جـــمهوريـــة الـــــــراق

وزارة التعليم العالي و البحث العلمي

جـامـــة الفـرات الأوســـط التقنية

الكلية التقنية الهندسية / النجف

قسم هندسة تقنيات الاتصالات

المرحلة الرابعة

أسئلة الفصل الأول للعام الدراسي

2017-2016

شعبة ضمان الجودة و الأداء الجامعي

القسم : هندسة تقنيات الاتصالات
المرحلة : الرابعة
المادة: شبكات الحاسبات
زمن الامتحان: ساعتان
التاريخ: 2017/01/ 18

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

إمتحان الفصل الأول ـ العام الدراسي 2016 / 2017

Note: Answer all questions

Q1) Put T (for True) or F (for False) in front of the number of each of the following statements. If the statement is false, correct it by rewriting the statement and changing one or more of the underlined words or phrases. **[25 marks]**

1. FDDI networks depend a <u>contention-based</u> MAC mechanism that is based on <u>broadcasting</u> a <u>24-Byte</u> frame around the ring.
2. In IEEE 802.5 networks; the <u>MAU</u> can be removed from the ring by a special <u>data</u> frame sent by the <u>destination station</u>.
3. <u>Routing</u> is one of the <u>protocols</u> of the 4th-<u>Layer</u> of the OSI reference model by which a data stream is separated by checkpoints.
4. IEEE 802.3af states that the <u>four</u> data wires of the Cat5e <u>UTP</u> cable can also be used to deliver power to the <u>PD</u>.
5. In IEEE 801.11 networks; a special <u>command</u> frame is used by the <u>DS-transition</u> mobility station to associate itself with another <u>station</u> into the same WLAN.

Q2-A) For each of the followings; explain why? **[16 marks]**
1. The MIMO of IEEE 802.11ac increases the throughput as compared to IEEE 802.11n.
2. Pause packets cannot be used in 10Base2 networks.

Q2-B) What are the main advantages and drawbacks of client/server networks?

[8 marks]

Q3) Briefly; mention the function(s) of each of the followings: **[21 marks]**
1. Presentation layer of the OSI reference model.
2. Truncated Binary Exponential Backoff algorithm in Ethernet.
3. CTS frame in IEEE 802.11 MAC mechanism.

