

رابعه اصابه الى صبره ٢٠١٩

MENOUFIA UNIVERSITY
FACULTY OF ELECTRONIC ENGINEERING.
Dept. of Electronic & Electrical Communication
SUBJECT: Satellite Engineering

4th year Exam.

Mid. Term exam 2019

TIME: 1Hr.

NAME:

Sec.

ANSWER THE FOLLOWING QUESTIONS:

Complete the following:

- 1 – The satellite system consists of
- 2 – The different types of satellite system based on inclination angle are
- 3 – The different services provided by the satellite are
- 4 – The main function of the satellite transponder are.....
- 5 – The Inclination angle is defined as.
- 6 – The Elevation angle is defined as
- 7 – The Footprint is defined as
- 8 – The atmospheric losses depends on
- 9 – The Handover types are and affected by
- 10 – The maximum signal propagation time of a geostationary satellite transmission is about

Q.2 Prove that the satellite footprint for LEO orbit is smaller than that for GEO orbit.

Q.3 – A LEO satellite system operates with a minimum elevation angle of 5° and an earth central angle of 40° .
Let the earth radius be 6370 Km.

Determine the following:

- 1- The orbital altitude. Comment on your results.
- 2- The required number of orbital planes.
- 3- The required number of satellites per orbit.
- 4 – The average orbital period.



الدرجة: ()
20

فصل:

الاسم:

Answer the Following Questions

The First Question

(8 marks)

- Draw the various protocols in TCP/IP model?
- Write the socket address data structure for IPv4.
- What is the function of The following functions with write its declarations:
 1. *ntohs(...)* and *htons(...)* functions.
 2. *inet_aton(...)* and *inet_addr(...)* functions.

The Second Question

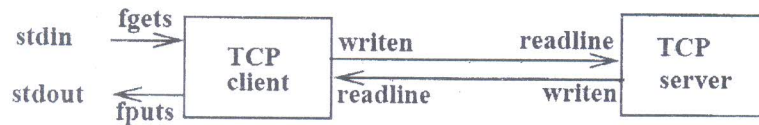
(6 marks)

- Explain by drawing the socket functions for both TCP client-server.
- Describe both Little-endian byte order and big-endian byte order.
- How to identify the connection between two machines.

The Third Question

(6 marks)

- Explain by drawing the socket address structure passed from process to kernel and vice versa.
- How to implement the client program and server program that shown in the following figure.



With my best wishes

ملحوظة: أجب عن الأسئلة السابقة في الصفحات التالية
بحيث كل سؤال في صفحة كما هو موضح في الصفحات التالية.

مكتبة
الفترة الرابعة
الكتاب



Menufiya University
2nd Term – Midterm Exam
Class: 4th Year

Subject: Advanced Operating System



Faculty of Electronic Engineering
Dept. of Computer Science and Engineering

Time: 1.30 hour

Date: 1/4/2019

Name: Class:

Answers all from following questions [15 Marks]

- 1- Discuss the polling mechanism. [5 Marks]
- 2- State the general categories of network oriented operating systems and some features. [5 Marks]
- 3- What are the DFS and its important performance measurement? [5 Marks]

With my best wishes

Dr. Eng. Ahmed M. Elmahalawy

Frist Question:

Explain the Step-Up Converter Operation

- (1 – a) Draw the converter circuit Diagram.
- (1 – b) Explain the converter operation steps.
- (1 – c) Draw the converter timing diagram and wave forms.
- (1 – d) Find the inductor current equations as a function of time.
- (1 – e) Find the average value of the load current.

Second Question:

- (2 – a) Why and when we need to operate electric motors in Multiple-Quadrant Operation.
- (2 – b) Discuss the Multiple-Quadrant Operation [in the IV – plane] for the DC motor that can run and break in the forward running or reverse running.
- (2 – c) Draw the power circuit diagram of the DC to DC converter that operates in all of the **Four-Quadrant**.
- (2 – d) Write in a table, the control strategy for the converter elements operation.

Third Question:

- (3 – a) Discuss the problem of the power factor in electric distribution network. Use an example of power angle equals to 45° .
- (3 – b) For active power 5 kW and power factor 0.7 lagging; calculate the capacitive power to correct the power factor to be 0.95 lagging.

→ **Best Wishes** ←

مستند رقم ٢٠١٩
الفرقة الرابعة
اتصالات

MENOUFIA UNIVERSITY
FACULTY OF ELECTRONIC ENGINEERING.
Dept. of Electronic & Electrical Communication
SUBJECT: Satellite Engineering

4th year Exam.

Mid. Term exam 2019

TIME: 1Hr.

NAME:

Sec.

ANSWER THE FOLLOWING QUESTIONS:

Complete the following:

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- 2- The required number of orbital planes.
- 3- The required number of satellites per orbit.
- 4 – The average orbital period.

