at all path, b. same at half path and differ at other points. c. differ from point to point. d. not any one from the above.

2. Using the flux principle, if there is no source for the vector fields (A) where the flux (ϕ) can be given by ($\phi = \oint_s A.ds$) then (ϕ) can equal to zero at:

a. At the case when the flux is larger than the surface contribution of any contour at that surface.
b. At the case when there is no source.
c. At the case when the flux is smaller than the surface contribution of any contour at that surface.
d. None of the above.

Q1:B- Assume there is a point charge (such as electron) affected by a magnetic force of 2N then compute the electric flux if you know that the charge velocity is about 0.12C, and the electric current generated in associating with the magnetic field (H) is (I = 0.02 mA). Assume that ($\rho = 0.002\,\pi^{-1}\ charge\ per\ unit\ length$). Assume also the angle generated by the charge under test is 45°. The case is under vacuum. **(15 marks)**

Q2:A- Compare according to Maxwell's equations between: (**Answer one only**)

1. The curl of magnetic field and that of the electric field.
2. The divergence of the electric field and this of the magnetic field. **(12 marks)**

Q2:B- Derive an expression to show the electric field of dipole. **(13 marks)**

Q3:A- The total results of adding the contribution for all the contours is defined as Stock's theorem. Which convert the line integral formula to several types of useful formula. One of these is: (**Derive if it is possible**) **(15 marks)**

a. $\int A.dl = \int_A^S (\nabla \times S) dA$, b. $\int A.dJ = \int (\nabla \times A) dl$,

c. $\oint_L A.dl = \int_S (\nabla \times A)\, dS$, d. None of the above.

Q3:B- Assume you should move a charge from point A to point B. Discuss briefly all the conditions that you may facing. **(10 marks)**

Q4:A- Using the definition of the dot product. The interior angle of the triangle at A and B defined by three points A (1,3,-2) , B(-2, 4, 5) and C(0, -2, 1) should be one of the following: **(15 marks)**

a. 65. 28° and 45.9°. b. 56.28° and 49.5° c. 64.82° and 59.4° d. none of the above

Q4:B- Usually there are three types of the generation of the charges. List all these types. Then discuss briefly the conclusions that we can obtain from the case when the work had done over a charge became at a time positive and at second time negative. **(10 marks)**

Q5: This question should be answered.

If two points where a point charge moving along the line in between such as (A) and (B). Assume that the electric field generated between two points is (0.5 $C.m^{-2}$) at point (A) and (0.7 $C.m^{-2}$) at point (B). Assume also the charge is electron in vacuum. compute the magnitude of the potential difference generated between these two points. Give a suitable explanation for the –ve sign if it was appear in your solution. **(25 marks)**

Good Luck 4 All

Signed
Examiner
A.L. Hussam N. Al-Anssary

24/05/2016
Head of Dept.
A.L. Laith W. Abdullah

Note: Answer all questions

Q1/

The antenna current of an AM transmitter is 8 A if only the carrier is sent, but it increases to 8.93 A if the carrier is modulated by a single sinusoidal wave. Determine the percentage modulation. Also find the antenna current if the percent of modulation changes to 0.8. **(20 marks)**

Q2/

A. How PM generated using FM? Explain. **(8 marks)**

B. Find the overall noise figure of a three stage cascaded amplifier, each stage having a power gain of 10 dB and noise figure of 6 dB. **(12 marks)**

Q3/

In an FM system, the audio frequency is 1 kHz and audio voltage is 2 volts. The deviation is 4 kHz. If the AF voltage is now increased to 8 volts and its frequency dropped to 500 Hz, find the modulation index in each case and the corresponding bandwidth using Carson's rule. **(20 marks)**

Q4/

A. What are the disadvantages of pulse position modulation (PPM)? **(8 marks)**

B. For a pulse-amplitude modulated (PAM) transmission of voice signal having maximum frequency equal to $f_m = 3$ kHz, calculate the transmission bandwidth. It is given that the sampling frequency $f_s = 8$ kHz and the pulse duration $\tau = 0.1$ Ts.

(12 marks)

Q5/ Answer two branches only:

A. Calculate the percent power saving for the SSB signal if the AM wave is modulated to a depth of (*a*) 100% and (*b*) 50%. **(10 marks)**

B. By using continuous-time convolution integral, find out the response of the system to unit-step input signal. Impulse response is given as

$$h(t) = \frac{R}{L} e^{-tR/L} .u(t).$$

(10 marks)

C. Find the Fourier transform of the signal

$$x(t) = e^{-at}\ u(t),\ \ a > 0.$$

(10 marks)

29/05/2016

رئيس القسم: ليث وجيه عبد الله

مدرس المادة: أحمد حسن هادي

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/٢
زمن الامتحان: ٣ساعات
التاريخ: ٢١ /٥/2016

الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦

Q1// Solve the following equations: (30M)

1) $\frac{dy}{dx} = \frac{2x\ln x + x}{\sin y + y\cos y}$

2) $y^2 - (xy + x^2)\frac{dy}{dx} = 0$

3) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = e^x \cos x$

Q2// (choose only two). (30 M)

a)Find the volume of the region in the first octant bounded by the planes (x+z=1) and (y+2z=2)

b) $\int_0^2 \int_{\frac{x}{2}}^2 \frac{dydx}{y^4+1}$

c) $\int_0^{2\pi} \int_0^{\pi} \int_0^{(1-\cos\emptyset)} \rho^2 \sin\emptyset \, d\rho d\emptyset d\theta$

Q3// a)If $A = x^2yi - 2xzj + 2yzk$. Find curl curl A. (30M)

b)Using Green's theorem .evaluate $\oint((y - \sin x)dx + \cos x\, dy)$ where C is the plane triangle enclosed by the lines y=0. $y = 0, x = \frac{\pi}{2}, y = \frac{2}{\pi}x$.

c)Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point (1,-2,1).

Q4// Find Taylors series for $\dot{y} = 2y + 3e^x$, y(0)=0. (10M)

Good Luck

31/05/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

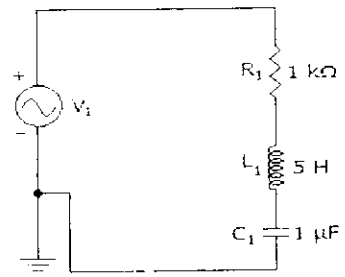
القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: دوائر الكترونية
زمن الامتحان: ٣ ساعات
التاريخ: 2016/06/02

الامتحان النهائي - العام الدراسي ٢٠١٥/٢٠١٦

Answer All Questions

Q1/Choose the correct answer with the solutions if need: **(30 Marks)**

1. What is the resonance frequency?



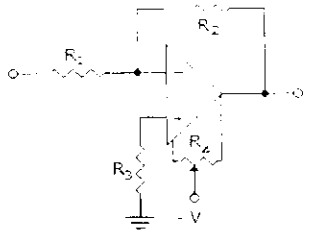
A. 31.8 Hz **B.** 71 Hz **C.** 7.1 kHz **D.** 31.8 kHz

2. Maximum efficiency produced by Class B amplifier is_____
A. 60% **B.**50% **C.**79% **D.** 180%

3. If the voltage gain of an amplifier without feedback is 20 and with negative voltage feedback it is 12. then feedback fraction is_____
A. 5/3 **B.**3/5 **C.** 1/5 **D.** 0.033

4. ___ _____ transforms digital signals into analog form.
A.digital to analog converter **B.** inverter **C.** comparator **D.** analog to digital converter

5. Refer to this figure. The purpose of R4 is_____



A. for bias current compensation. **B.** for input offset voltage compensation.
C. to set input impedance. **D.** to set input impedance and voltage gain.

6. A 2-transistor class B power amplifier is commonly called _____amplifier.
A. Dual **B.** Push-pull **C.** Symmetrical **D.** Differential

7. fly back oscillator is type of _____
A. harmonic oscillator **B.** feedback oscillator **C.** negative resistance oscillator **D.** relaxation oscillator

8. _____ is typically used in analog-to-digital converters to eliminate variations in input signal that can corrupt the conversion process.
A. Sample and hold **B.** digital-to-analog converter **C.** Schmitt trigger **D.** none of the above

9. If the output of an amplifier is 10 V and100 mV from the output is fed back to the input, then feedback fraction is_____
A.10 **B.**0.1 **C.**0.01 **D.** 0.15

10. When negative voltage feedback is applied to an amplifier, its voltage gain
A. is increased **B.** is reduced **C.** remains the same **D.** none of the above

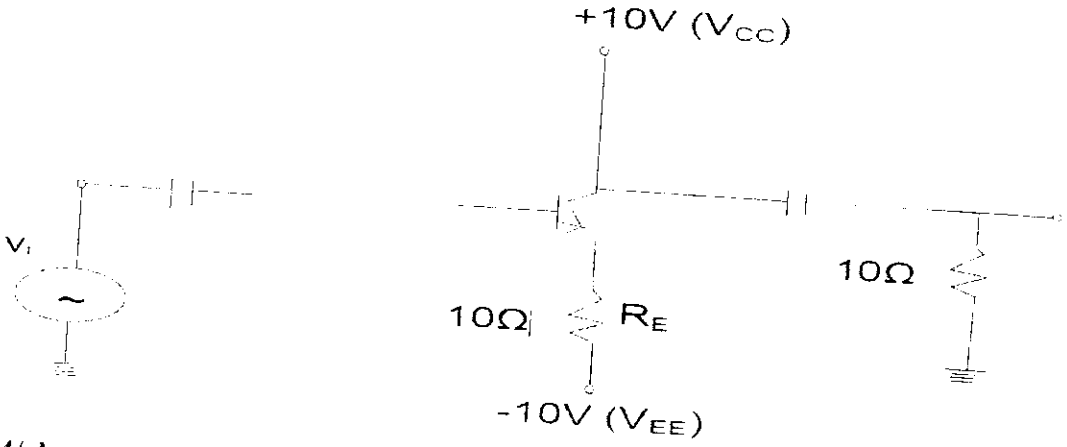
Q2/ a) Derivative the input and output impedances for shunt-series feedback with drawing the circuit. **(10Marks)**

b) The overall gain of an amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input. **(10Marks)**

