UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2011/2012

COURSE NAME	:	REAL TIME EMBEDDED SYSTEM
COURSE CODE	:	BEH 30802
PROGRAMME	:	BEH
EXAMINATION DATE	:	JUNE 2012
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **FOUR (4)** QUESTIONS ONLY.

THIS PAPER CONSISTS OF **THREE** (3) PAGES

Q1 (a) Define the multitasking of the operating system.

(1 mark)

(b) Illustrate and explain the most common components in the kernel of a real time operating system (RTOS) kernel.

(6 marks)

(c) Compare the operation of two common scheduling algorithms.

(8 marks)

(d) Recommend the key characteristics to choose the best RTOS.

(10 marks)

Q2 (a) Define the semaphore.

(2 marks)

(b) Illustrate and compare the three types of semaphores that is supported by kernel.

(15 marks)

(c) Explain the operation of two types of semaphores used to address common synchronization.

(8 marks)

Q3 (a) List three examples of message queues used to send and receive a variety of data.

(3 marks)

(b) Different kernels store message queues in different locations in the memory bank either system pools or private buffers. Distinguish these two types of memory.

(4 marks)

(c) Give three common ways to apply message queues for data communication.

(3 marks)

(d) Compare and illustrate the concepts of event registers, signal, and condition variable operation.

(15 marks)

Q4 (a) Compare a hard timer and a soft timer.

(4 marks)

(b) Part of a timer chip initialization involves installing an interrupt service routine (ISR) that is called when the timer interrupt occurs. Explain three duties performed by ISR.

(6 marks)

(c) There are three common groups of operation in a soft timer.

(i) Explain these three groups.
(ii) Give two examples of the operations from each group.

(9 marks)

(d) Give an example to show how the hierarchical timing wheels work.

(6 marks)

Q5 (a) Express the things to be considered by a system engineer in the design of an input/output (I/O) subsystem.

(4 marks)

(b) Compare the concept of basic I/O mapping between the port and the memory.

(10 marks)

(c) I/O devices are classified as either character-mode or block-mode devices. Compare these modes by referring to how the devices handle data transfer.

(6 marks)

(d) Show the steps to accomplish I/O operation at the application level.

(5 marks)