Menoufia University Faculty of Electronic Engineering
Dept. of Communications Fourth Year
Midterm Exam: Advanced Communication Systems
Time Allowed 1 hour

Answer Five questions only:

- 1- Compare between wireless, acoustic, and optical OFDM.
- 2- Explain the wavelet based approach for PAPR reduction in OFDM systems.
- 3- Explain three different cancelable biometric systems.
- 4- What are the limitations of acoustic communication channels? Explain how the equalization process is simplified in OFDM systems.
- 5- What is the main difference between image, video, and 3D video systems? Explain briefly three different challenges for wirelessly 3D video communication systems. Discuss the proposed solutions to mitigate each explained challenge?
- 6- Explain how to use NOMA techniques in 5G systems. What is the difference between NOMA, Single-Carrier NOMA, Multi-Carrier NOMA, cooperative NOMA, and traditional OMA techniques? Discuss their features, advantages, and disadvantages.
- 7- Explain how the molecular communication system works. Show its communication model. Compare between the traditional communication systems and Nano-network-based molecular communication systems.
- 8- Discuss the communication architecture layers of WBAN. Explain a medical WBAN-based system. Mention the obligatory goals to fulfill its adequate functionality.

راية كماله عبد الله

Faculty of Electronic Engineering
Dept. of Electrical Communication
Engineering
2nd term- (4th year)



Subject: Radar Systems

Mid-term Exam

Date: 30/3/2018

Allowed Time: 60 min

Name:

Section:

Answer the following questions

Q1. Derive the radar range equation showing the effect of receiver noise and signal to noise ratio.

Q2. Explain how the Radar is used to measure the range of a target?

Q3. What is a Duplexer and explain the principle of operation of typical Duplexer with a schematic diagram?

Q4. A radar system provides 18 dB SNR for a target having an RCS of 1 square meter at a range of 50 km. Ignoring the effects of atmospheric propagation loss, determine the range at which the SNR be 18 dB if the target RCS is reduced to:

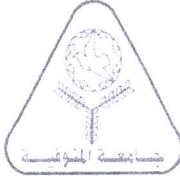
a. 0.5 square meters,

b. 0.1 square meters.

Q5. A Milli-Meter Wave (MMW) radar has the following specifications:

operating frequency $f_0 = 94 \text{ GHz}$, PRF $f_r = 15 \text{ KHz}$, pulse width $\tau = 0.05 \text{ ms}$, peak power $P_t = 10 \text{ W}$ noise figure $F = 5 \text{ dB}$, circular antenna with diameter $D = 0.254 \text{ m}$, antenna gain $G = 30 \text{ dB}$, target RCS $\sigma = 1 \text{ m}^2$, system losses $L = 8 \text{ dB}$, radar scan time $T_{sc} = 3 \text{ s}$, radar coverage 200° , and atmospheric attenuation 3 dB/Km . Compute the follow (a) wavelength (b) range resolution ΔR ; (c) bandwidth B ; (d) the SNR as a function of range (e) the range for which $SNR = 15 \text{ dB}$; (f) antenna beam width; (g) antenna scan rate; (h) time on target (i) the effective maximum range when atmospheric attenuation is considered.

Answer

University : Menoufia Faculty : Electronic Engineering Department : Electronics & Communications Academic level : 4 Course Name : Elective course 6 : Numerical Techniques in Electromagnetics Course Code : ECE 426		Date : 2 / 06 / 2019 Time : 3 Hours No. of pages : 1 Full Mark : 70 Marks Exam : Final Exam Examiner : Prof. Adel Abdel Masieh Saeed
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Question No 1 : Choose the right answer

(18 Marks)

- To model a dielectric medium, a/an..... stub is used. (a) short circuited (b) open circuited (c) matched (d) none of the above
- To model a dielectric medium, a stub of length Is used. (a) Δl (b) $\Delta l/2$ (c) $2\Delta l$ (d) $\Delta l/4$
- To model a lossy medium, a stub is used. (a) short circuited (b) open circuited (c) matched (d) none of the above
- To model a lossy medium with $\epsilon=3$, a stub with characteristic admittance.....is used. (a) $\epsilon \Delta l Z_0$ (b) $\epsilon \Delta l Z_0/2$ (c) $2 \epsilon \Delta l Z_0$ (d) $\epsilon \Delta l Z_0/4$
- To model a dielectric medium with $\epsilon_r=4$, a stub with characteristic admittance..... is used. (a) 10 (b) 11 (c) 12 (d) 13
- The phasor form is : $A_s = -j e^{-j3z}$, the corresponding time varying form is : (a) $\cos(wt - 3z + \pi/2)$ (b) $\cos(-\pi/2 - 3z + wt)$ (c) $\sin(\pi/2 - 3z + wt)$ (d) $\sin(wt - 3z)$
- The time varying form is : $3 \sin(wt + 3x)$, the corresponding phasor form is : (a) $3 e^{j(3x - \pi/2)}$ (b) $3 e^{-j(3x - \pi/2)}$ (c) $3 e^{-j3x}$ (d) $3 e^{+j3x}$
- The equation $\frac{\partial^2 \psi}{\partial x^2} = k \frac{\partial^2 \psi}{\partial t^2}$ is (a) Poisson's equation (b) Wave equation (c) Diffusion equation (d) Laplace
- The fields E_z , H_y , and H_x are (a) TE wrt Y-axis (b) TE wrt Z-axis (c) TM wrt Z-axis (d) TM wrt X-axis

Question No 2: Choose the right answer

(16Marks)