Q4) Refer to Figure-1-:
1. Find the Ant. gain at Branch1 building that keeps Link-1- feasible. **[12 marks]**
2. Find the proper height of the antenna above the roof of Branch2 building. **[12 marks]**
3. Check the feasibility of Link-2-. **[6 marks]**
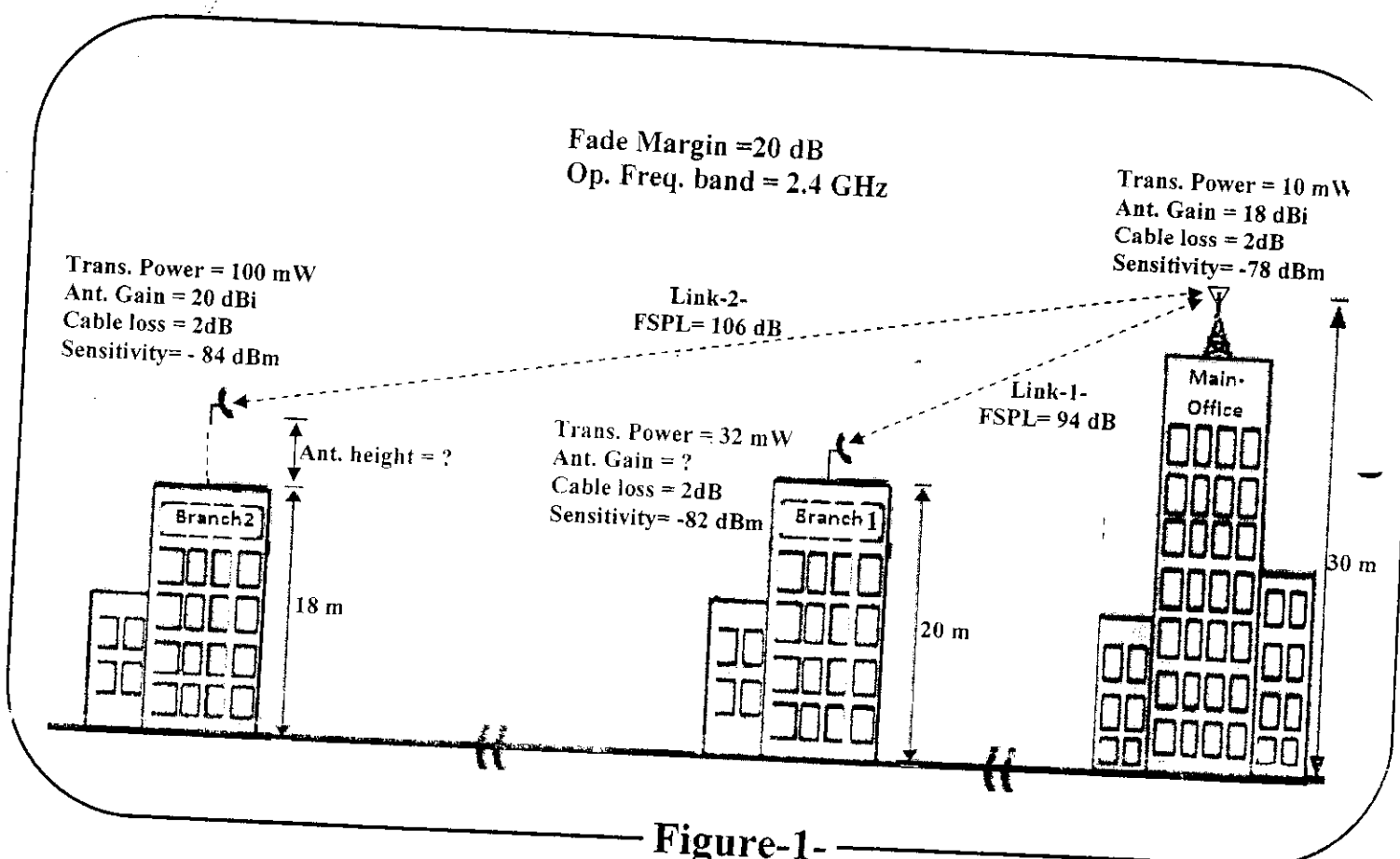
Good Luck ..

مدرس المادة و رئيس القسم
ليث وجيه

Fade Margin =20 dB
Op. Freq. band = 2.4 GHz

Trans. Power = 10 mW
Ant. Gain = 18 dBi
Cable loss = 2dB
Sensitivity= -78 dBm

Trans. Power = 100 mW
Ant. Gain = 20 dBi
Cable loss = 2dB
Sensitivity= - 84 dBm

Link-2-
FSPL= 106 dB

Link-1-
FSPL= 94 dB

Main-
Office

Ant. height = ?

Trans. Power = 32 mW
Ant. Gain = ?
Cable loss = 2dB
Sensitivity= -82 dBm

Branch 1

Branch2

18 m

20 m

30 m

Figure-1-

قسم هندسة تقنيات الاتصالات
المرحلة: الرابعة
المادة: تطبيقات الحاسبة /4
وقت الامتحان: ساعتان
التأريخ: 2017/1/19

وزارة التعليم العالي والبحث العلمي
جامعة الفرات الاوسط التقنية
الكلية التقنية الهندسية - النجف

امتحان الفصل الاول للعام 2016-2017

Part I (PowerPoint) 50 marks

Q1/ Choose correct answer.(10 M)

1-How can you see all your slides at once ?
A. Through normal view
B. Through slide sorter view
C. Through slide show
D. Through slide view

2-What is a trigger, in context of animations?
A. An object to be inserted in the presentation.
B. An item on the slide that performs an action when clicked.
C. An action button that advances to the next slide.
D. The name of a motion path.