Q3/ a) A 3-stage RC Phase Shift Oscillator is required to produce an oscillation frequency of 6.5 kHz. If 1nF capacitors are used in the feedback circuit, determining resistors and the value of the feedback resistor required to sustain oscillations. Also draw the circuit. **(15 Marks)**

b) Calculate maximum ac output power and efficiency of the amplifier shown in fig.below? (VBE =0)

(15Marks)



Q4/choose only one of the following:

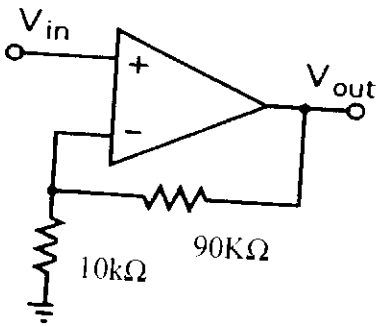
a) fig. below is circuit of a negative voltage feedback amplifier. If without feedback, Av = 10,000, Zin = 10 kΩ, Zout = 100 Ω, find:

(i) Feedback fraction

(ii) gain with feedback

(iii) Input impedance with feedback

(iv) output impedance with feedback.



b) Determine the output voltage of an op-amp for input voltages of V1=150μV, V2=140μV. The amplifier has a differential gain of Ad=4000 and the value of CMMR is 100. **(20Marks)**

(20 Marks)

02/06/2016

رئيس القسم

ليث وجيه عبد الله

GOOD LUCK

مدرسة المادة

رؤى شلال عنوز

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة: نظرية المعلومات
زمن الامتحان: ثلاث ساعات
التاريخ: ٢٠١٦/٦/ .

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

الامتحان النهائي - العام الدراسي ٢٠١٥/٢٠١٦

➢ ***Answer four questions only // please read the questions carefully.***

Q1:A:- *Is the following valid generator polynomial* $x + x^2$ *,why?* ***(9 MARKS)***

Q1:B:- *The two experiments A and B have the joint probability matrix is given by:*

$$\begin{bmatrix} 0.1 & 0.25 \\ 0 & 0.2 \\ 0.25 & 0.2 \end{bmatrix}$$

Find P(A),P(B),P(A/B) and P(B/A). ***(16 MARKS)***

Q2:A:- *Let as consider the throw of two coin .what is the probability two faces appears H provided that H appears from first attempt?* ***(15 MARKS)***

Q2:B:- *What is different between the Convolutional and linear codes?* ***(10 MARKS)***

Q3:- *Develop the* ***Shannon code*** *for the following set of messages:* ***(25 MARKS)***
p(A) =[0.3 0.2 0.15 0.12 0.1 0.08 0.05] , Using ***ternary coding*** *to find Code efficiency ,and p(0) at the encoder output?*

Q4:- *for the Convolutional encoder in fig .(1) ,Draw the trellis diagram if the message bits(11010) and decode the received bits are 01 00 01 00 10 using viterbis algorithm.* ***(25 MARKS)***

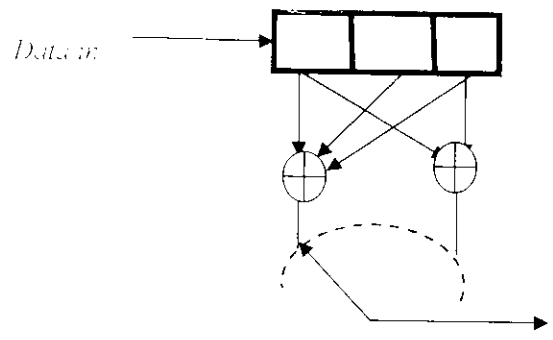


fig .(1)

Q5:-*Fill the following blanks:* ***(the solution must be required to get full marks)*** ***(25 MARKS)***

1. To find amount of information gained from a die is thrown if the number (4) will appear ---------- -
2. If code words used are (000,101,110,011),then the H.D. between the words is ----------
3. Consider a linear block code (6, 3) where n,d_{min} and code rate respectively are ----------
4. To find efficiency of a fixed length code used to encode messages obtained from throwing Adie once ----------
5- The probability of selecting a month with **31** days is ----------

---

05/06/2016

HoD:
Laith Wajeeh

Lecturer:
Hawraa F.Abd

القسم : قسم هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ثلاث ساعات
التاريخ: 2016/06/05

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الأوسط التقنية
الكلية التقنية/ نجف

الامتحان النهائي للعام الدراسي 2015 – 2016

Q1.A) Multiple Choice Questions: **(10 Marks)**

1. A 4-bit synchronous counter uses flip-flops with propagation delay times of 15 ns each. The maximum possible time required for change of state will be
(A) 15 ns **(B) 30 ns** **(C) 45 ns** **(D) 60 ns**

2. The group of bits 1001 is serially shifted (right-most bit first) into an 4-bit parallel output shift register with an initial state of 1011. After three clock pulses, the register contains.
(A) 1111 **(B) 0011** **(C) 1100** **(D) 0000**

3. How many select lines will a 16 to 1 multiplexer will have
(A) 4 **(B) 3** **(C) 5** **(D) 1**

4. Which of the memory is volatile memory
(A) ROM **(B) RAM** **(C) PROM** **(D) EEPROM**

5. A memory with 512 addresses has
(A) 256 address lines **(B) 7 address line** **(C) 1 address line** **(D) 9 address line**

Q1. B) Illustrate a 4-bit data movement for parallel in serial out shift registers and draw typical logic symbol. **(10 Marks)**

Q2) Answer **ONE** of the followings,

1) Develop a synchronous 2-bit up/down counter by using D flip-flop. The counter should count when an UP /$\overline{DOWN}$ control input is 1 and count down when the control input is 0. **(10 Marks)**

2) Design a counter to produce the following decimal sequence. **(10 Marks)**

0, 1, 3, 2, 6, 0, 1, 3 ...

1. How many states does this counter have?
2. How many flip-flops are required to build this counter?
3. Draw the state diagram for this circuit.
4. If T flip-flops are to be used, write the excitation equation for the flip-flops inputs.
5. Draw the logic circuit for this counter.

Q3.A) Design a four-input priority encoder using K-map, such that the input D_3 has the highest priority, D_2 has next highest priority, D_0 has the lowest priority. **(10 Marks)**

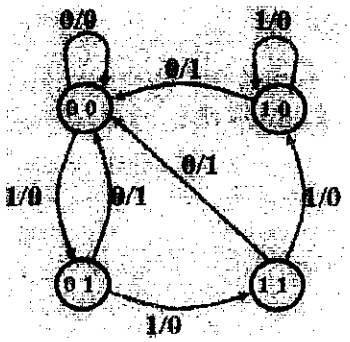
Q3.B) Implement the function F (a, b, c, d) = $\sum$ m (0, 1, 2, 3, 4, 5, 12, 13) using tow 2×4 decoders and two external OR gate. **(15 Marks)**

Q4.A) Implement the switching function **(15 Marks)**

$$F(a,b,c,d) = \sum m(0,1,2,5,9,11,13,15)$$

a. Using two 8-to-1 multiplexers with an active high enable, plus an OR gate.
b. Using one 8-to-1 multiplexers assume (a) as input multiplexed.

Q4.B) Given the following state diagram, design the sequential circuit using D flip-flops.

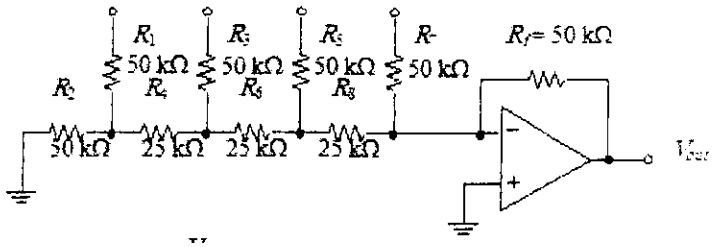


(10 Marks)

Q5.A) Answer **ONE** of the following

1. Draw logic circuit of a typical SRAM latch memory cell. **(10 Marks)**
2. What are the main differences between RAM & ROM. **(10 Marks)**

Q5. B) An R-2R ladder (DAC) the sequence of 4-bit binary numbers 1011 are applied to the inputs as shown in Figure below. If a HIGH = +5.0 V and a LOW = 0 V, what is V_{out}? **(10 Marks)**



10/06/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

Ministry Of High Education And Scientific Research
Alfurat Al-Awsat Technical University
Technical College / Najaf
Depart. / The Technical Communication Engineering

Class: 2nd
Subject: Electrical Machines
Time of Exam: (3) Hours
Date : ٩ / ٦ / 2016

Final Examination 2015 – 2016

NOTE: Answer All Questions.

Q1: A belt-driven 100kW, shunt generator running at 360 (r.p.m) on 220V bus bars continuous to run as a motor when the belt breaks, then taking 10kW. What will be its speed? Given armature resistance 0.025Ω, field resistance 60Ω and contact drop under each brush 1 volt. Ignore armature reaction. **[30 M]**

Q2: A 220V dc series motor is running at speed 800(r.p.m), and draws 100A. Calculate at what speed the motor will run when developing half the tourqe. Total resistance of the armature and field is 0.1Ω. Assume that the magnetic circuit is unsaturated. **[20 M]**

Q3: A train is driven by a DC machine with independent electrical excitation. At a speed of 1500 rpm, the following magnetization characteristic has been measured.

E_A [volt]	50	420	780	950	1120	1180	1260
I_f [ampere]	0	4.0	8.0	10.0	12.8	14.4	28.8

(A) Answer **TWO** of the following **[14 M]**

(1) Sketch the equivalent circuit of the DC machine.
(2) Why is a voltage induced in the armature when the excitation current is zero?
(3) Why does the induced voltage at high excitation currents not increase proportional to the excitation current?