- When voltages $V_1^i = V_2^i = V_3^i = V_4^i = E_0/2$ are applied to a node (m,n), an is imposed (a) electric field with magnitude E_0 in y-direction (b) electric field with magnitude $2E_0$ in y-direction (c) electric field with magnitude $E_0/2$ in y-direction (d) electric field with magnitude $2E_0$ in z-direction
- To impose magnetic field $H_x = H_0$ at node (m,n), apply (a) $V_4^i = -V_2^i = H_0/2$ (b) $V_3^i = -V_1^i = H_0/2$ (c) $V_4^i = V_1^i = H_0$ (d) $V_4^i = V_2^i = H_0$
- An impulse $V_1^r(z, x)$ reflected from terminal 1 of a node becomes automatically incident at the node (a) $V_3^i(z, x - \Delta l)$ (b) $V_3^i(z, x - \Delta l)$ (c) $V_3^i(z - \Delta l, x)$ (d) $V_3^i(z + \Delta l, x)$

4. To impose magnetic field $H_z = H_0$ at node (m,n) , apply
- (a) $\kappa V_3^i = \kappa V_1^i = H_0/2$ (b) $\kappa V_3^i = -\kappa V_1^i = H_0/2$ (c) $\kappa V_4^i = \kappa V_1^i = H_0$
 (d) $\kappa V_4^i = \kappa V_2^i = H_0$
5. When terminal 4 of node (m,n) is terminated with a perfect electric conductor, the following condition applies : (a) $\kappa V_4^i(m,n) = \kappa V_4^r(m,n)$ (b) $\kappa V_4^i(m,n) = -\kappa V_4^r(m,n)$
 (c) $\kappa V_4^i(m,n) = -\kappa V_4^r(m,n)$ (d) $\kappa V_4^i(m,n) = \kappa V_4^r(m,n)$
6. An impulse $V_2^r(z,x)$ reflected from terminal 2 of a node becomes automatically incident at the node (a) $\kappa V_2^i(z,x)$ (b) $\kappa V_4^i(z - \Delta l, x)$
 (c) $\kappa V_4^i(z - \Delta l, x)$ (d) $\kappa V_4^i(z + \Delta l, x)$
7. An impulse $V_3^r(z,x)$ reflected from terminal 3 of a node becomes automatically incident at the node (a) $\kappa V_2^i(z,x)$ (b) $\kappa V_1^i(z, x - \Delta l)$
 (c) $\kappa V_1^i(z, x + \Delta l)$ (d) $\kappa V_1^i(z, x + \Delta l)$
8. An impulse $V_4^r(z,x)$ reflected from terminal 4 of a node becomes automatically incident at the node (a) $\kappa V_2^i(z - \Delta l, x)$ (b) $\kappa V_2^i(z + \Delta l, x)$
 (c) $\kappa V_1^i(z, x)$ (d) $\kappa V_2^i(z + \Delta l, x)$

Question No 3 :

(18 Marks)

The dispersion of velocity of waves in a two-dimensional TLM network is given by :

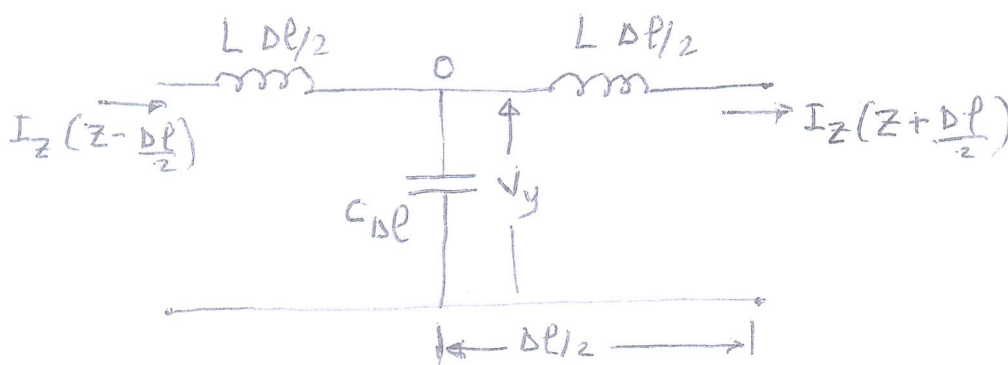
$$\sin [(\pi/r) (\Delta l / \lambda)] = (2)^{1/2} \sin (\pi \Delta l / \lambda)$$

- (a) Find the maximum value for $(\Delta l / \lambda)$ (b) Find the corresponding value for r .
 (c) Draw r vs. $(\Delta l / \lambda)$

Question No 4 :

(18Marks)

- (a) For the one-dimensional TLM section shown find $(\partial I_z / \partial z)$ and $(\partial V_y / \partial z)$.
 (b) For a propagating EM wave with components E_y and H_x use Maxwell's equations to find $(\partial E_y / \partial z)$ and $(\partial H_x / \partial z)$.
 (c) From results of (a) and (b) find equivalences between network and field quantities.





Answer as much as you can

Question One (25 Marks)

A) Write short notes about:

(10 Marks)

1. Plasmon and Plasmonics
2. Pulsed wave technological family
3. Quantum well, wire, and dot.
4. Defect size effect on nanostructures
5. Geometric diode and MIM diodes.