3-Which option can be used to set custom timings for slides in a presentation?
A. Slider Timings
B. Slider Timer
C. Rehearsal
D. Slide Show Setup

4-View the slides in your presentation as thumbnail-sized images while you edit.
A. Through slide sorter view
B. Through slide view
C. Through normal view
D. Through slide show

5-To edit a chart, we can.
A. Double click the chart object
B. Click and drag the chart object
C. Triple click the chart object
D. Click the chart object

Q2) List the uses and importance of Hyperlinks in presentation. (10 M)

Q3) Give the action of following shortcut keys(in power point) (for 5 only) . (10M)

1-Ctrl+Z   2-Ctrl+W   3-Ctrl+O   4-Ctrl+N   5-F5   6-Ctrl+M

Q4) List the components of M.S PowerPoint window, with details. (10 M)

Q5) Answer only one branch. (10M)

A) What is a PowerPoint Template?

B) Explain the importance of Slide Masters.

Part II (C++) (50 marks)

Q6/ Find the value of the following variables (a,b,c and d).(10 M)

```
a=c=3;
d=4;
b=a-- +1;
c*=++a+b--;
d/=b - a-- +1;
```

Q7) Write a C++ program to swap two variables without using third variable(use only two variable) .(10 M)

Q8) Answer only one branch. (10M)

A- Write a C++ program to read an integer number and check if it is   positive or negative.

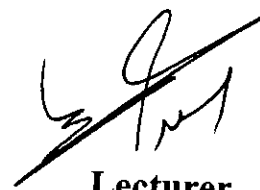B- Write a C++ program to read an integer number and check if it is odd or even.

Q9)Write a C++ program to read number and test whether it is from multiples of number 3 . (10M)

Q10) What is the output of following code. (10M)

```
unsigned int  a = 12;
unsigned int  b = 4;
   int c = 0;
   c = a & b;
   cout << "Line 1 - Value of c is : " << c << endl ;
   c = a | b;
   cout << "Line 2 - Value of c is: " << c << endl ;
   c = a ^ b;
   cout << "Line 3 - Value of c is: " << c << endl ;
   c = b << 1;
   cout << "Line 4 - Value of c is: " << c << endl ;
   c = a >> 2;
   cout << "Line 5 - Value of c is: " << c << endl ;
```

19 / 5 / 2017

Head of Department
Laith Wajeeh

Good luck

Lecturer
Sameer H. Abdulshaheed

2-2

القسم : هندسة تقنيات الاتصالات
المرحلة: الرابعة
المادة: سيطرة
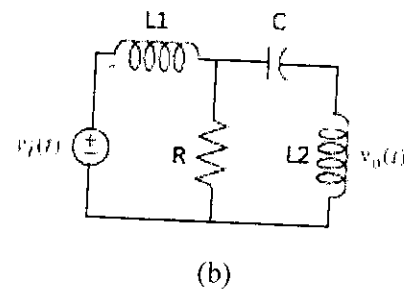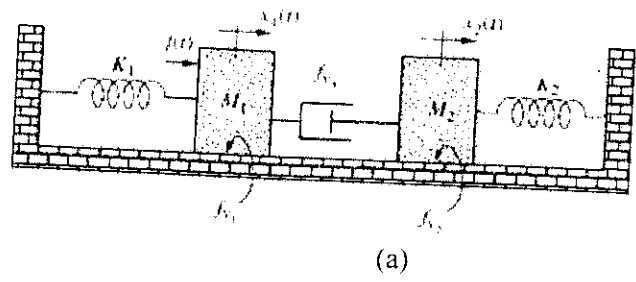زمن الامتحان: ساعتان
التاريخ: 22 /1 /2017