(B) Answer **TWO** of the following **[16 M]**

The machine runs at 1500 rpm and the train has a speed of 20 m/s. The armature terminal voltage is 790 V. The current is 50 A. The armature resistance is 0.2Ω.

(1) Calculate the product of the motor constant and the pole flux KΦ in this operation point.
(2) Calculate the torque.
(3) In a train application, how does the load torque change as a function of speed?

Q4: Choose the correct answer for **TEN** of the following **[20 M]**

1. A machine operating as motor may go into regenerative braking mode if its speed becomes
   a. Sufficiently high to make back emf greater than supply voltage
   b. Sufficiently low to make back emf greater than supply voltage
   c. Sufficiently high to make back emf half of the supply voltage
   d. Sufficiently low to make back emf half of the supply voltage
2. In the biomedical instruments like artificial heart pumps, the commonly used motor is
   a. Permanent magnet d.c. motor
   b. Brushless d.c. motor
   c. Ward-Leonard system
   d. Series motor

3. Permanent magnet d.c. motors are extensively used in
   a. Automobiles b. Heaters c. Air conditioners d. All of these
4. The speed of permanent magnet d.c. motor cannot be controlled by
   a. Flux control method b. Rheostat control method
   c. Electronic circuits d. None of these
5. The torque constant (K_m), of a permanent magnet d.c. motor is 0.25 V sec / radian and armature resistance is 2 ohm. If the applied armature voltage is 90 V, then its zero speed torque is
   a. 10.45 N-m b. 11.25 N-m c. 13.65 N-m d. 15.56 N-m
6. If a resistance is added in series with the field winding of d.c. shunt motor, then its
   a. Both speed and torque decreases b. Both speed and torque increases
   c. Speed decreases, torque increases d. Speed increases, torque decreases
7. Which method is suitable for the speed control, below and above the normal rated speed of d.c. shunt motor?
   a. Flux control method b. Rheostatic control method
   c. Voltage control method d. All of these
8. With the increase in temperature, the speed of series and shunt motor will
   a. Increase, decrease b. Decrease, increase c. Increase, increase
   d. Decrease, decrease
9. Speed of d.c. shunt motors are controlled by
   a. Flux control method b. Rheostatic control method
   c. Voltage control method d. All of these
10. In electric traction, which type of motor is generally used?
    a. Shunt motor b. Series motor c. Cumulative compound motor
    d. Differential compound motor
11. In a differential compound d.c. motor, with increase in load, speed
    a. Increases b. Decreases c. Remains same d. None of these
12. D.C. series motors are used in electric traction. What happens to the speed and current of d.c motor if there is sudden slight drop in the mains voltage?
    a. Speed decreases and current also decreases b. Speed decreases and current increases
    c. Speed increases and current decreases d. Speed decreases and current remains same
13. If a d.c. series motor is started on very light load or on no load then
    a. It will run at dangerously high speed which may damage the motor mechanically
    b. It will run at very low speed
    c. Load does not effect the speed of d.c. series motor d. None of these
14. Which motor is not suitable for the application of centrifugal pumps?
    a. Shunt motor b. Series motor c. Cumulative compound motor
    d. Differential compound motor

Good Lock

Examiner
Abdulrahman M. Khash

2-2

09/06/2016
Department Head
Laith Najeeb

Note: Answer all questions

Q1/

A. The carrier amplitude after amplitude modulation varies between 4 V and 1 V. Calculate depth of modulation. **(8 marks)**

B. A 400 W carrier is modulated on a depth of 75 percent; calculate the total power in the modulated wave in the following forms of AM.

a) Double sideband with full carrier (DSBFC)

b) Double sideband suppressed carrier (DSBSC)

c) Single sideband suppressed carrier (SSB) **(12 marks)**

Q2/

A. Draw the block diagram of the idealized FM receiver. **(8 marks)**

B. Determine the receiver's noise figure in decibels and its equivalent noise temperature. A receiver is connected to an antenna whose resistance is 50 Ω. The equivalent noise resistance of this receiver is 30 ohms. **(12 marks)**

Q3/

A. Determine the bandwidth of a narrowband FM signal which is generated by a 4 kHz audio signal modulating a 125 MHz carrier. **(8 marks)**

B. A FM wave is represented by the following equation:

$$\upsilon(t) = 10\sin[5\times10^{8}t + 4\sin 1250t]$$

Determine the following:

(*i*) Carrier and modulating frequencies

(*ii*) Modulation index and maximum deviation

(*iii*) The power dissipated by this FM wave in a 5 Ω resistor. **(12 marks)**

Q4/

A. What is Nyquist rate and Nyquist interval? **(6 marks)**

B. Draw the block diagram of PAM demodulator. **(6 marks)**

C. How do you get PPM from PDM? **(8 marks)**

Q5/ Answer two branches only:

A. Draw the block diagram of the phase-shift method of generating SSB. **(10 marks)**

B. Calculate the energy of the two-sided exponential

$$f(t) = \exp(-a|t|), \quad a > 0$$

(across a one-ohm resistance) in the time domain. **(10 marks)**

C. Find the Fourier transform of

$$f(t) = \begin{cases} 2 & for \quad -T \le t \le 0 \\ -2 & for \quad 0 \le t \le T \end{cases}$$ **(10 marks)**

14/09/2016

رئيس القسم: ليث وجيه عبد الله

مدرس المادة: أحمد حسن هادي

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة: نظرية المعلومات
زمن الامتحان: ثلاث ساعات
التاريخ: ٢٠١٦/٦/٩

الامتحان النهائي - العام الدراسي ٢٠١٥/٢٠١٦

➢ ***Answer four questions only // please read the questions carefully.***

Q1:- Each blank carries 5 marks: (the solution must be required to get full marks)

1-To find the amount of information ganned from a coin has p(Head)=0.3 , if a Tail will appear ----------
2- To find efficiency of a fixed length code used to encode messages obtained from throwing Adie twice ----------
3-Error control coding characteristics is capable of ----------
4- The probability of selecting a month with 30 days is ----------
5-the average information content in the English language with equal probability is ----------

---

Q2:A:-*A red die and a green die are rolled .what is the probability the sum rolled on the dice is 6,given that the sum is less than 7?* ***(13 marks)***

Q2:B:-*The A,B are two experiment ,the* $P(A,A)=\frac{9}{20}, P(A,B)=\frac{3}{20}, P(B,A)=\frac{3}{20}, and P(B,B)=\frac{5}{20}$ *,write the joint and conditional probabilities?* ***(12 marks)***

Q3:-*Draw the block diagram to error correction for cyclic code and what are the error correction steps?* ***(25marks)***

Q4:A:- *Given a K=3 ,rate code 1/2 ,binary Convolutional code with the partially completed state diagram Show in fig.(1),find the complete state diagram and sketch a diagram for the encoder?* ***(15 marks)***

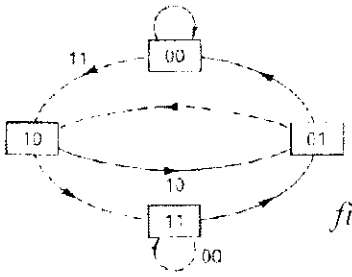


fig.(1)

Q4:B:- *List the properties of syndrome* ***(10marks)***

Q5:- *Develop the* ***Shannon code*** *for the following set of messages with their probabilities:*

p(A) =[0.3,0.2,0.15,0.12, 0.1,0.08,0.05]

(25marks)

Then find :

i. Code efficiency ,
ii. P(0) at the encoder output.

HoD:
Laith Wajeeh

Lecturer:
Hawraa F.Abd

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة :دوائر الكترونية
زمن الامتحان: ٣ساعات
التاريخ: 2016/9/ 8

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
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الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦ / الدور الثاني

Answer All Questions

Q1/Choose the correct answer with the solutions if need: **(30 Marks)**

1. main types of electronic oscillator are_____
A. harmonic oscillator **B.** relaxation oscillator **C.**none of A&B **D.** all A&B

2. Signal distortion of Class C amplifiers is_____
A. large **B.** small **C.** none **D.** crossover point

3. The ideal OP-AMP has the following characteristics
A. Ri = ∞, AV= ∞, Ro = 0 **B.** Ri = 0, AV= ∞, Ro = 0
C. Ri = ∞, AV= ∞, Ro = ∞ **D.** Ri = 0, AV= ∞, Ro = ∞

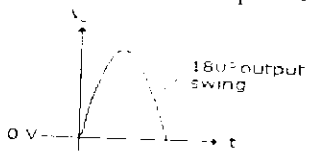
4. Relaxation oscillators are divided into _____ types.
A. two **B.** three **C.** four **D.** five

5. The push-pull circuit must use _____ operation.
A. Class A **B.** Class C **C.** Class B **D.** Class AB

6. An oscillator converts _____.
A. a.c. power into d.c. power **B.** d.c. power into a.c. power
C. mechanical power into a.c. power **D.** none of the above

7. When a sinusoidal voltage wave is fed to a Schmitt trigger, the output will be_____
A. triangular wave. **B.** asymmetric square wave. **C.** rectangular wave. **D.** trapezoidal wave.

