35.5

Dharmsinh Desai University, Nadiad
MCA – III [Introduction to Systems Programming]
External Examination

FRIDAY
Max. Marks 60

Date: 7|12|2007
Time: 3 hours [10:00 TO 1:00]

SECTION – I

Q1 Answer the following questions: **[10]**

(i) Mainframes were introduced in _____ generation while multiprogramming was introduced in _____ generation.
(ii) _____ memory is at top of memory hierarchy while _____ is at bottom.
(iii) A page must be written to disk if it is to be removed from memory and _____ bit is to set to _____.
(iv) _____ is the background process which ensures that there is enough supply of empty page frames to maintain paging systems.
(v) The file access can be either _____ or _____.
(vi) Unsafe state is not a deadlocked state. (T/F) Justify your answer.
(vii) The time required to complete number of jobs per unit time is called as
(a) Turnaround time (b)Throughput (c) Waiting time (d) None of the given
(viii) The system call in UNIX to delete a file is
(a) delete() (b) remove() (c) exit() (d) None of the given
(ix) The disk having alternate numbering of sectors is called as
(a) Interleaving (b) Double interleaving (c) Single interleaving (d) None of the given
(x) For the command cat f1.txt | grep hello, grep will be in which state until cat is not executed?
(a) Running (b) Ready (c) Blocked (d) None of the given

Q2
(A) Explain in brief different types of operating system. **[4]**
(B) Give the solution to producer consumer problem using semaphore. **[4]**
(C) Distinguish between preemptable and non preemptable resources. **[2]**

OR

Q2
(A) What is process? Explain with example conditions for process termination. **[4]**
(B) Write an algorithm for deadlock detection with one resource of each type. **[4]**
(C) Distinguish between preemptive and non preemptive scheduling algorithm. **[2]**

Q3
(A) Memory is divided with allocation unit size of 4KB and is allocated in the following sequence of processes and holes: **[4]**
Process A of size 9KB, hole of size 12KB, B of size 2KB, C of 8KB, hole of 12KB and D of 10KB
Draw the figure showing this memory allocation. Also represent it using bitmap and linked list.
(B) Explain the importance of selecting optimum page size. **[4]**
(C) Explain in brief linked list allocation of file implementation. **[2]**

OR

Q3
(A) A machine has 4 page frames and page frames are referenced in the following order: 1 0 2 3 2 2 3. Which is the least recently used page frame? Show using matrix implementation of LRU algorithm. **[4]**
(B) Explain with figure file system layout. **[4]**
(C) What do you mean by segmentation? **[2]**

SECTION – II

Q4 Select appropriate option from the multiple choices given below: **[10]**

(i) In DMA _____ and _____ modes are used for transferring data.

(ii) The assembly statement which indicates actions to be performed is called as _____ while which directs to the assembler is called as _____.

(iii) The non terminal on LHS of the first production rule is called as _____.

(iv) _____ phase of compiler divides program into tokens while _____ phase validates meaning of the statement.

(v) In variant I of intermediate code, the second operand of statement is represented by pair _____.

(vi) Which statement is used to assign values to sequencing symbol?
(a) LCL (b) SET (c) GBL (d) None of the given

(vii) In public key cryptography, encryption of text is done using which key?
(a) Plain (b) Public (c) Private (d) None of the given

(viii) If the translation time origin is 300 and translation time address of symbol A is 321. If the link origin is 285 then what will be the link time address of A?
(a) 306 (b) 385 (c) 336 (d) None of the given

(ix) The type of I/O in which control registers are stored in separate area is called as
(a) Programmed (b) Memory mapped (c) I/O mapped (d) None of the given

(x) Protecting data from being updated by unauthorized users are called as
(a) Data integrity (b) Data confidentiality (c) Privacy (d) None of the given

Q5

(A) Write a note on memory mapped I/O. **[5]**

(B) Generate SYMTAB, LITTAB and POOLTAB for the following program unit. Also convert the given program in machine language. **[5]**

```
        START 300
        MOVER BREG, A
        ADD BREG, B
LOOP    ADD BREG, ='2'
        MOVEM BREG, A
        CMP BREG, ='10'
        BC LT, NEXT
        LTORG
        SUB BREG, ='3'
        STOP
A       DS 1
B       DS 1
NEXT    EQU LOOP
        END
```

OR

Q5

(A) The disk consists of 60 cylinders and initially arm is at cylinder number 15. Then the request arrives in the order 16, 10, 12, 45, 18, 57 and 32. Calculate total number of cylinder movement using FCFS and Elevator (initially upward direction) algorithms **[4]**

(B) Explain in brief ORIGIN and LTORG statements. **[4]**

(C) What do you mean by interrupt driven I/O? **[2]**

Q6

(A) Explain in brief digital signatures. **[4]**

(B) What is object module? Write an algorithm for program relocation. **[4]**

(C) Define following terms: **[2]**
(i) Forward reference (ii) Location counter

OR

Q6

(A) What is macro preprocessor? Write a macro CALC for performing calculation A-B+C. Give the default register as BREG. **[4]**

(B) Define grammar. Explain in brief classification of grammar. **[4]**

(C) What is an ENTRY and EXTRN statement? **[2]**