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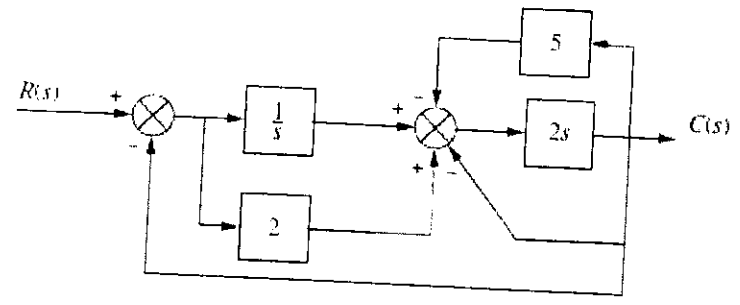جامعة الفرات الأوسط التقنية
الكلية التقنية الهندسية / نجف

امتحان الفصل الاول للعام الدراسي 2016-2017
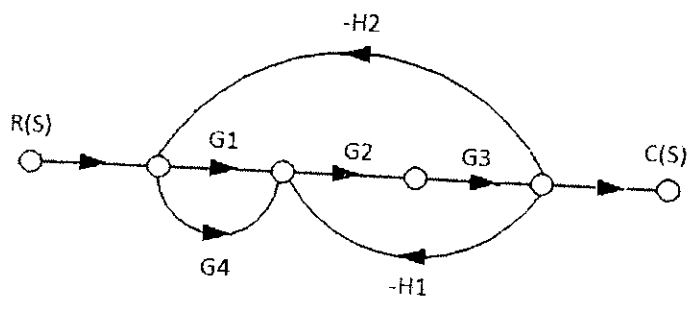
Note : *Answer all the questions*

Q1/Find the transfer function for *one* system shown below:
(a) T.F=X2(s)/F(s)   **(b)** T.F=Vo(s)/Vi(s)   (25 mark)
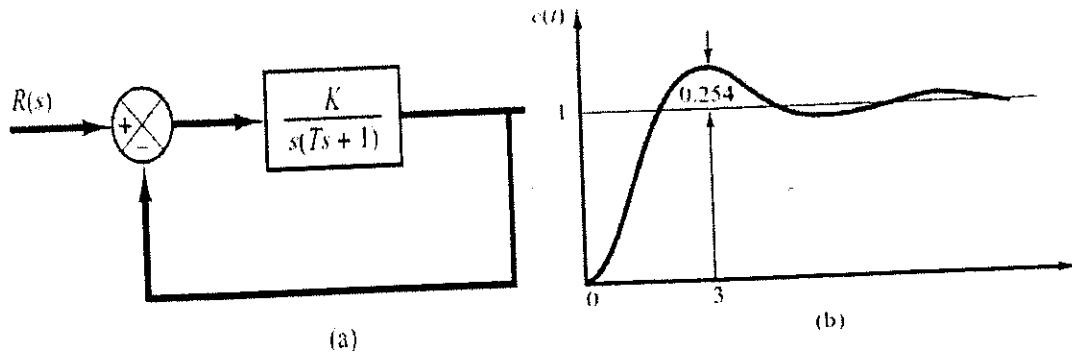

(a)

(b)

Q2/ Find the equivalent transfer function, *T(s) = C(s) / R(s)*, for the system shown below:

(25 mark)

Q3/ By using Mason's Rule ,Find the transfer function **C(s)/R(s)** for the signal flow graph shown below :

(25 mark)

Q4/When the system shown in Figure(a) is subjected to a unit-step input, the system output responds as shown in Figure(b). Determine the values of K and T from the response curve.

.25 mark)

(a)

(b)

القسم : هندسة تقنيات الاتصالات

المرحلة : الرابعة

المادة : إدارة هندسية

زمن الامتحان: ساعتان

التاريخ: 23 / 01 / 2017

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

جامعة الفرات الأوسط التقنية

الكلية التقنية الهندسية / نجف

امتحان الفصل الأول- العام الدراسي 2016/2017

ملاحظة: الاجابة عن جميع الاسئلة. لكل سؤال20 درجة.