8. This is an example of the output swing for a class _____ amplifier.



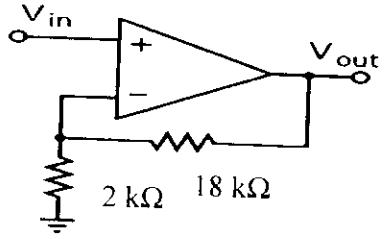
A. Class A **B.** Class C **C.** Class B **D.** Class AB

9. Class AB operation is _____ operation.
A. similar to class A **B.** similar to class B **C.** similar to class C **D.** None of the above

10. A feedback circuit usually employs _____network.
A. resistive **B.** capacitive **C.** inductive **D.** none of the above

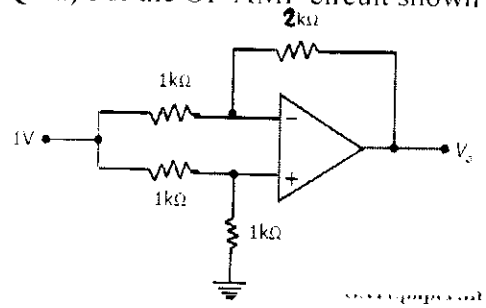
Q2/ a) The input to an op-amp differentiator circuit is a sinusoidal voltage of peak value V= 10μ and frequency of 2 kHz. If the values of differentiating components are given as R = 40 kΩ and C = 3μF , determine the output voltage.

b) Fig. below shows the negative voltage feedback amplifier. If the gain of the amplifier without feedback is 10,000, find: (i) feedback fraction (ii) overall voltage gain (iii) output voltage if input voltage is 1 mV. **(15 Marks)**



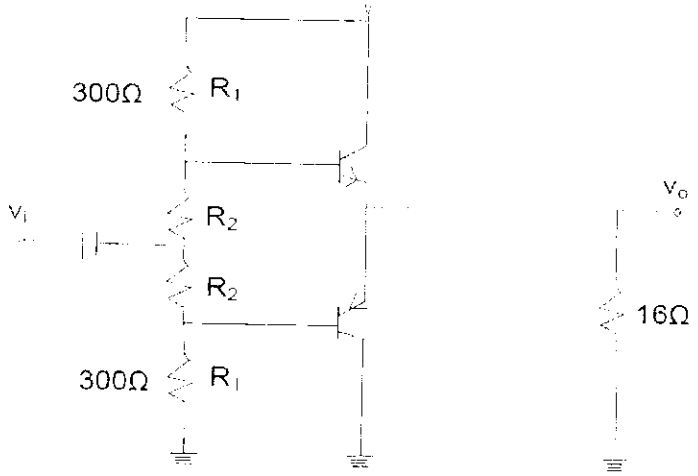
(15Marks)

Q3/a) For the OP-AMP circuit shown in the figure, calculate the output voltage?



(10Marks)

b) Find the value of resistor R2 to provide bias current for distortion free output in the push pull amplifier shown in fig. VBE for each transistor is 0.7V. **(10 Marks)**



Q4/ choose only one of the following:

a) Calculate maximum ac output power and efficiency of the amplifier in fig.(1)? **(20 Marks)**

b) Calculate maximum ac output power and efficiency and power dissipation of the amplifier shown in fig.(2)? **(20 Marks)**

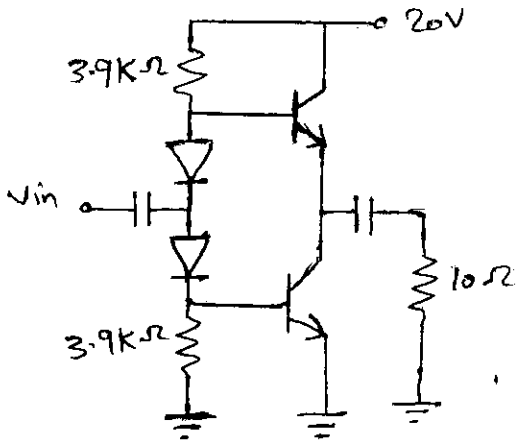


fig.(1)

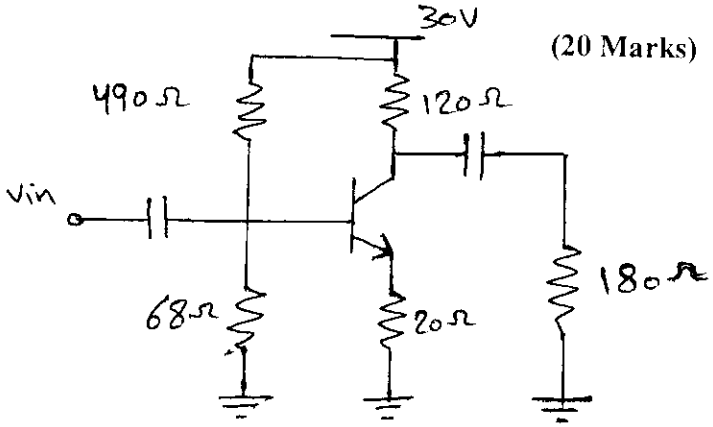


fig.(2)

GOOD LUCK

08/09/2016

رئيس القسم
ليث وجيه عبد الله

مدرسة المادة
رؤى شلال عنوز

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/٢
زمن الامتحان:٣ ساعات
التاريخ: 2016/٩/٨

الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦ / الدور الثاني

Q1// Solve the following equations: (30M)

1) $y^2\frac{dy}{dx} = \cos^2 x$

2) $\left(1+e^{x/y}\right)dx + \left(1-\frac{x}{y}\right)e^{x/y}dy = 0$

3) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = xe^x$

Q2//Evaluate the following integral:**(choose only three).** (30M)

1) $\int_1^2\int_x^{2x}\frac{x}{y}dydx$

2) $\int_{-1}^{1}\int_0^{\sqrt{1-x^2}}dydx$

3) $\int_{-2}^{2}\int_{-\sqrt{1-z^2}}^{\sqrt{1-z^2}}\int_{-\sqrt{1-y^2-z^2}}^{\sqrt{1-y^2-z^2}}dx\,dy\,dz$

4) $\int_0^2\int_{\sqrt[3]{x}}^{2}\frac{dydx}{y^4+1}$

Q3//(choose only three). (30M)

a)Evaluate $\iint A.n\,ds$ over the entire surface S of the region bounded by the cylinder $x^2+z^2=9$. x=0,y=0,z=0 and y=8. If A=6zi +(2x+y)j –xk.

b) If R=xi+yj+zk. show that

1)$\nabla\cdot R = 3$

2)$\nabla\times R = 0$

c) Show that the vector filed defined by $f=(x^2+xy^2)i+(y^2+x^2y)j$ is conservative and find the scalar potential. Hence evaluate $\int F.dR$ from (0,2) to(1,2).

d) Find the angle between the surfaces $2x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point (1,-1,3).

Q4//Find Maclaurin series for $\dot{y}=\frac{1}{(1-x)^2}$. given y(0)=1 (10M)

Good Luck

18/09/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

Ministry Of High Education And Scientific Research
Alfurat Al-Awsat Technical University
Technical College / Najaf
Depart. / The Technical Communication Engineering

Class: 2nd
Subject: Electrical Machines
Time of Exam: (3) Hours
Date : 21/05/2016

الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦ / الدور الثاني

NOTE: Answer All Questions.

Q1: A 25 kW 250V DC shunt generator has an armature resistance of 0.06Ω and field resistance of 100Ω. Determine the total armature power developed working as
(A) Generator delivering 25 kW output **[15 M]**
(B) A motor taking 25 kW input **[15 M]**

Q2: A 230V DC shunt motor has an armature resistance of 0.5Ω and field resistance of 115Ω. An no load the speed is 1200 (r.p.m) and the armature current 2.5A. On application of no load, the speed drops to 1120 (r.p.m). Determine the line current and power input when the motor delivers rated load. **[20 M]**

Q3: A train is driven by a DC machine with independent electrical excitation. At a speed of 1500 rpm, the following magnetization characteristic has been measured.

E_a [volt]	50	420	780	950	1120	1180	1260
I_f [ampere]	0	4.0	8.0	10.0	12.8	14.4	28.8

Answer **TWO** of the following
(A) Sketch the equivalent circuit of the DC machine. **[10 M]**
(B) Why is a voltage induced in the armature when the excitation current is zero? **[10 M]**
(C) Why does the induced voltage at high excitation currents not increase proportional to the excitation current? **[10 M]**

Q4: Choose the correct answer for **TEN** of the following **[30 M]**

1. In case of D.C. shunt motors the speed is dependent on
(a) armature drop is negligible (b) flux is proportional to armature current
(c) flux is practically constant in D:C. shunt motors
(d) back e.m.f. only because back e.m.f. is equal to armature drop
2. A D.C. series motor is that which
(a) has its field winding consisting of thick wire and less turns (b) has a poor torque
(c) can be started easily without load (d) has almost constant speed
3. When two D.C. series motors are connected in parallel, the resultant speed is
(a) more than the normal speed (b) loss than the normal speed (c) normal speed (d) zero

4. If a D.C. motor is to be selected for conveyors, which motor would be preferred ?
(a)Series motor (b)Shunt motor (c)Differentially compound motor
(d) Cumulative compound motor

5. Starters are used with D.C. motors because
(a) these motors have high starting torque (b) these motors are not self-starting
(c) back e.m.f. of these motors is zero initially
(d) to restrict armature current as there is no back e.m.f. while starting

6. Which D.C. motor will be preferred for machine tools ?
(a) Series motor (b)Shunt motor (c) Cumulative compound motor (d)Differential compound motor

7. The direction of rotation of a D.C. series motor can be changed by
(a) interchanging supply terminals (b) interchanging field terminals (c) either of (a) and (b) above
(d) None of the above

8. Which of the following application requires high starting torque ?
(a) Lathe machine (b) Centrifugal pump (c) Locomotive (d) Air blower

9. For starting a D.C. motor a starter is required because
(a) it limits the speed of the motor (b) it limits the starting current to a safe value
(c) it starts the motor (d) none of the above

10. Which D.C. motor is preferred for elevators ?
(a)Shunt motor (b)Series motor (c) Differential compound motor (d)Cumulative compound motor

11. What will happen if the back e.m.f. of a D.C. motor vanishes suddenly?
(a)The motor will stop (b)The motor will continue to run
(c)The armature may burn (d)The motor will run noisy

12. In D.C. shunt motors as load is reduced
(a)the speed will increase abruptly (b)the speed will increase in proportion to reduction in load
(c) the speed will remain almost/constant (d)the speed will reduce

13. The starting torque developed in the d.c. series motor and in d.c. shunt motor is
(a) High, low (b) High, moderate (c) Moderate, low (d) Moderate, high

14. The speed of a d.c. series motor is
(a) Directly proportional to the both armature current and torque developed
(b) Inversely proportional to the armature current and square root of torque developed
(c) Directly proportional to the square of the armature current and square root of torque developed
(d) Inversely proportional to the square of the armature current and square of torque developed

15. The speed armature current characteristics of a d.c. series motor is
(a) Rectangular hyperbola (b) Linear (c) Parabolic
(d) Parabolic till saturation and then linear

Good Luck

Examiner
Abdulrahman M. Kshash

21/09/2016
Department Head
Laith Najeeh

(2-2)

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الاوسط التقنية
الكلية التقنية- نجف

الامتحان النهائي – العام الدراسي ٢٠١٥ / ٢٠١٦
الدور الثاني

القسم : هندسه تقنيات الاتصالات
المرحلة : الثانية
المادة: مجالات كهرومغناطيسية
زمن الامتحان: ثلاث ساعات
التاريخ: 22 / 05 / 2016

Note: Attempt All Questions. For each question 20 marks only.

