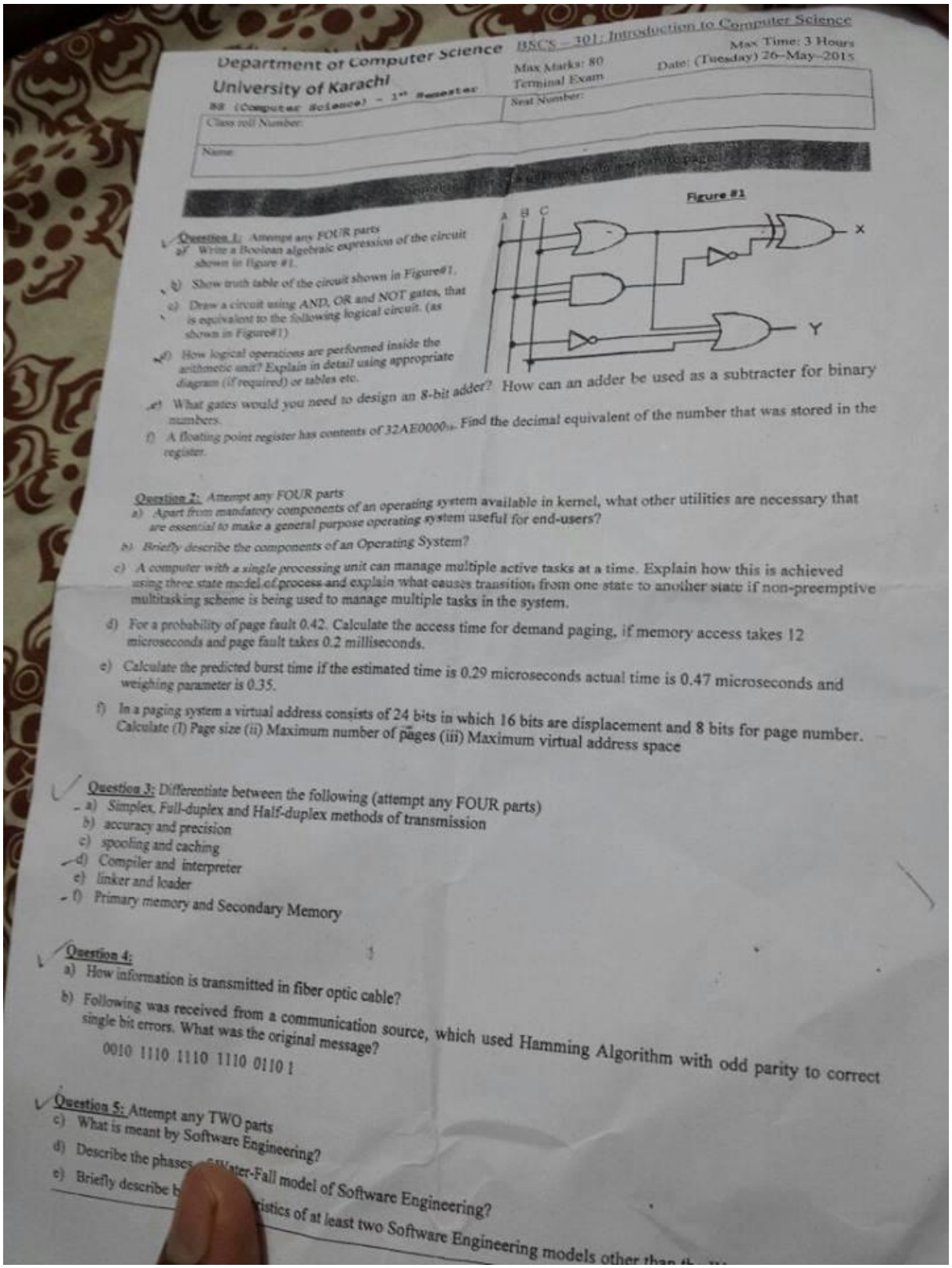
ICS Past Paper: (Sir Badar Sami)



Department of Computer Science — BSCS – 101: Introduction to Computer Science
University of Karachi — Max Time: 3 Hours
BS (Computer Science) – 1st Semester — Max Marks: 80 — Date: (Tuesday) 26-May-2015
Terminal Exam
Class roll Number: — Seat Number:
Name:

Figure #1

Question 1: Attempt any FOUR parts
a) Write a Boolean algebraic expression of the circuit shown in figure #1.
b) Show truth table of the circuit shown in Figure#1.
c) Draw a circuit using AND, OR and NOT gates, that is equivalent to the following logical circuit. (as shown in Figure#1)
d) How logical operations are performed inside the arithmetic unit? Explain in detail using appropriate diagram (if required) or tables etc.
e) What gates would you need to design an 8-bit adder? How can an adder be used as a subtracter for binary numbers.
f) A floating point register has contents of $32AE0000_{16}$. Find the decimal equivalent of the number that was stored in the register.

Question 2: Attempt any FOUR parts
a) Apart from mandatory components of an operating system available in kernel, what other utilities are necessary that are essential to make a general purpose operating system useful for end-users?
b) Briefly describe the components of an Operating System?
c) A computer with a single processing unit can manage multiple active tasks at a time. Explain how this is achieved using three state model of process and explain what causes transition from one state to another state if non-preemptive multitasking scheme is being used to manage multiple tasks in the system.
d) For a probability of page fault 0.42. Calculate the access time for demand paging, if memory access takes 12 microseconds and page fault takes 0.2 milliseconds.
e) Calculate the predicted burst time if the estimated time is 0.29 microseconds actual time is 0.47 microseconds and weighing parameter is 0.35.
f) In a paging system a virtual address consists of 24 bits in which 16 bits are displacement and 8 bits for page number. Calculate (I) Page size (ii) Maximum number of pages (iii) Maximum virtual address space

Question 3: Differentiate between the following (attempt any FOUR parts)
a) Simplex, Full-duplex and Half-duplex methods of transmission
b) accuracy and precision
c) spoofing and caching
d) Compiler and interpreter
e) linker and loader
f) Primary memory and Secondary Memory

Question 4:
a) How information is transmitted in fiber optic cable?
b) Following was received from a communication source, which used Hamming Algorithm with odd parity to correct single bit errors. What was the original message?
0010 1110 1110 1110 0110 1

Question 5: Attempt any TWO parts
c) What is meant by Software Engineering?
d) Describe the phases of Water-Fall model of Software Engineering?
e) Briefly describe the characteristics of at least two Software Engineering models other than the

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