B) State the basic characteristics of terahertz wave, and **List** some of its applications. **(10 Marks)**

C) Compare between the Narrowband and Broadband detectors for continuous wave Terahertz technology. **(5 Marks)**

Question Two (25 Marks)

A) Compare between the operation principle of photovoltaic cells and nano-antenna for solar energy harvesting. **(10 Marks)**

B) Starting with the equation of motion of a free electron due to applied electric field, Derive the complex permittivity and conductivity of metal at THz frequencies. **(10 Marks)**

C) Discuss the Surface Plasmon Polariton phenomena and its effect on the dielectric constant of materials. **(5 Marks)**

Question Three (20 Marks)

- A) With the aid of simple drawing, Discuss the *top-down method* for the preparation of nanostructures. (10 Marks)
- B) Based on your reading, Discuss a subject in communication technologies indicating its importance, limitations and applications. (5 Marks)
- C) Discuss the differences between electromagnetic waves interaction with metals at the frequency bands. (5 Marks)

Good Luck

Dr. Hend Abd EL-Azem Malaht

Faculty of Electronic Engineering
Electronic and Communication
Department
Forth Year
Examiner: Dr. Amir Salah



Subject: Network Planning
Second semester
Data: 12-6-2019
Time allowed: 3 Hours
No. of Pages: 4

Question 1 (10-12)

a. In your answer sheet, only put the missing word/s

- 1- PSTN stands for:
- ISDN stands for:
- PSPDN stands for:
- 2- Investments in communication equipments in the network is so
- 3- The extent to which the network to meet the user's requirements is of
- 4- The capacity of the networks depends on the number of
- 5- Every subscriber connection to the system must be
- 6- The system must be will dimensioned in such a way as to be
- 7- The system should be able to cater for
- 8- The levels in the hierarchy can be linked to form the coherent world
- 9- The micro financial plan deal with the problems of getting the best for
- 10-In developing networks the selection of the correct plant is important
- 11-The growth of the telecommunication network is governed by the
- 12-Forecasting of subscriber density growth is an essential step in
- 13-The total traffic is more responsive to the business activity and
- 14-If the annual growth is a constant percentage, the number of user increase
- 15-The Gompertz model caters for
- 16-Tandem exchange is used to route transit calls between
- 17-Store and forward switching method is another name of
- 18-.....is only one of a number of possible network protocol introduced problems
- 19-The object of a numbering plan is to allocate ato each subscriber
- 20-The numbering plan must consider the division of the country into areas for

b. In your answer sheet only put true or false

- 1- The international network consists of trunk exchanges
- 2- Fundamental plan involves only financial plan
- 3- Optimum network is the one designed for efficient performance only

- 4- Usually sparsely populated area contains few, small exchanges
- 5- In Densely populated areas, the subscribers have short lines
- 6- The typical provision period of sites is a bout 20-40 years
- 7- The typical provision period of numbering scheme is a bout 30 years
- 8- The typical provision period of cable duct is 20 years
- 9- The technical plans set the technical standards and detailed technical guidelines
- 10-The linear model is reasonable for a small number of years
- 11-Tandem exchange is an important economic expedient for a telephone company
- 12-A direct trunk circuit is used when there are a traffic over than 20 Erlang for busy hour
- 13-Circuit switching is a fully transparent switching technique
- 14-Delay is constant in packet switching techniques
- 15-Message switching allows interactive session between end users
- 16-Packet switching is inefficient than circuit switching
- 17-In packet switching a large storage capacity must be available at each node
- 18-Transmitting very short message as a unit is harmful in several ways
- 19-Packet switching allows simultaneous use of communication circuits
- 20-The in-band signaling is more better than the out-band signaling
- 21-One of the circuits switching advantages is that the delay is constant and prior to data transfer
- 22-In virtual circuit the channel is reserved between two users only
- 23-Circuit switching has a lower delay for small message size
- 24-Supervisory signals provide information about the state of the call

Question 2 (6-6)

- a- The number of subscriber lines put in services in certain exchange area during the interval 1992-1997 was registered in the following table:

year	1992	1993	1994	1995	1996	1997
Number of lines	105	110	112	115	117	120

Calculate the expected number of lines required to be connected at year 2018

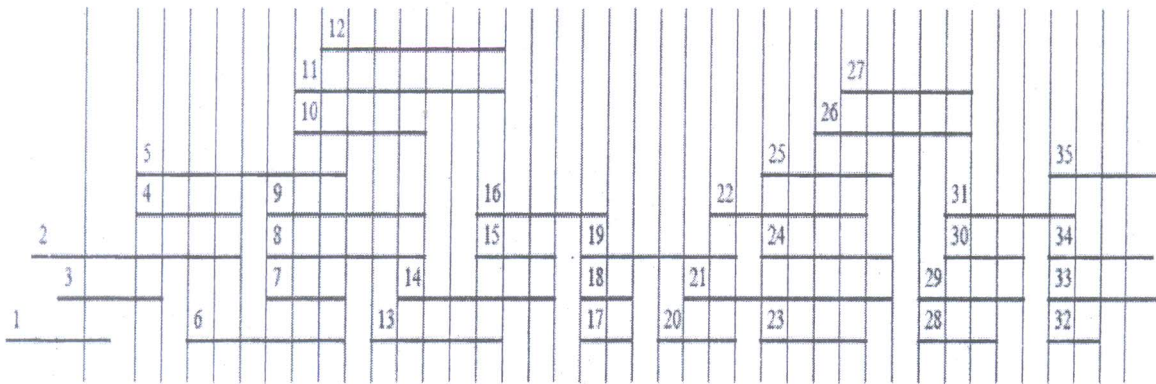
- b- A message of 6000 byte is transferred through a network with 3 nodes between the sources and destination. The data rate on all links is 96 kbs, with packet size 250 bits and 50 bits as a header. The setup time is 0.2

second, with processing time at each node is 0.025 sec, while the average queuing delay at each node is 0.15 sec. the propagation speed over any link is 250 m/ μ sec, with 60 km distance between each two nodes.