Q1: A- Compute the electric field intensity for four electrons passing through a conductor if you know that these four electrons are affect to each other by coulomb's force with (2N). Assume that this conductor is in vacuum, where ($\lambda_o = 4 \times 1.6 \times 10^{-19}\ C/m$) assume also that the conductor has ∞- length. (12 marks)

Q1: B- Compare, **select two only**: (8 marks)

1. Curl principle in electric field and magnetic field.
2. The field of dipole if the charges are differ and similar.
3. The force in electric field and magnetic field.

Q2: **Answer Two only**.

A- **Answer two** of the following: (10 marks)

i. Derive the divergence theorem for Cartesian coordinate system only.
ii. Derive the Stocke's theorem.
iii. List all Maxwell's equations.

B- Convert the x,y,z in Cartesian coordinate system to their values in the polar coordinate systems. (10 marks)

C- Div A = ? in (Cartesian , cylinder and sphere) coordinate systems. (10 marks)

Q3:A- Compute the unit vector perpendicular in the Right – Hand sense to the vectors shown in fig. (1) of your exam sheet. Then compute the angle of the crossing. (12 marks)

Q3:B- Define and give only the main relations **for two** of the following: (8 marks)

1. Coulomb's force.
2. Lorentz's force.
3. The gravitational constant G.

Q4:A- Give the reason for the following events. **Select two only**. (8 marks)

i. Using Coulomb's principle, the charge other than q2 would feel a different force from q1 proportional to its own magnitude and sign. It becomes convenient to work with the quantity of the force per unit charge that is called the electric field.

ii. The field due to an infinitely long line charge became uniform?

iii. $\boldsymbol{D = \varepsilon_0 E}$ is used to calculate the electric flux in vacuum only. Why?

Q4:B- Compute the electric flux generated by a charge moved with (0.6 C) velocity and generate a magnetic field with flux of H = 0.2 T. Assume that the charge mobility is in vacuum. Assume also the angle between the charge velocity and the magnetic field is about 45°. The charge under test is electron. (12 marks)

Q5:A- For a given points A(8, -5, 4) and B(-2, -3, 2) compute: (12 marks)

1. The distance from A to B.
2. The unit vector from A toward B.
3. The unit vector from the origin point to the midpoint of the line AB.

Q5:B- Compare between the electric and magnetic field in the following. **Select two only.** (8 Marks)

i. The curl principle.

ii. The force generation.

iii. The propagation direction.

Good Luck for All

Signed

Examiner

A.L. H. Al-Anssary

22/09/2016

Head of Dept.

A.L. Laith W. A.

(2-3)

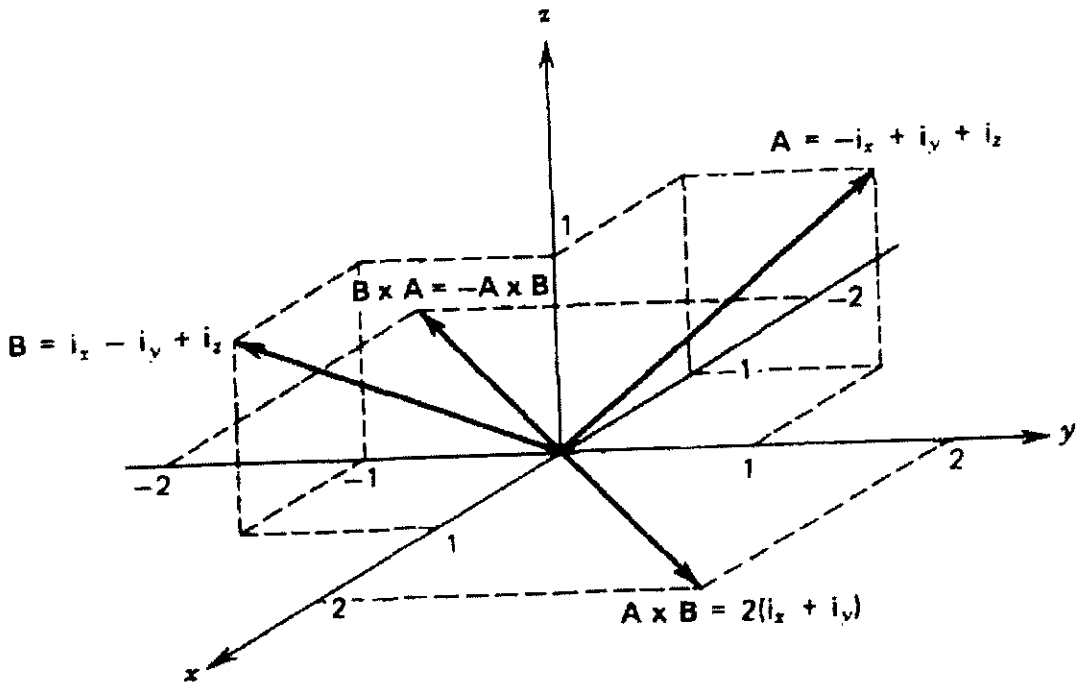


Fig. (1)

القسم : قسم هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ثلاث ساعات
التاريخ: 25 /2016/09

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الأوسط التقنية
الكلية التقنية- نجف

الامتحان النهائي للعام الدراسي 2015 – 2016

Q1.A) Multiple Choice Questions **(10 Marks)**

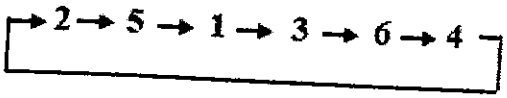
1. How many Flip-Flops are required for mod–16 counter?
   (A) 5 **(B) 6** **(C) 3** **(D) 4**
2. A ring counter consisting of five Flip-Flops will have
   (A) 5 states **(B) 10 states** **(C) 32 states** **(D) Infinite states.**
3. For JK flipflop J = 0, K=1, the output after clock pulse will be
   (A) 1 **(B) no change** **(C) 0** **(D) high impedance**
4. With a 1 MHz clock frequency, eight bits can be parallel entered into a shift register
   (A) in 8 µs **(B) in 4 µs** **(C) in 2 µs** **(D) in 1 µs**
5. The bit capacity of a memory that has 1024 addresses and can store byte at each address is
   (A) 1024 **(B) 8192** **(C) 8** **(D) 4096**

Q1. B) Illustrate a 4-bit data movement for parallel in parallel out shift registers and draw typical logic symbol. **(10 Marks)**

Q2) Answer **ONE** of the following

1) How to construct an asynchronous MOD-5 counter? MOD-7 counter? **(10 Marks)**

2) It is required to design a synchronous counter that counts in the following decimal sequence: **(10 Marks)**



a. How many states does this counter have ?
b. How many flip flops are required to build this counter ?
c. Draw the state diagram for this circuit.
d. If D flip flops are to be used, write the excitation equation for the flip flops inputs.
e. Draw the logic circuit for this counter.

Q3.A) Verify the circuit in Figure 1 for function: $F(a, b, c) = \sum m(0, 3, 4, 7)$ is reducing from 3 x 8 decoder. **(10 Mark)**

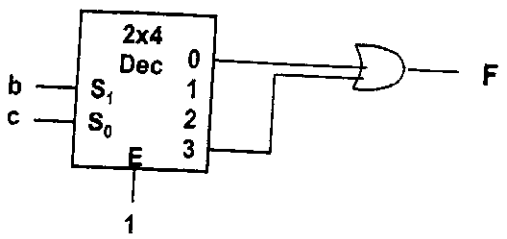


Figure 1

Q3.B) Implement the following logic function using decoders and logic gates.

$$f(Q,X,P) = \prod M(2,3,5)$$ **(10 Mark)**

- Use a decoder (with active-high outputs)

Q4.A) Implement the switching function **(15 Marks)**

$$F(x,w,y) = \sum m(0,1,3,6)$$

a. Using two 4-to-1 multiplexers with an active low enable, plus an OR gate.
b. Using one 4-to-1 multiplexers assume (x) as input multiplexed.