س1/ أ. توجد عدة مراحل مرت بها العملية الانتاجية لاي منتج. عدد هذه المراحل واشرحها بالتفصيل.(10 درجة)

س1/ب. أوجز اهم تطبيقات بحوث العمليات في الميدان الصناعي. (10 درجات)

س2/ معمل لانتاج الورق المقوى، اذا كان رأس المال الكلي (750 مليون دينار) والمكائن والالات قدرت بحوالي (155 مليون دينار) والابنية والمنشآت فقد كانت قيمتها بحوالي (225 مليون دينار) اما الادوات الاحتياطية فقد قدرت قيمتها بحوالي (100 مليون دينار) احسب: أ: مجموع رأس المال المستثمر، ب. رأس المال التشغيلي اذا علمت ان عدد المدراء (1 فقط) عدد المعاونين (2 فقط) وعدد المهندسين (4) وعدد العمال (8) وان نسبة راتب المدير الى رأس المال الكلي هي 0.09 وان نسبة راتب المعاونين الى الراس المال الكلي هو 0.07 وان نسبة رواتب المهندسين الى الرأس المال الكلي هو 0.06 وان رواتب العمال كانت نسبتها الى الراس المال الكلي هو 0.04، جـ. المصاريف الصناعية اذا علمت ان الفواتير كانت مقتصرة فقط على استهلاك الماء والكهرباء والانترنت في المصنع. (20 درجة)

س3/ أ. ارسم الهيكل التنظيمي لمراحل انتاج الانابيب الفولاذية وباشكالها المختلفة. (10 درجة)

س3/ب. ما المقصود بتكاليف الانتاج؟ إعط خمسة اسباب رئيسية في ارتفاع كلفة الانتاج لمنتوج معين. (10 درجة)

س4/ في احد المعامل استغلت طاقة المكائن والمعدات الانتاجية بنسبة 70% وبلغت قيمة صافي المبيعات الشهرية المنتجة 700 مليون دينار وقد صرفت المبالغ التالية في العمليات التشغيلية: 250 مليون دينار مواد اولية. 17500 مليون دينار اجور مباشرة، اقساط التأمين كانت 32 مليون دينار، فوائد القروض كانت 25 مليون دينار، مصاريف التسويق كانت 100 مليون. احسب، قيمة نقطة التعادل، نسبة حد الامان اذا كانت المبيعات الفعلية للمنتوج تقدر بحوالي 60% من رأس المال الكلي. (20 درجة)

س5/أ. عَرِّف اثنين من ما ياتي: (10 درجة)

1. نسبة حد الامان، 2. الانتاجية، 3. طريقة معامل التحويل

س5/ب. عدد فقط لواحد من ما يلي: (10 درجة)

1. الخطوات الرئيسية لدراسة العمل.

2. أساليب زيادة الانتاج.

مع تمنياتنا للجميع بالموفقية والنجاح

رئيس القسم

ليث وجيه عبد الله

مدرس المادة

حسام نعمان محمد علي

القسم : قسم هندسة تقنيات الاتصالات
المرحلة الرابعة
المادة : صيانة نظم اتصالات٢
زمن الامتحان: ساعتان
التاريخ: ٢٤/ ١ / ٢٠١٧

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

إمتحان الفصل الأول – العام الدراسي ٢٠١٦/٢٠١٧

_____ الإجابة عن جميع الاسئلة _____

Q1-(A) what is the time it takes to dial the number (4512)   (10 M)

(B) When the time of sending a puls =16 *msec* ,and the time of distorting a   signal
=10 *msec,* find the value and classification for telegraph distortion degree (10 M)

Q2 – (A) Determine the number of channel in cell ,when uplink frequency

(865 -895)MHz &fequency of channel is (200)KHz.   (10M)

(B) Sketch the differential duplex circuit of telegraph   (10 M)

Q3-Fill in the blanks for the followings   (20 M)
1.---------may be located at the entrances of tunnels.
2.PSTN consists of the following hierarchy---------,---------,and---------network.
3.The GSM network can be divided into four main parts-------,-------,-------and---------.
4.Extra services of system performance quality consists of -------,------,-----and-------
5.RAM memory of SIM-card containse on ---------,---------and----------.

