

KABARAK



UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF COMPUTER
SCIENCE**

COURSE CODE: COMP 453

COURSE TITLE: REAL TIME APPLICATIONS

STREAM: Y4S2

DAY: WEDNESDAY

TIME: 2.00-4.00 P.M.

DATE: 10/12/2008

INSTRUCTIONS:

Attempt **Question ONE** and **Any other TWO**

PLEASE TURN OVER

QUESTION ONE: (30 marks)

- (a) What is a real time system? Discuss any four characteristics of real time systems [4marks]
- (b) Using a suitable example discuss building real time application with real time programming language [4 marks]
- (c) Using a suitable diagram discuss D/A& D/A conversion [6 marks]
- (d) Using a suitable diagram discuss loop control and its advantages over the analog control [6 marks]
- (e) Discuss any two CPU scheduling strategies. [4 marks]
- (f) Consider the following real time system
a fast food restaurant has four kinds of process **P1** the order taker which takes orders from the customers **P2** which prepares food **P3** which packs the food into bags **p4** which gives bags to customers and takes the money.
Each process is regarded as communicating community in the process you are required to write a pseudo code to execute the above real time system [6 marks]

QUESTION TWO: (20 marks)

- (a) Discuss the following terms:
 - 1) Hard Real Time System
 - 2) Soft Real Time System
 - 3) Film Real Time System[6marks]
- (b) Discuss any four real time design issues to be considered [4 marks]
- (c) Discuss about real time databases [4 marks]
- (d) Consider a preemptive priority system, the tasks in the system, time need to complete and priority(1 being the highest) are given below.

Task	Time needed in miliseconds	Priority
1	40	3
2	20	1
3	30	2

what is the time needed to complete the task and the average waiting time [4marks]

QUESTION THREE: (20 marks)

- (a) Using round robin scheduling mechanism solves the following problem to find average waiting time and the order of their completion [4 marks]

Process	Burst time
P1	3
P2	6
P3	4
P4	2

Time quantum is 2 milliseconds

- (b) Discuss time sharing in real time systems [3 marks]
- (c) Discuss the factors to consider in designing real time software [5 marks]
- (d) Write a note on processors used in real time system [4marks]
- (e) Discuss the common features experienced batch, continuous, laboratory systems [4 marks]

QUESTION FOUR (20 marks)

- (a) Using a suitable diagram Discuss the real time architecture [8 marks]
- (b) Discuss about semaphore in process synchronization [4 marks]
- (c) Discuss the four factors to consider when scheduling a resource [4 marks]
- (d) Explain any four requirements for mutual exclusion to occur [4 marks]

QUESTION FIVE (20 marks)

- (a) Explain any four factors to consider when interfacing the real time application [4 marks]
- (b) Explain the components of the monitor as used in process synchronization [4 marks]
- (c) Explain the similarities & differences between monitor and semaphore [4 marks]

(d) Consider the real time program described by the pseudo code below, names of tasks are in bold

At 9am **start** break fast and go to office at 10am

If there is class **teach**

else **help** students

When **teach** or **help** is done **eat lunch**

until 2 pm **rest**

If there is a seminar

If topic is interesting **listen**

Else **read**

When the seminar is over attend **social hour**

You are required to draw a flow chart for the above real time system to capture major tasks of the system

[8 marks]