Q4.B) Obtain the state diagram and state table for the circuit in Figure (2) **(15 Marks)**

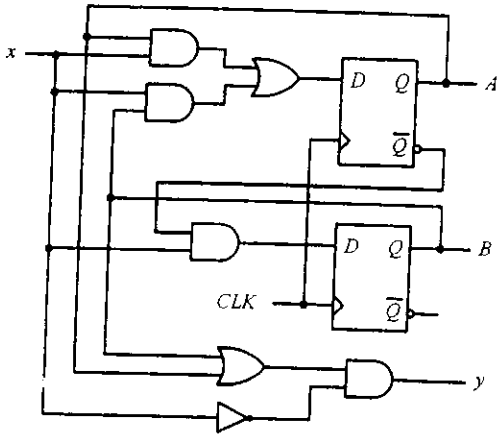
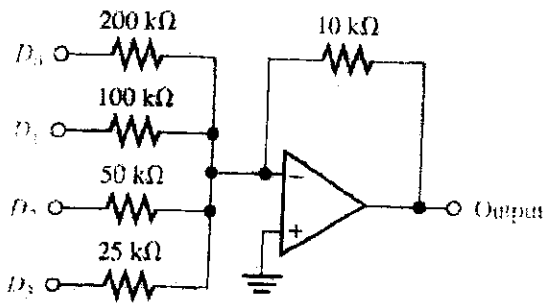


Figure (2)

Q5.A) Answer **ONE** of the following

1. Draw logic circuit of a typical SRAM latch memory cell. **(10 Marks)**
2. What is the difference between Static Random Access Memory (SRAM) and Dynamic Random Access Memory (DRAM)? **(10 Marks)**

Q5. B) Determine the output of the DAC in below if the sequence of 4-bit numbers are, 1101 applied to the inputs. The data inputs have a low value of 0 V and a high value of + 5V. **(10 Marks)**



25/09/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany

جمهورية العراق

وزارة التعليم العالي و البحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات الاتصالات

المرحلة الثانية

أسئلة الامتحان النهائي للعام الدراسي

٢٠١٥-٢٠١٦

الدور الثاني

شعبة ضمان الجودة و الأداء الجامعي

Note: Answer all questions

Q1/

A. The carrier amplitude after amplitude modulation varies between 4 V and 1 V. Calculate depth of modulation. **(8 marks)**

B. A 400 W carrier is modulated on a depth of 75 percent; calculate the total power in the modulated wave in the following forms of AM.

a) Double sideband with full carrier (DSBFC)

b) Double sideband suppressed carrier (DSBSC)

c) Single sideband suppressed carrier (SSB) **(12 marks)**

Q2/

A. Draw the block diagram of the idealized FM receiver. **(8 marks)**

B. Determine the receiver's noise figure in decibels and its equivalent noise temperature. A receiver is connected to an antenna whose resistance is 50 Ω. The equivalent noise resistance of this receiver is 30 ohms. **(12 marks)**

Q3/

A. Determine the bandwidth of a narrowband FM signal which is generated by a 4 kHz audio signal modulating a 125 MHz carrier. **(8 marks)**

B. A FM wave is represented by the following equation:

$$\upsilon(t) = 10\sin[5\times10^{8}t + 4\sin 1250t]$$

Determine the following:

(*i*) Carrier and modulating frequencies

(*ii*) Modulation index and maximum deviation

(*iii*) The power dissipated by this FM wave in a 5 Ω resistor. **(12 marks)**

Q4/

A. What is Nyquist rate and Nyquist interval? **(6 marks)**

B. Draw the block diagram of PAM demodulator. **(6 marks)**

C. How do you get PPM from PDM? **(8 marks)**

Q5/ Answer two branches only:

A. Draw the block diagram of the phase-shift method of generating SSB. **(10 marks)**

B. Calculate the energy of the two-sided exponential

$$f(t) = \exp(-a|t|), \quad a > 0$$

(across a one-ohm resistance) in the time domain. **(10 marks)**

C. Find the Fourier transform of

$$f(t) = \begin{cases} 2 & for \quad -T \le t \le 0 \\ -2 & for \quad 0 \le t \le T \end{cases}$$ **(10 marks)**

14/09/2016

رئيس القسم: ليث وجيه عبد الله

مدرس المادة: أحمد حسن هادي

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة :الثانية
المادة: نظرية المعلومات
زمن الامتحان: ثلاث ساعات
التاريخ: ٢٠١٦/٦/٩

الامتحان النهائي - العام الدراسي ٢٠١٥/٢٠١٦

➢ ***Answer four questions only // please read the questions carefully.***

Q1:- Each blank carries 5 marks: (the solution must be required to get full marks)

1-To find the amount of information ganned from a coin has p(Head)=0.3 , if a Tail will appear ----------
2- To find efficiency of a fixed length code used to encode messages obtained from throwing Adie twice ----------
3-Error control coding characteristics is capable of ----------
4- The probability of selecting a month with 30 days is ----------
5-the average information content in the English language with equal probability is ----------

---

Q2:A:-*A red die and a green die are rolled .what is the probability the sum rolled on the dice is 6,given that the sum is less than 7?* ***(13 marks)***

Q2:B:-*The A,B are two experiment ,the* $P(A,A)=\frac{9}{20}, P(A,B)=\frac{3}{20}, P(B,A)=\frac{3}{20}, and P(B,B)=\frac{5}{20}$ *,write the joint and conditional probabilities?* ***(12 marks)***

Q3:-*Draw the block diagram to error correction for cyclic code and what are the error correction steps?* ***(25marks)***

Q4:A:- *Given a K=3 ,rate code 1/2 ,binary Convolutional code with the partially completed state diagram Show in fig.(1),find the complete state diagram and sketch a diagram for the encoder?* ***(15 marks)***

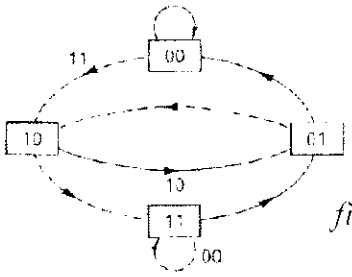


fig.(1)

Q4:B:- *List the properties of syndrome* ***(10marks)***

Q5:- *Develop the* ***Shannon code*** *for the following set of messages with their probabilities:*

p(A) =[0.3,0.2,0.15,0.12, 0.1,0.08,0.05]

(25marks)

Then find :

i. Code efficiency ,
ii. P(0) at the encoder output.

HoD:
Laith Wajeeh

Lecturer:
Hawraa F.Abd

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة :دوائر الكترونية
زمن الامتحان: ٣ساعات
التاريخ: 2016/9/ 8

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
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الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦ / الدور الثاني

Answer All Questions

Q1/Choose the correct answer with the solutions if need: **(30 Marks)**

1. main types of electronic oscillator are_____
A. harmonic oscillator **B.** relaxation oscillator **C.**none of A&B **D.** all A&B

2. Signal distortion of Class C amplifiers is_____
A. large **B.** small **C.** none **D.** crossover point

3. The ideal OP-AMP has the following characteristics
A. Ri = ∞, AV= ∞, Ro = 0 **B.** Ri = 0, AV= ∞, Ro = 0
C. Ri = ∞, AV= ∞, Ro = ∞ **D.** Ri = 0, AV= ∞, Ro = ∞

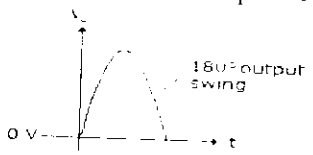
4. Relaxation oscillators are divided into _____ types.
A. two **B.** three **C.** four **D.** five

5. The push-pull circuit must use _____ operation.
A. Class A **B.** Class C **C.** Class B **D.** Class AB

6. An oscillator converts _____.
A. a.c. power into d.c. power **B.** d.c. power into a.c. power
C. mechanical power into a.c. power **D.** none of the above

7. When a sinusoidal voltage wave is fed to a Schmitt trigger, the output will be_____
A. triangular wave. **B.** asymmetric square wave. **C.** rectangular wave. **D.** trapezoidal wave.

8. This is an example of the output swing for a class _____ amplifier.



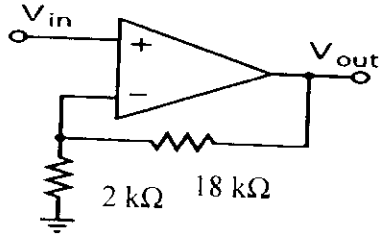
A. Class A **B.** Class C **C.** Class B **D.** Class AB

9. Class AB operation is _____ operation.
A. similar to class A **B.** similar to class B **C.** similar to class C **D.** None of the above

10. A feedback circuit usually employs _____network.
A. resistive **B.** capacitive **C.** inductive **D.** none of the above

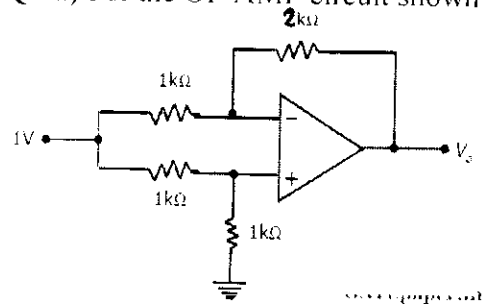
Q2/ a) The input to an op-amp differentiator circuit is a sinusoidal voltage of peak value V= 10μ and frequency of 2 kHz. If the values of differentiating components are given as R = 40 kΩ and C = 3μF , determine the output voltage.

b) Fig. below shows the negative voltage feedback amplifier. If the gain of the amplifier without feedback is 10,000, find: (i) feedback fraction (ii) overall voltage gain (iii) output voltage if input voltage is 1 mV. **(15 Marks)**



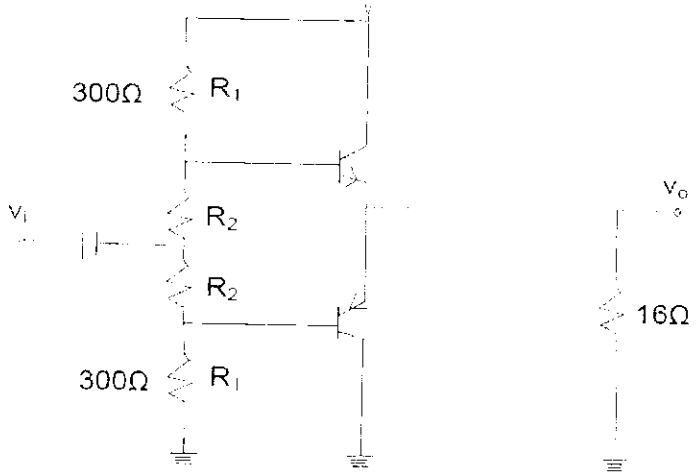
(15Marks)

Q3/a) For the OP-AMP circuit shown in the figure, calculate the output voltage?