Q4-Answer with yes for correct senteces ,and with no for incorrect sentences with
correction.   answer only **five**.   (20 M)
1.Power budget has been controled by SIM card .
2.Echo cancellor is function of MSC.
3.One of OMC functions is long planning for network.   •
4.Handoff occures when the mobile telephone network automatically keep the call
in one cell.   •   .
5.Account recharge channel is one of teleservises functions.
6.One of disadvantages of GSM is no full ISDN bandwidth of 64 Kbit/s to the user.

Q5-Sketch the electrical circuit of normal telephone then explain the mechanesim
of call response .
.   (20 M)

24/01/2017

رئيس القسم
ليث وجيه عبد الله

مدرس المادة
محمد علي كريم

القسم : هندسة تقنيات الاتصالات
المرحلة : الرابعة
المادة: أنظمة اتصالات متقدمة
زمن الامتحان: ساعتان
التاريخ: 26 /01/ 2017

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

امتحان الفصل الأول ـ العام الدراسي 2016/2017

Q1: Choose the correct answer: (15 Marks)

1- The reason(s) behind using of the optical fibers is (are) ....

a- in electrical systems there is always the possibility of "ground loops".

b- fiber cable costs significantly less than copper cable for the same transmission capacity.
c- the high losses of the electrical signals conveyed by the wires.

d- all of the above.

2- .... which one reason that optical communication has so few errors.

a- In the WAN environment there is much greater flexibility in route selection.
b- The maximum theoretical capacity of installed fiber is very great.

c- Fiber cable is significantly smaller and lighter than electrical cables to do the same job.

d- the connection is not electrical. you can neither pick up nor create electrical interference.

3- The orientation of the electromagnetic field trace is referred to as ...
a- Scattering   b- Polarization   c- Interference   d- Dispersion

4- Which is the important feature of any fiber transmission system from the following?
a- the choice of operating wavelength.
b- low losses and a large bandwidth of optical fibers.
c- fiber properties such fiber thickness. its refractive index, its absorption spectrum and its geometry.
d- all of the above.

5- Which one from the following communication resources the WDM is used?
a- time   b- frequency   c-code   d- space

Q2: Assume you have three types of fibers as shown in Table 1, find the numerical aperture NA, relative index Δ, and acceptance angle Θ_a. What are the technical difference notes among them? (15 Marks)

Fiber number	Refractive index of core, n_1	Refractive index of cladding, n_2
#1	1.4	1.42
#2	1.52	1.5
#3	1.48	1

Table 1 related to Q2

Q3: Answer A or B from the following:
A- Light wave is traveling in a semiconductor medium (GaAs) of refractive index 3.6. This is incident on a different semiconductor medium (AlGaAs) of refractive index 3.4 and angle of incidence is 80°. Is this result achieve the total internal reflection concept or not?

B- List and discuss the fiber optic transmission windows?   (10 Marks)

(10 Marks)

Q4: A graded-index fiber has $n_1=1.487$ and $\Delta=1.71\%$, for a link of 5Km in length, find pulse spreading and determine the maximum bit rate?

(15 Marks)

Q5: A transmitter has an output power of 0.1 mW. It is used with a fiber having N.A = 0.25, attenuation of 6 dB/km and length 0.5 km. The link contains two connectors of 2 dB average loss. The receiver has a minimum acceptable power (sensitivity) of −35 dBm. The designer has allowed a 4 dB margin. Calculate the link power budget.

(15 Marks)

Q6: What is the maximum core diameter for a fiber if it is to operate in single mode at a wavelength of 1550 nm if the N.A. is 0.12?

(15 Marks)

Q7: A 2-km-length multimode fiber has a modal dispersion of 1 ns/km and a chromatic dispersion of 100 ps/km. nm. If it is used with an LED of line-width 40 nm, (a) what is the total dispersion? (b) Calculate the bandwidth (BW) of the fiber.

