



طرابلس

اتحاد طلبة
كلية التقنية الالكترونية

أسئلة مادة :

أجهزة إتصالات 2

الفصل السادس
اتصالات

هذا العمل من إعداد
اتحاد طلبة كلية التقنية الالكترونية - طرابلس
بالتعاون مع قسم الشؤون العلمية والتقنية بالكلية

أسئلة امتحان مادة اجهزة اتصالات 2
(نهائي)

2015

أساتذة :

أ- محمد ابوسيدا

أ- عبدالسلام نوري بريون

CM417 Communication Devices II - Final Exam

Please Answer four of the following Questions (Q1-Q5):

اجب عن اربع اسئلة

Q1- Answer the following:-

[10/40]

- What are the important elements in designing communication devices?
- Compare between LEO satellite system and GEO satellite system?
- Why is the uplink frequency higher than the down link in satellite systems?
- In satellite systems, What does the antenna gain and beam width depend on?
- What are the frequency bands for the following systems: GSM system, and Alarm system.

Q2- Please mark the following statements if correct () (): [10/40]

- For navigation services in the GPS system we need at least 3 satellites.
- The propagation losses models for the mobile systems and satellite systems both depend on the communication distance, frequency, and antenna height.
- For Space stations (SS) the MEO satellites are with smaller size than the LEOs.
- Higher communication frequencies requires larger satellite antenna.
- The SS transponder's bandwidth limits the communication bandwidth.
- The location of communication devices on Earth influence the communication performance when using satellite communication.
- In satellite communication the earth station (ES) while using a larger frequency, it will have an increase in the communication losses.
- In GEO satellite system Africa's ESs have better design options than Europe.
- When the satellite transponder gain is 10 dB it will always have satellite transmitted power of 10 time its received power.
- The GPS system with time error of 0.25 μ s will have a range error 75 m.

Q3- A GEO satellite 14/12 GHz located at 15 degree E, given that we have two Libyan earth stations one in Tripoli and one in Benghazi (Tripoli is at latitude 32.9022 degree N, and longitude 13.1858 degree E, Benghazi is at latitude 32.1167 degree N, and longitude 20.0667 degree E). Find the following: [10/40]

- The ES antenna elevation angle in Tripoli.
- The ES antenna elevation angle in Benghazi.
- The communication losses of uplink in both cities.
- The communication losses of downlink in both cities.
- The highest elevation angle for Tripoli by choosing the GEO satellite location.

(Assume the Earth radius is 6,378 Km, GEO altitude (a_{GEO}) is 42,164 Km.)

Q4- A circle area land in south **Libya** is 1000 Km in diameter, needed to be covered by a satellite communication system at a height of 38000 Km operating on 6/4 GHz. The satellite available power is 35 dBW (i.e. EIRP) and the ES transceiver device bandwidth is 4MHz. Determine the following: [10/40]

- Earth station (ES) antenna diameter to transmit with beam-width of 0.7 degrees.
- The largest free space loss for the downlink with in the area.
- The C/N down link, when G/T at ES is 10.46 dB/k.
- The downlink channel capacity.
- The total $C/N)_t$ ratio for the system, if $C/N)_i = 17$ dB and $C/N)_up = 22.62$ dB.

Q5- A mobile communication GSM system in Tripoli, operating with two link frequencies 898 MHz and 980 MHz, the base station transmits power at 25 W and the base station antenna height of 30 m, with antenna gain of 5 dB. The mobile station height is 1.5 m with antenna gain of 1 dB and the average propagation distance of 2 km and bandwidth of 200 kHz. Please answer the following: [10/40]

- The propagation losses for the uplink and down link considering the Hata model.
- The received power for the mobile.
- The C/N for the mobile stations if the system temperature is 300 K (i.e. C/N without considering interference).
- Transmission bit rate for the mobile station.
- While considering interference (I), if the C/N = 14 dB and C/I =15 dB what is C/(N+I).

The Hata model:

$$L_p = 69.55 + 26.16 \log f_c + (44.9 - 6.55 \log h_b) \log d - 13.82 \log h_b - a(h_m)$$

$$a(h_m) = 3.2 [\log (11.75 h_m)]^2 - 4.97$$

L_p = propagation loss (dB)

d = propagation distance (meter)

f_c = carrier frequency (Hz)

h_b = base station height (meter)

h_m = mobile height (meter)

$a(h_m)$ = correlation factor for mobile antenna height

Note: For all Questions assume:

Boltzmann's constant (K)= -228.6 dBW/k/Hz or $K = 1.38 \times 10^{-23}$ J/k, and the light velocity is 3×10^8 m/s.

Allah with you all,

By: Dr. Abdussalam Nuri Baryun

وزارة التعليم العالي والبحث العلمي
الهيئة الوطنية للتعليم التقني والفني
كلية التقنية الإلكترونية - طرابلس
الامتحان النهائي لمادة اجهزة اتصالات ii

السؤال الاول :

- ا- تنقسم الاقمار الصناعية من حيث طبيعة عملها الي قسمين وضحهما .
- ب- ماهي مميزات الاتصال عبر الاقمار الصناعية .