(10Marks)

b) Find the value of resistor R2 to provide bias current for distortion free output in the push pull amplifier shown in fig. VBE for each transistor is 0.7V. **(10 Marks)**



Q4/ choose only one of the following:

a) Calculate maximum ac output power and efficiency of the amplifier in fig.(1)? **(20 Marks)**

b) Calculate maximum ac output power and efficiency and power dissipation of the amplifier shown in fig.(2)? **(20 Marks)**

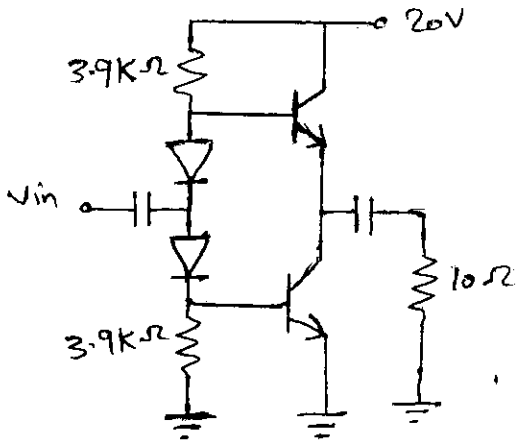


fig.(1)

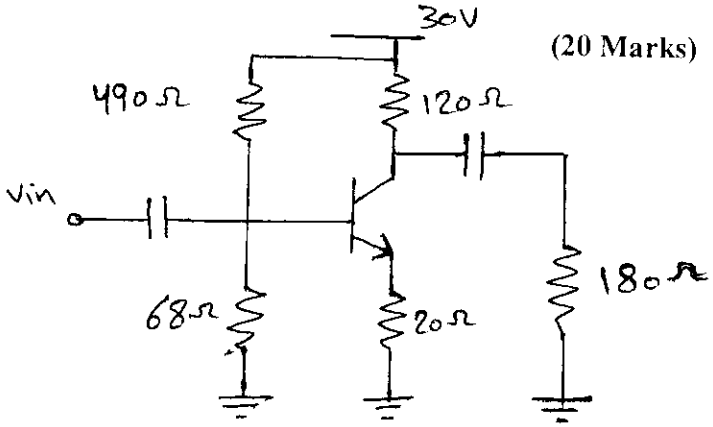


fig.(2)

GOOD LUCK

08/09/2016

رئيس القسم
ليث وجيه عبد الله

مدرسة المادة
رؤى شلال عنوز

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

القسم : هندسة تقنيات الاتصالات
المرحلة : الثانيه
المادة: رياضيات/٢
زمن الامتحان:٣ ساعات
التاريخ: 2016/٩/٨

الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦ / الدور الثاني

Q1// Solve the following equations: (30M)

1) $y^2\frac{dy}{dx} = \cos^2 x$

2) $\left(1+e^{x/y}\right)dx + \left(1-\frac{x}{y}\right)e^{x/y}dy = 0$

3) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = xe^x$

Q2//Evaluate the following integral:**(choose only three).** (30M)

1) $\int_1^2\int_x^{2x}\frac{x}{y}dydx$

2) $\int_{-1}^{1}\int_0^{\sqrt{1-x^2}}dydx$

3) $\int_{-2}^{2}\int_{-\sqrt{1-z^2}}^{\sqrt{1-z^2}}\int_{-\sqrt{1-y^2-z^2}}^{\sqrt{1-y^2-z^2}}dx\,dy\,dz$

4) $\int_0^2\int_{\sqrt[3]{x}}^{2}\frac{dydx}{y^4+1}$

Q3//(choose only three). (30M)

a)Evaluate $\iint A.n\,ds$ over the entire surface S of the region bounded by the cylinder $x^2+z^2=9$. x=0,y=0,z=0 and y=8. If A=6zi +(2x+y)j –xk.

b) If R=xi+yj+zk. show that

1)$\nabla\cdot R = 3$

2)$\nabla\times R = 0$

c) Show that the vector filed defined by $f=(x^2+xy^2)i+(y^2+x^2y)j$ is conservative and find the scalar potential. Hence evaluate $\int F.dR$ from (0,2) to(1,2).

d) Find the angle between the surfaces $2x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point (1,-1,3).

Q4//Find Maclaurin series for $\dot{y}=\frac{1}{(1-x)^2}$. given y(0)=1 (10M)

Good Luck

18/09/2016

رئيس القسم
ليث وجيه عبدالله

مدرس المادة
رسل عاشور جواد

Ministry Of High Education And Scientific Research
Alfurat Al-Awsat Technical University
Technical College / Najaf
Depart. / The Technical Communication Engineering

Class: 2nd
Subject: Electrical Machines
Time of Exam: (3) Hours
Date : 21/05/2016

الامتحان النهائي- العام الدراسي ٢٠١٥/٢٠١٦ / الدور الثاني

NOTE: Answer All Questions.

Q1: A 25 kW 250V DC shunt generator has an armature resistance of 0.06Ω and field resistance of 100Ω. Determine the total armature power developed working as
(A) Generator delivering 25 kW output **[15 M]**
(B) A motor taking 25 kW input **[15 M]**

Q2: A 230V DC shunt motor has an armature resistance of 0.5Ω and field resistance of 115Ω. An no load the speed is 1200 (r.p.m) and the armature current 2.5A. On application of no load, the speed drops to 1120 (r.p.m). Determine the line current and power input when the motor delivers rated load. **[20 M]**

Q3: A train is driven by a DC machine with independent electrical excitation. At a speed of 1500 rpm, the following magnetization characteristic has been measured.

E_a [volt]	50	420	780	950	1120	1180	1260
I_f [ampere]	0	4.0	8.0	10.0	12.8	14.4	28.8

Answer **TWO** of the following
(A) Sketch the equivalent circuit of the DC machine. **[10 M]**
(B) Why is a voltage induced in the armature when the excitation current is zero? **[10 M]**
(C) Why does the induced voltage at high excitation currents not increase proportional to the excitation current? **[10 M]**

Q4: Choose the correct answer for **TEN** of the following **[30 M]**

1. In case of D.C. shunt motors the speed is dependent on
(a) armature drop is negligible (b) flux is proportional to armature current
(c) flux is practically constant in D:C. shunt motors
(d) back e.m.f. only because back e.m.f. is equal to armature drop
2. A D.C. series motor is that which
(a) has its field winding consisting of thick wire and less turns (b) has a poor torque
(c) can be started easily without load (d) has almost constant speed
3. When two D.C. series motors are connected in parallel, the resultant speed is
(a) more than the normal speed (b) loss than the normal speed (c) normal speed (d) zero

4. If a D.C. motor is to be selected for conveyors, which motor would be preferred ?
(a)Series motor (b)Shunt motor (c)Differentially compound motor
(d) Cumulative compound motor

5. Starters are used with D.C. motors because
(a) these motors have high starting torque (b) these motors are not self-starting
(c) back e.m.f. of these motors is zero initially
(d) to restrict armature current as there is no back e.m.f. while starting

6. Which D.C. motor will be preferred for machine tools ?
(a) Series motor (b)Shunt motor (c) Cumulative compound motor (d)Differential compound motor

7. The direction of rotation of a D.C. series motor can be changed by
(a) interchanging supply terminals (b) interchanging field terminals (c) either of (a) and (b) above
(d) None of the above

8. Which of the following application requires high starting torque ?
(a) Lathe machine (b) Centrifugal pump (c) Locomotive (d) Air blower

9. For starting a D.C. motor a starter is required because
(a) it limits the speed of the motor (b) it limits the starting current to a safe value
(c) it starts the motor (d) none of the above

10. Which D.C. motor is preferred for elevators ?
(a)Shunt motor (b)Series motor (c) Differential compound motor (d)Cumulative compound motor

11. What will happen if the back e.m.f. of a D.C. motor vanishes suddenly?
(a)The motor will stop (b)The motor will continue to run
(c)The armature may burn (d)The motor will run noisy

12. In D.C. shunt motors as load is reduced
(a)the speed will increase abruptly (b)the speed will increase in proportion to reduction in load
(c) the speed will remain almost/constant (d)the speed will reduce

13. The starting torque developed in the d.c. series motor and in d.c. shunt motor is
(a) High, low (b) High, moderate (c) Moderate, low (d) Moderate, high

14. The speed of a d.c. series motor is
(a) Directly proportional to the both armature current and torque developed
(b) Inversely proportional to the armature current and square root of torque developed
(c) Directly proportional to the square of the armature current and square root of torque developed
(d) Inversely proportional to the square of the armature current and square of torque developed

15. The speed armature current characteristics of a d.c. series motor is
(a) Rectangular hyperbola (b) Linear (c) Parabolic
(d) Parabolic till saturation and then linear

Good Luck

Examiner
Abdulrahman M. Kshash

21/09/2016
Department Head
Laith Najeeh

(2-2)

وزارة التعليم العالي والبحث العلمي
هيئة التعليم التقني
جامعة الفرات الاوسط التقنية
الكلية التقنية- نجف

الامتحان النهائي – العام الدراسي ٢٠١٥ / ٢٠١٦
الدور الثاني

القسم : هندسه تقنيات الاتصالات
المرحلة : الثانية
المادة: مجالات كهرومغناطيسية
زمن الامتحان: ثلاث ساعات
التاريخ: 22 / 05 / 2016

Note: Attempt All Questions. For each question 20 marks only.