Compare between circuit switching and datagram packet switching end to end delay time.

Question 3 (12)

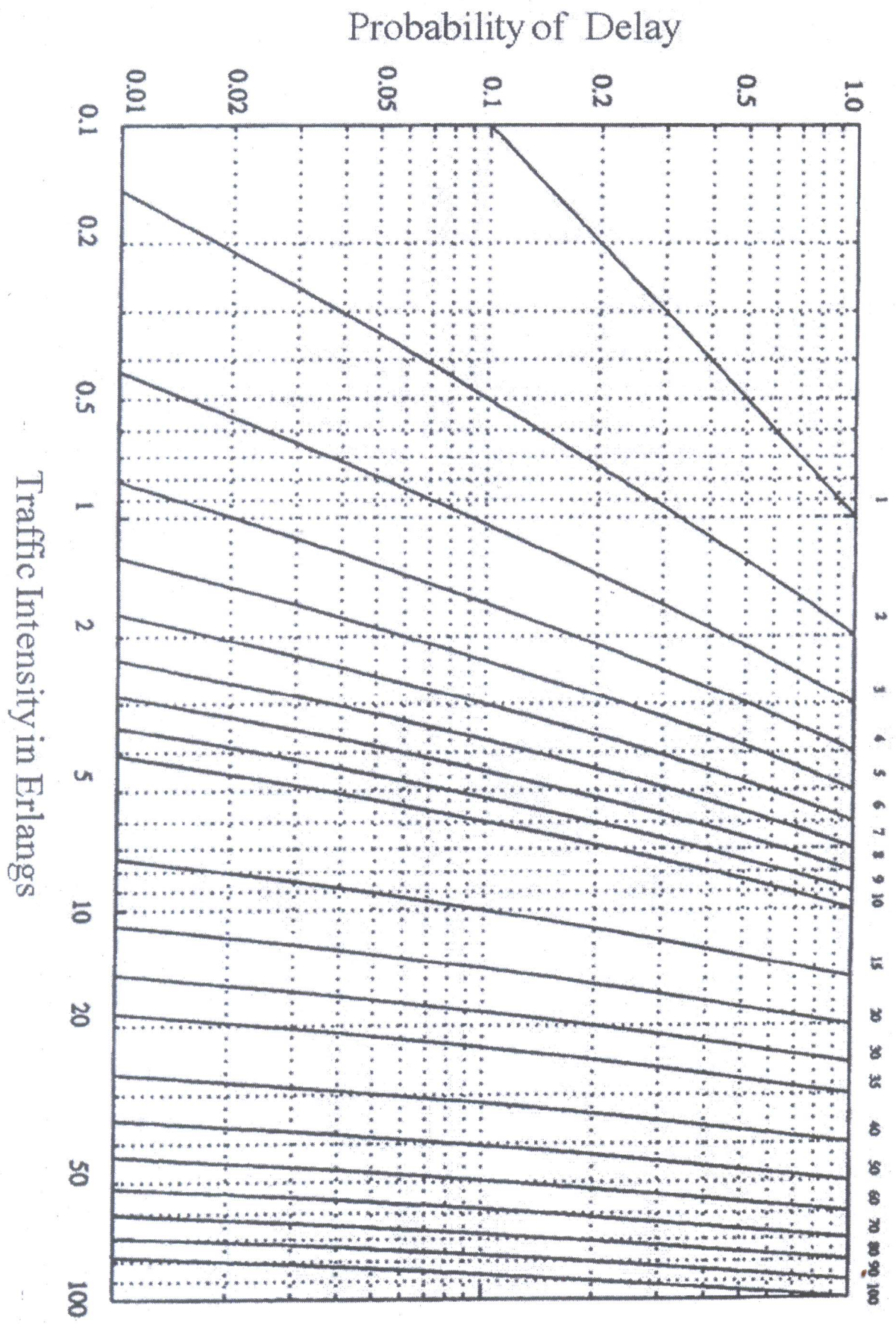
For the calls monitoring system shown in figure, Find the traffic intensities(offered-carried-rejected) and draw the traffic distribution for $T=40$, and $N=8$