(15 Marks)

دعائي للجميع بالموفقية والنجاح

26/01/2017

ليث وجيه عبد الله
رئيس القسم
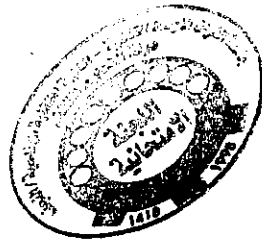
د. حيدر جواد محمد
مدرس المادة

القسم : هندسة تقنيات الاتصالات
المرحلة : الرابعة
المادة: امن الاتصالات
زمن الامتحان: ساعتان
التاريخ: 29 /01/ 2017

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

إمتحان الفصل الأول- العام الدراسي 2017/2016

Note: Answer all the following questions

Q1/ A- Give a brief discussion with drawings for the operation modes of block cipher. **(14 Marks)**

B- Answer the followings: **(6 Marks)**
1. which mode can be preferred to use for mobile communication ? and why ?
2. which mode can be employed against replay attach ? and how ?
3. which mode uses for encryption key ? and why ?
4. which modes eliminate the need to the padding technique ? and why ?
5. which mode can be used for fading channel ? and why ?
6. Define the error propagation ? where it can be happened ?

Q2/

A- Compare with drawings between Man-in-the-middle attack and Meet-in-the-middle attack? **(8 Marks)**

B- Explain the idea of dictionary attack ? **(6 Marks)**

C- Explain why we need to one-time password for identification protocol ? **(6 Marks)**

Q3/ For the following hexadecimal values of plaintext (P) and encryption key (K),

P = FFFFFFFFFFFFFFFF5555555555555555

K= AAAAAAAAAAAA

Calculate the ciphertext C by using CTR operation mode which has the following detail:
1. The encryption algorithm is DES with a single round only (the first round).
2. CTR mode system has two stages only.
3. Assume that the initial value of the counter to be all zeros vector.

(30 Marks)

Q4/ Find the ciphertext (C) at the output of the following systems.

1. Where C = GEGFQGFELGLQCXMFSK **(30 Marks)**

K_1= 11 & K_2= security
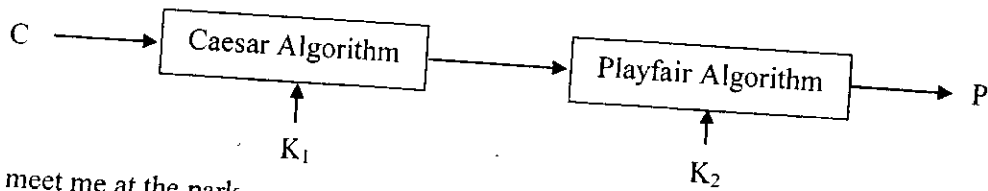
2. Where P= meet me at the park

$K_1 = 35421$ & $K_2 = \begin{bmatrix} 2 & 1 & 4 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$
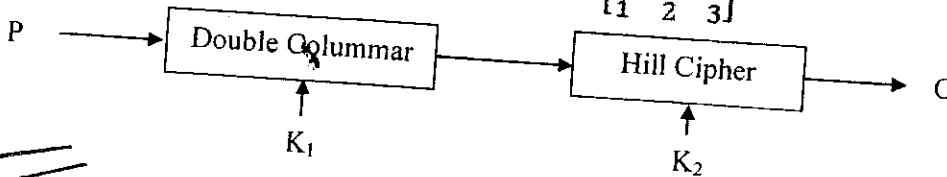
Lecturer
Dhargham AL-Khaffaf

Good luck

29/01/2017

Head of Department
Laith Wajeeh

القسم : هندسة تقنيات الاتصالات
المرحلة : الرابعة
المادة : نظم اتصالات ٣ \
وقت الامتحان : 2 ساعت
التاريخ : 31 / 1 / 201٧

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

امتحان الفصل الاول 2016-2017

NOTE: 1- Answer All Questions Including Q5
2- All Questions Have Equal Marks

****

Q1/ Explain the following:
1. Types of Satellite
2. Types of orbits

Q2/ A LEO satellite at an altitude of 1000 km provides service to a circular region with a radius of 200 km around its sub-satellite point in the Ka band (18 GHz – 23 GHz). Assuming a satellite antenna aperture efficiency of 0.75, find the following:
   a) 3-dB beam width of the antenna that will provide this coverage.
   b) Radius of the satellite antenna.
   c) Gain of the satellite antenna.
   d) If two identical antennas of this type are placed facing each other at a distance of 10 km apart, and 1 W of power is fed to one of them, what will be the power at the output of the other one (assume no losses other than path loss).