Q1: A- Compute the electric field intensity for four electrons passing through a conductor if you know that these four electrons are affect to each other by coulomb's force with (2N). Assume that this conductor is in vacuum, where ($\lambda_o = 4 \times 1.6 \times 10^{-19}\ C/m$) assume also that the conductor has ∞- length. (12 marks)

Q1: B- Compare, **select two only**: (8 marks)

1. Curl principle in electric field and magnetic field.
2. The field of dipole if the charges are differ and similar.
3. The force in electric field and magnetic field.

Q2: **Answer Two only**.

A- **Answer two** of the following: (10 marks)

i. Derive the divergence theorem for Cartesian coordinate system only.
ii. Derive the Stocke's theorem.
iii. List all Maxwell's equations.

B- Convert the x,y,z in Cartesian coordinate system to their values in the polar coordinate systems. (10 marks)

C- Div A = ? in (Cartesian , cylinder and sphere) coordinate systems. (10 marks)

Q3:A- Compute the unit vector perpendicular in the Right – Hand sense to the vectors shown in fig. (1) of your exam sheet. Then compute the angle of the crossing. (12 marks)

Q3:B- Define and give only the main relations **for two** of the following: (8 marks)

1. Coulomb's force.
2. Lorentz's force.
3. The gravitational constant G.

Q4:A- Give the reason for the following events. **Select two only**. (8 marks)

i. Using Coulomb's principle, the charge other than q2 would feel a different force from q1 proportional to its own magnitude and sign. It becomes convenient to work with the quantity of the force per unit charge that is called the electric field.

ii. The field due to an infinitely long line charge became uniform?

iii. $\boldsymbol{D = \varepsilon_0 E}$ is used to calculate the electric flux in vacuum only. Why?

Q4:B- Compute the electric flux generated by a charge moved with (0.6 C) velocity and generate a magnetic field with flux of H = 0.2 T. Assume that the charge mobility is in vacuum. Assume also the angle between the charge velocity and the magnetic field is about 45°. The charge under test is electron. (12 marks)

Q5:A- For a given points A(8, -5, 4) and B(-2, -3, 2) compute: (12 marks)

1. The distance from A to B.
2. The unit vector from A toward B.
3. The unit vector from the origin point to the midpoint of the line AB.

Q5:B- Compare between the electric and magnetic field in the following. **Select two only.** (8 Marks)

i. The curl principle.

ii. The force generation.

iii. The propagation direction.

Good Luck for All

Signed

Examiner

A.L. H. Al-Anssary

22/09/2016

Head of Dept.

A.L. Laith W. A.

(2-3)

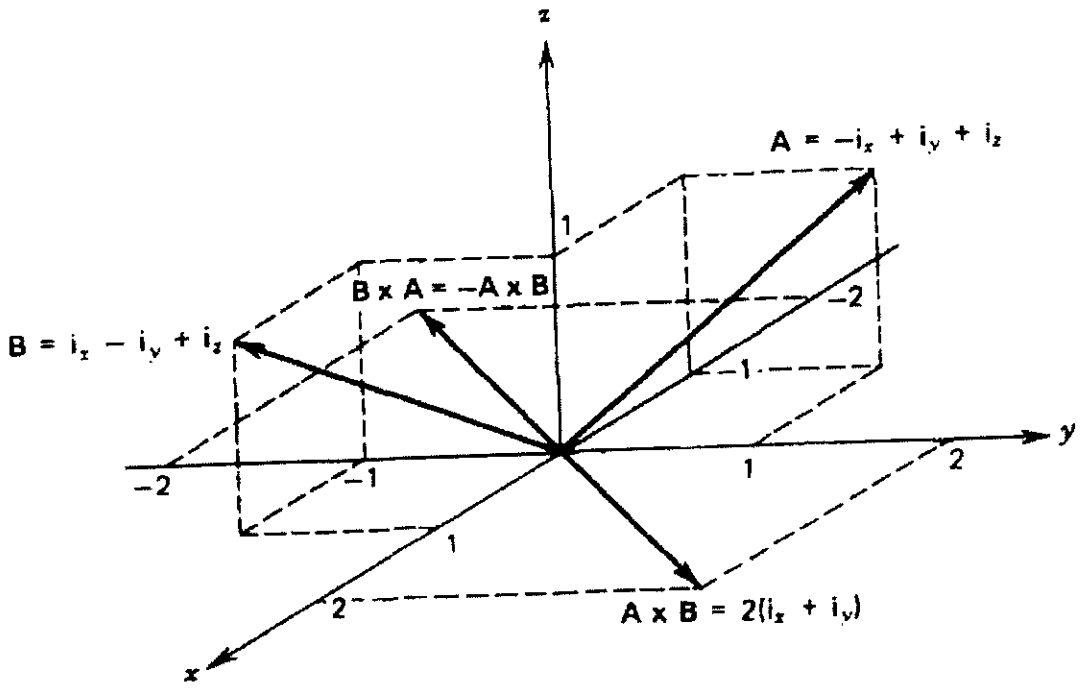


Fig. (1)

القسم : قسم هندسة تقنيات الاتصالات
المرحلة : الثانية
المادة: تطبيقات رقمية
وقت الامتحان: ثلاث ساعات
التاريخ: 25 /2016/09

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الأوسط التقنية
الكلية التقنية- نجف

الامتحان النهائي للعام الدراسي 2015 – 2016

Q1.A) Multiple Choice Questions **(10 Marks)**

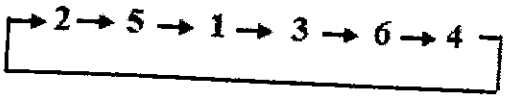
1. How many Flip-Flops are required for mod–16 counter?
   (A) 5 **(B) 6** **(C) 3** **(D) 4**
2. A ring counter consisting of five Flip-Flops will have
   (A) 5 states **(B) 10 states** **(C) 32 states** **(D) Infinite states.**
3. For JK flipflop J = 0, K=1, the output after clock pulse will be
   (A) 1 **(B) no change** **(C) 0** **(D) high impedance**
4. With a 1 MHz clock frequency, eight bits can be parallel entered into a shift register
   (A) in 8 µs **(B) in 4 µs** **(C) in 2 µs** **(D) in 1 µs**
5. The bit capacity of a memory that has 1024 addresses and can store byte at each address is
   (A) 1024 **(B) 8192** **(C) 8** **(D) 4096**

Q1. B) Illustrate a 4-bit data movement for parallel in parallel out shift registers and draw typical logic symbol. **(10 Marks)**

Q2) Answer **ONE** of the following

1) How to construct an asynchronous MOD-5 counter? MOD-7 counter? **(10 Marks)**

2) It is required to design a synchronous counter that counts in the following decimal sequence: **(10 Marks)**



a. How many states does this counter have ?
b. How many flip flops are required to build this counter ?
c. Draw the state diagram for this circuit.
d. If D flip flops are to be used, write the excitation equation for the flip flops inputs.
e. Draw the logic circuit for this counter.

Q3.A) Verify the circuit in Figure 1 for function: $F(a, b, c) = \sum m(0, 3, 4, 7)$ is reducing from 3 x 8 decoder. **(10 Mark)**

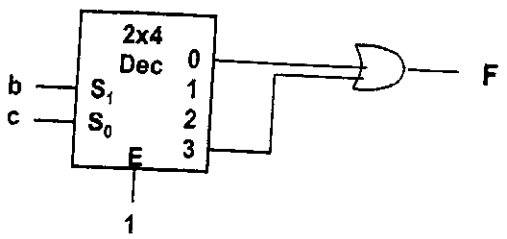


Figure 1

Q3.B) Implement the following logic function using decoders and logic gates.

$$f(Q,X,P) = \prod M(2,3,5)$$ **(10 Mark)**

- Use a decoder (with active-high outputs)

Q4.A) Implement the switching function **(15 Marks)**

$$F(x,w,y) = \sum m(0,1,3,6)$$

a. Using two 4-to-1 multiplexers with an active low enable, plus an OR gate.
b. Using one 4-to-1 multiplexers assume (x) as input multiplexed.

Q4.B) Obtain the state diagram and state table for the circuit in Figure (2) **(15 Marks)**

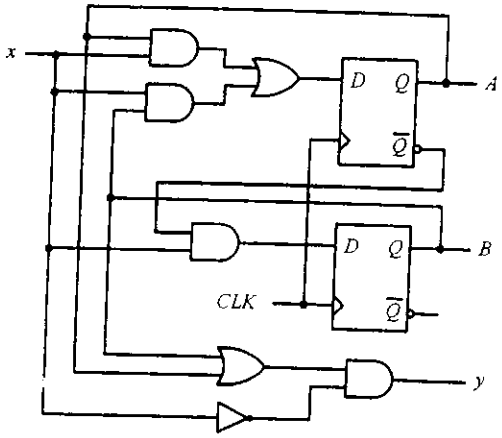
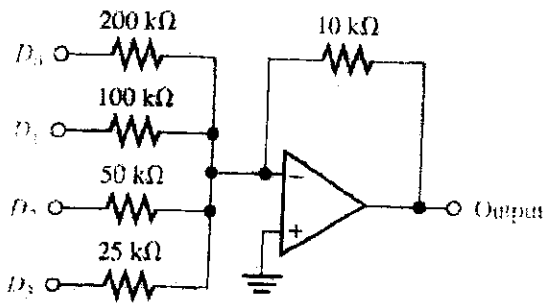


Figure (2)

Q5.A) Answer **ONE** of the following

1. Draw logic circuit of a typical SRAM latch memory cell. **(10 Marks)**
2. What is the difference between Static Random Access Memory (SRAM) and Dynamic Random Access Memory (DRAM)? **(10 Marks)**

Q5. B) Determine the output of the DAC in below if the sequence of 4-bit numbers are, 1101 applied to the inputs. The data inputs have a low value of 0 V and a high value of + 5V. **(10 Marks)**



25/09/2016

Head of dept.
Laith Wajeeh

Examiner
Ali M. Alsahlany