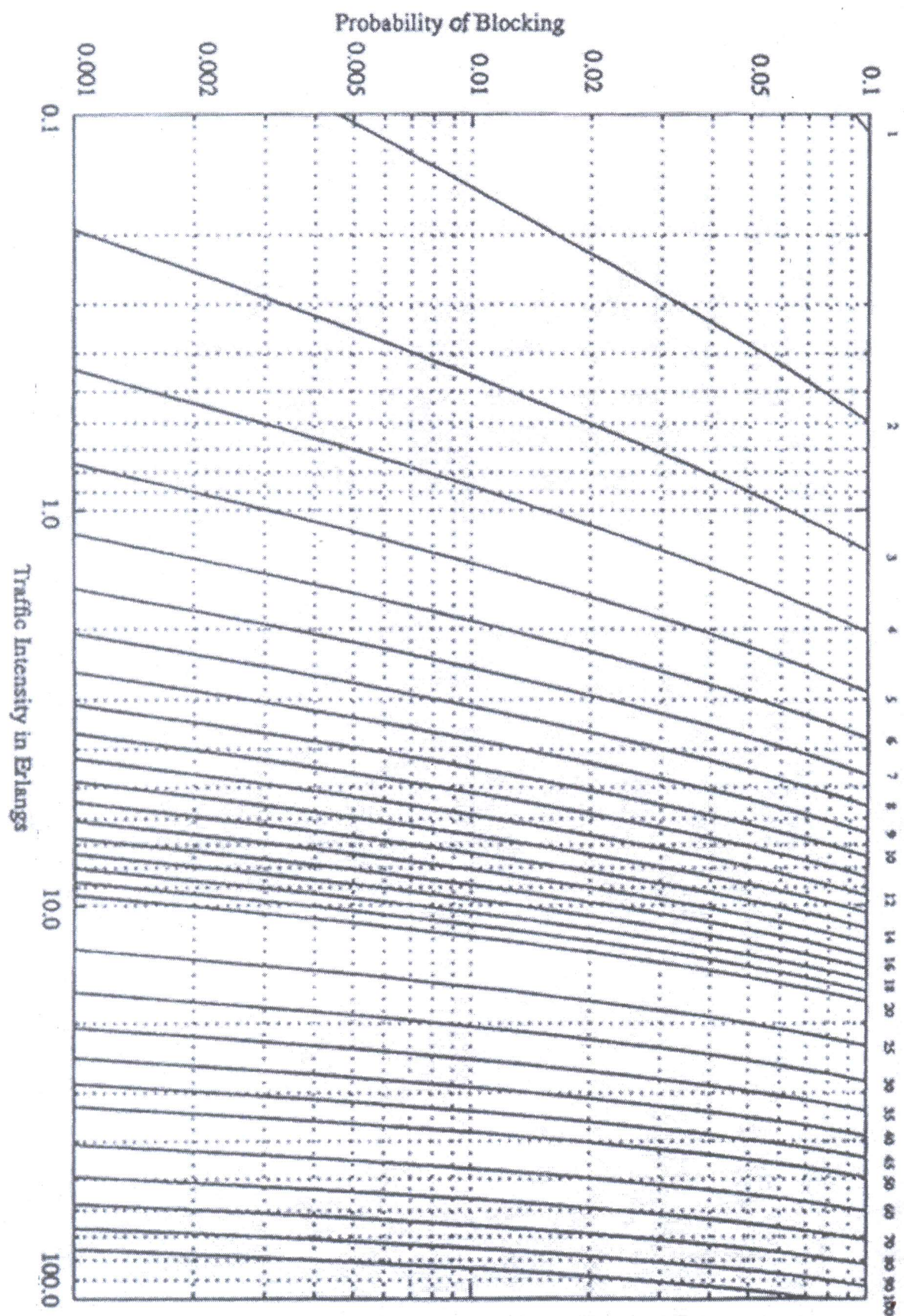


Question 4 (6-6)

a- A certain city has an area of 1,300 square miles and is covered by a cellular system using a 7-cell reuse pattern. Each cell has a radius of 4 miles. The city is allocated 40 MHz of spectrum with a full duplex channel bandwidth of 60 kHz. Assume a GOS of 2% for an Erlang B system is specified. If the offered traffic per user is 0.03 Erlangs, compute:

- the number of cells in the service area,
- the number of channels per cell,
- traffic intensity of each cell,
- the maximum carried traffic in the system,
- the total number of users that can be served by the system for 2% GOS,
- the number of mobiles per channel, and
- the theoretical maximum number of users that could be served at one time by the system





- b- The state transitions of a private exchange with 3 channels has the following probabilities
 $p(1)=0.2$ and $p(2)=0.3$. When a load of 3.48 Erlang is offered a blocking probability of 40% results, evaluate
- a- The probability that all channels are free
 - b- Average arrival rate while the average call duration is 120 second
 - c- Lost traffic
 - d- Channel utilization
-

Question 5 (6-6)

- a- Assuming that packets arrival at rates of 50 packets/sec. and the link speed is 64 kbps. Consider the packet length to be 1000 bits. Calculate:
 - a- The probability of delay of all arriving packets more than or equal 0.1 sec for M/M/1/ ∞/∞ system
 - b- The probability of delay for delayed packets to wait more than or equal 0.1 sec. for M/M/2/ ∞/∞ system
- b- A hexagonal cell within a 4-cell system has a radius of 1.387 km. A total of 60 channels are used within the entire system. If the load per user is 0.029 Erlangs, and arrival rate per user 1 call/hour, compute the following for an Erlang C system with probability of delay of 5%:
 - a. How many users per square kilometre will this system support?
 - b. What is the probability that a delayed call will have to wait for more than 10 s?
 - c. What is the probability that a call will be delayed for more than 10 seconds?

With my Wishes
Dr. Amir Salah



Answer the following questions:

Question 1: (Answer two points only)

(10 Marks)

- a- Prove that the envelope of narrowband noise has a Rayleigh distribution, while that of a signal immersed in narrowband noise has a Rician distribution.
- b- Compare between the different versions of optical OFDM.
- c- Discuss the channel impairments in underwater acoustic communications and explain how to avoid these impairments.

Question 2: (Answer two points only)

(10 Marks)

- a- What is the basic concept of cancelable biometrics? Explain two cancelable biometric systems based on encryption and bio-hashing.
- b- Define the PAPR problem in wireless communication systems. Explain how the wavelet transform can be implemented in PAPR reduction in multi-carrier communication systems.
- c- What is meant by adaptive modulation? Why is it needed in wireless communication systems? Explain the different scenarios of adaptive modulation. Illustrate how the cepstral analysis can be used in adaptive modulation classification.