Q3/ A C-band earth station has an antenna with a transmit gain of 54 dB. The transmitter output power is set to 100 W at a frequency of 6.100 GHz. The signal is received by a satellite at a distance of 37.500 km by an antenna with a gain of 26 dB. The signal is then routed to a transponder with a noise temperature of 500 K, a bandwidth of 36 MHz, and a gain of 110 dB.
   a) Calculate the path loss at 6.1 GHz. Wavelength is 0.04918 m.
   b) Calculate the power at the output port (sometimes called the output waveguide flange) of the satellite antenna, in dBW.
   c) Calculate the noise power at the transponder input, in dBW, in a bandwidth of 36 MHz.
   d) Calculate the C/N ratio, in dB, in the transponder.
   e) Calculate the carrier power, in dBW and in watts, at the transponder output.

Q4** Geostationary satellites use L, C, Ku and Ka bands. The path length from an earth station to the GEO satellite is 38.500 km. For this range, calculate the path loss in decibels for the following frequencies: (Note:** Round all results to nearest 0.1 dB)
   a) 1.6 GHz, 1.5 GHz (Wavelengths are: 1.6 GHz, λ = 0.1875 m; 1.5 GHz, λ = 0.200) m.
   b) 6.2 GHz, 4.0 GHz
   c) 14.2 GHz, 12.0 GHz
   d) 30.0 GHz 20.0 GHz

Q5 to establish a satellite link between two earth stations. assumed to be located at the center of the satellite antenna's coverage. The data are as follows:

- $f_1 = 14\ G$
- $f_b = 12\ GHz$.
- $L_b = 206\ dB$.

For the satellite (SL):

- Power flux density required to saturate the satellite channel amplifier is (-90dBW/m2)
- Satellite receiving antenna gain at boresight: 30 dBi
- Satellite figure of merit at boresight: $3.4\ \text{dBK}^{-1}$
- Satellite channel amplifier characteristic (single carrier operation) modelled by: **OBO(dB) =IBO(dB) +6 − 6 exp[IBO (dB) / 6]**
- Satellite effective isotropic radiated power at saturation in the direction of the considered receiving earth station (i.e. at boresight of the satellite transmitting antenna) :50 dBW
- Satellite transmitting antenna gain at boresight: 40 dBi

The following losses are considered:
(Satellite reception and transmission feeder losses: 0 dB. Satellite antenna polarization mismatch loss : 0 dB . Satellite antenna depointing losses: 0 dB).

For the earth station (ES):

- Figure of merit of earth station in satellite direction : $25\ \text{dBK}^{-1}$

It is assumed that there is no interference. Calculates the following

a) Satellite repeater gain at saturation

b) C/N_0 for the up- and downlinks and the overall link when the repeater operates at saturation

c) Input and output back-off to achieve $(C/N_0)_T$ =80 dBHz and the corresponding values of $(C/N_0)_U$ and $(C/N_0)_D$

d) Value of $(C/N_0)_T$ under rain conditions causing an attenuation of 6 dB on the uplink

e) Value of $(C/N_0)_T$ under rain conditions causing an attenuation of 6 dB on the downlink with a reduction of 2 dB in the figure of merit of the earth station due to the increase of antenna noise temperature

Important Constants:

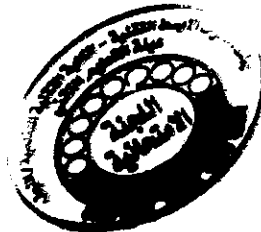Earth's average radius (r_E) = 6378 km, Speed of light (c)= 2.998 * 10^8 m/s
Boltzmann's constant (k) = 1.38 * 10^{-23} J/K, Standard Noise Temperature T_0 = 290 K
Power provided by sun (P_{sun}) = 1.39 kW/m^2

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رئيس القسم

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