السؤال الثاني :

- ا- تعمل الاقمار الصناعية في مجال الاتصالات وفق حيزات ترددية مختلفة . ماهي مميزات ودرجة قصور تلك الترددات .
- ب- ماهي عيوب النظام التقليدي في مجال الاتصالات .

السؤال الثالث :

- ا- ماهي المعايير الاساسية المستخدمة في الجيل الثاني للاتصالات المتنقلة (2G) .
- ب- تعتبر عملية نقل البيانات هي احد اهم المشاكل من الجيل الثاني المطور (2.5 G) التي ظهرت تقنيّة packet switched (switched) بدلا من تقنيّة تبديل الدارات (circuit switched) . وضح ذلك .

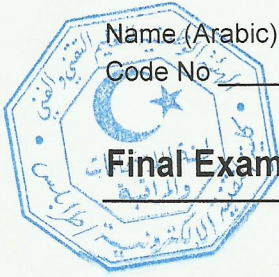
السؤال الرابع :

- ا- ماهي المكونات الاساسية لنظام تحديد المواقع العالمي (GPS) .
- ب- تكلم بشكل مختصر عن فكرة العمل الاساسية لنظام تحديد المواقع العالمي (GPS) .

انتهت الاسئلة

تمنيتي للجميع بالتوفيق

استاذ المادة



Name (Arabic) _____

Code No _____



Final Exam in Communication Devices II

Time Left: 120 min

Final Score

60

1 Underline the correct answer in the following:

01- It is used in the point to point communication

- A- MSS
- B- BSS
- C- FSS

02- Satellites are much closer to the earth and don't stay in fixed position relative to the surface which is

- A- LEO
- B- MEO
- C- GEO

03- It's non-continuous consisting of spikes of short duration but relatively high amplitude.

It is caused by electromagnetic disturbances produced by heavy duty switchgear.

- A- Shot Noise
- B- Impulse Noise
- C- Quantization Noise

04- GSM system consist four parts one of them considered as core network which is:

- A- BSS
- B- NSS
- C- NMS

05- Its Lines are run horizontally

- A- Longitude
- B- Latitude
- C- Altitude

06- In GPS the monitor stations as part of

- A- Space segment
- B- Control segment
- C- User segment

07- One of GPS applications is data collection & mapping which is belong to:

- A- GIS
- B- Navigation
- C- Recreation

Name (Arabic) _____

Code No _____



Final Exam in Communication Devices II

Time Left: 120 min

- 08- The primary function of the alarm sys is to warn the operator about a situation that is:
- A- Normal
 - B- Idle
 - C- Not Normal
- 09- If you designed and made an alarm system, you should use something to display the information which is:
- A- Microcontroller
 - B- Strop
 - C- Keypad
- 10- Its a system utilize a RF receiver that is hardwired to the main control unit which is:
- A- Wired System
 - B- Wireless System
 - C- Hybrid System

20

2 Mark as true or false, and if false write the correct answer

- 1 FAMA: The sub-channel allotment changes based on demand.
A True B False _____
- 2 Star topology: VSATs are linked together without going through a large hub
A True B False _____
- 3 Handoff means to continue a call even a mobile crosses the border of one cell to another Procedure.
A True B False _____
- 4 In GPRS the existing MSCs are based upon packet-switched central-office technology.
A True B False _____
- 5 PDOP are signals arrive at the receiver having traveled different paths
A True B False _____

10

Name (Arabic) _____

Code No _____



Final Exam in Communication Devices II

Time Left: 120 min

4 Write the final value in the following problems:

- A- Calculate the transmitter EIRP if the power rating of ground transmitter 65 dB which is operating at following conditions, Up link rain attenuation 0.02 dB, Up link path loss 199.65 dB, satellite G/T(dB/K) 4.02.

(Hint: $[C/No]U = [EIRP]U + [G/T]U - [losses]U + 228.6$)

- B- Calculate downlink and uplink path loss for the satellite located 37000 km far from the earth station where the downlink frequency 2040 GHz, and uplink frequency 6451 GHz? (Hint: speed of light = 300,000,000 m/sec)

$$\text{link Path loss} = 10 \log \left(\frac{4\pi d}{\lambda} \right)^2 \text{ dB}$$

10

Name (Arabic) _____

Code No _____



Final Exam in Communication Devices II

Time Left: 120 min

4 These abbreviation stand for what?

1. HPA _____

2. TT&C _____

3. DAMA _____

4. BSC _____

5. LAI _____

6. TMSI _____

7. IMEI _____

8. GIS _____

9. PDOP _____

10. GNSS _____

10

Name (Arabic) _____

Code No _____



Final Exam in Communication Devices II

Time Left: 120 min

5 Draw the Generic GSM Architecture and give me the functions of NMS?

	10
--	----

Total	60
-------	----

I WISH TO YOU THE BEST LUCK ,,,

Eng. M.I.Abouseda



أسئلة إمتحانات كلية التقنية الإلكترونية - طرابلس

العمل من إعداد

اتحاد طلبة كلية التقنية الإلكترونية - طرابلس
بالتعاون مع قسم الشؤون العلمية والتقنية بالكلية

وكل الشكر والتقدير لمن ساهم وساعد
على إنجاح هذا العمل



صفحة الإتحاد على الفيس بوك

<https://www.facebook.com/E.T.studentunion>