Question 3: (Answer two points only)

(10 Marks)

- a- Explain why the OFDM is implemented with IFFT and FFT blocks. What are the advantages of OFDM from the ISI and equalization perspectives? What is the difference between OFDM and SC-FDMA systems?
- b- Explain the steps of iris-based security system. Show how to use sectorized random projection to build a secure iris recognition system.
- c- Compare between optical OFDM, acoustic OFDM, and wireless OFDM.

Question 4: (Answer two points only)

(10 Marks)

- a- Discuss the main differences between traditional network and Software Defined Network (SDN), their architectures, advantages, and disadvantages.
- b- Discuss the main differences between NOMA, Single-Carrier NOMA, Multi-Carrier NOMA, Cooperative NOMA, and conventional OMA techniques. Mention their features, benefits, and limitations.
- c- Discuss briefly the Visible Light Communication (VLC) system, its advantages, its limitation, and its applications. Compare between the VLC and infrared communication systems.

Question 5: (Answer two points only)

(10 Marks)

- a- Discuss the meaning of WiFi offloading, its advantages and disadvantages, and its communication architecture.
- b- Explain the operation of molecular communication system. Illustrate its communication model. Compare in detail between the traditional wireless communication systems and the Nano-based molecular communication systems.
- c- Compare in detail between SaaS, PaaS, and IaaS cloud computing services. State their merits and characteristics. Mention the case where each one of them makes sense and where each one of them may not be the best option, why?

Question 6: (Answer two points only)

(10 Marks)

- a- Compare between Radio Frequency (RF) and Free Space Optics (FSO) communication systems. Draw and discuss briefly the block diagram of FSO system. State the FSO challenges and applications.
- b- Explain briefly three different challenges for 3D video communication system. Discuss briefly suggested solutions to mitigate each explained challenge.
- c- Define the meaning of Distributed Antenna System (DAS). State the benefits, system components, and applications of DAS system. Compare between active DAS and passive DAS. In your opinion, which one of them is more suitable for the incoming new trends in indoor and outdoor communication system, why?

Question 7: (Answer two points only)

(10 Marks)

- a- Mention the main advantages of 5G wireless networks. Compare in detail between the 2G, 3G, 4G, and 5G network architecture. State the main new enabling technologies in 5G networks.
- b- Compare between WiFi and LiFi communication systems. State the suggested modulation techniques which can be employed in LiFi system. Mention LiFi system limitations, advantages, and applications. In your opinion, how to integrate between LiFi and WiFi systems?
- c- Discuss the objectives of IoT system, its merits, disadvantages, threats, architecture layers, and applications. Explain briefly the IoT generic architecture.

Best Regards
Prof. Fathi E. Abd El-Samie
Dr. Walid El-Shafai

MENOUFIA UNIVERSITY
FACULTY OF ELECTRONIC ENGINEERING.
SUBJECT: Satellite Engineering.
Dept. of Electronic & Electrical Communication.
4th year final Exam. May 2019 TIME: 3 Hrs.

ANSWER THE FOLLOWING QUESTIONS: (60 Mark)

Question 1

- A:**
- 1 – State the different types of satellite transmission losses.
 - 2 – State the main causes of perturbations of satellite orbits.
 - 3 – State the different types of intersatellite links.
 - 4 – State the different services provided by the satellite.
- B-** A satellite at a distance of 40000 Km from a point on the earth's surface radiates a power of 2 W from an antenna with a gain of 17 dB in the direction of the observer. **Find:**
- 1 – The flux density at the receiving point.
 - 2 – The power received by an antenna with an effective area of 10 m².

Question 2

- A –** Derive the mathematical expression of the satellite velocity and orbital period for the elliptical orbit.
- B –** Consider a satellite that travels in a circular orbit for which the period is 1-day. **Calculate the following:**
- 1 - The radius for the orbit.
 - 2 - The orbital velocity in Km/hr.
 - 3 - The satellite orbital period at that altitude.
 - 4 - The satellite altitude in Km.

Question 3

- A –** Draw the general block diagram of satellite wideband receiver.
- B –** Draw the general block diagram of FH-CDMA transmitter and
- C –** Discuss briefly with mathematical analysis and drawing the, principles of spread spectrum multiple access.

Question 4

Discuss briefly the following:

- 1 – Handover in LEO satellite network.
- 2 – Telemetry, Tracking and Command (TTC) system.
- 3 – The Intermodulation Product (IM) and how to reduce it.
- 4 – Satellite transponder channels in C – band.
- 5 – Prove that the satellite footprint for MEO orbit is greater than the footprint for LEO orbit.

Question 5

A – Compare between the following:

DS - CDMA, FH - CDMA and the TH - CDMA.

- B – Design a TDMA system for multiplexing 4 signals. Three of these signals are band limited to 4 kHz, while the fourth one is band limited to 12 kHz.**
- 1 - Sketch the block diagram of the TDMA system.
 - 2 - Draw the TDMA frame structure.
 - 3 - Determine the transmission rate of the channel if PAM is used.
 - 4 - For a PCM of 1024 levels, determines the bit rate and bandwidth required.

Question 6

A – Compare using the mathematical equations and with drawing between the capacities of pure Aloha, the capacity of Slotted Aloha and the capacity of Aloha with capture showing the conditions and the values of maximum capacities in each case.

B – Consider a satellite channel with a rate of 50 Mb/s. If slotted Aloha with capture is adopted with probability of 0.333 for three collided packets. How many users can be supported if the user traffic = 3 kb/s.



- ◆ الفرقة: الرابعة
- ◆ زمن الامتحان: ساعتان
- ◆ درجة التحرير: ٣٥ درجة

- ◆ كلية الهندسة الإلكترونية بمنوف
- ◆ قسم هندسة الإلكترونيات والاتصالات الكهربائية
- ◆ تاريخ الامتحان: ٢٠١٩ / ٦ / ١٦ م

المادة: اقتصاد هندسي وتشريعات

اجب على الاسئلة الآتية :

السؤال الأول

(١٠ درجات)

- (ب) المشكلة الهندسية
- (د) الجدوى الاقتصادية ومراحل دراستها

- (ب) الانحراف المعياري
- (د) المنوال

(١) أكتب نبذة مختصرة عن الآتي:

- (أ) الاقتصاد الهندسي
- (ج) أهم العناصر التي تحدد الانتاج

(٢) عرف الآتي:

- (أ) المتغير العشوائي
- (ج) الالتواء

3) Find the correlation of the following two phenomena

x	1	2	3	4	5
y	2	3	4	5	6

(١٠ درجات)

السؤال الثاني

(١) أذكر أهم العناصر التي تشتمل عليها دراسة الوضع الاقتصادي العام لأي دولة

(٢) ما هي العوامل التي يتم بها اختيار موقع لمشروع معين

(٣) ما هو الاستهلاك مع ذكر انواعه

(٤) حدد على الرسم منطقة الحل التي تحقق المتباينات التالية:

$$x \geq 0.0 \quad \text{و} \quad y \geq 0.0 \quad \text{و} \quad y \leq 15.0 \quad \text{و} \quad x \leq 15.0 \quad \text{و} \quad x + y \geq 7.5 \quad \text{و} \quad x + y \leq 15$$

5) The cost C of a product which depends on two Causes A and B is given by:

$$C = C_0 (A^2 - 40A + 500)(B^2 - 100B + 7500)$$

a) Optimize C (find A^* , B^* and C^*),

b) Find S_A^C and S_B^C at:

- i) A^* and B^* ,
- ii) $2A^*$ and $2B^*$,
- iii) $0.5A^*$ and $0.5B^*$

(١٠ درجات)

السؤال الثالث

(١) تكلم عن شركة التضامن مع ذكر شروطها

(٢) ما هي المرونة وما هي انواعها

(٣) ما هو مفهوم الجودة مع ذكر اهم شروط تحقيق الجودة

(١٠ درجات)

السؤال الرابع

- (١) اذكر اهم خطوات تحسين الجودة
(٢) تكلم عن الآتي: لماذا ننتج؟ - كيف ننتج؟ - لمن ننتج؟

3) For the following points:

x	1	2	3	4	5	6
y	1	3	4	3	4	2

Use the least squares to fit:


i) Straight line

ii) parabola

أ.د / عبد الناصر عبد الجواد محمد

مع أطيب تمنياتي لكم بالنجاح والتوفيق

28 421 2019

University : Menoufia		Date : 26/05/2019
Faculty : Electronic Engineering		Time : Three Hours
Department : Computer Science & Engineering		No. of pages : Two
Academic level : Fourth Year- Second Semester		Full Mark : 60 Marks
Course Name : Embedded Systems		Exam : Final Written Exam
Course Code : CSE 421		Examiner : Dr. Salah Eldin Shaban

From left to right in your answer sheet, Answer All the following Four questions in their order.

First Question

45 Min/15 Marks

(a) What is a real-time system?

- [1] Identify three hard-real-time systems, and for each, identify a few hard timing constraints.
- [2] Identify three soft real-time systems, and for each, identify a few soft timing constraints.

(b) If a memory system consists of a single cache with an access time of 20 ns and a hit rate of 0.92, and a main memory with an access time of 60 ns.

- [1] What is the effective memory access time of this system?
- [2] Assume that doubling the cache size reduces the miss rate by roughly 30%. Given that the cache is 256K bytes, what is the expected percentage improvement in the effective access time if we double the cache size to 512K bytes?

(c) Draw a timing diagram that shows the bus burst read transaction.

Second Question

45 Min/15 Marks

(a) Rewrite the given basic block (I) in a single assignment form and draw the equivalent data flow graph.

(b) Draw the CDFG for the code fragment (II).

(c) Consider the following C statements:

$w = a + b;$ /* statement 1 */
 $x = c + d;$ /* statement 2 */
 $y = x + e;$ /* statement 3 */
 $z = a - b;$ /* statement 4 */

Basic block
$w = a - b + c;$ $x = w - d;$ $y = x - 2;$ $w = a + b - c;$ $z = y + d;$ $y = b * c;$

(I)

Code fragment
<pre>for (i = 0; i < N; i++) { if (a[i] == 0) x[i] = 5; else x[i] = a[i] * b[i]; }</pre>

(II)

- [1] Draw a lifetime graph of the statements and determine the maximum number of registers required for allocating and assignment variables used in these statements.
- [2] Redraw a lifetime graph after reorder the statements to reduce the number of registers.
- [3] Use graph coloring to solve the registers allocation and assignment problems.

P.T.O.