Code: DC61   **Subject: OPERATING SYSTEMS & SYSTEMS SOFTWARE**

DipIETE – CS (NEW SCHEME)

Time: 3 Hours | **JUNE 2012** | **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions, selecting at least TWO questions from each Part. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

a. Mutual exclusion problem occurs between

   (A) Two disjoint process that do not interact
   (B) processes that share resources
   (C) Processes that do not use the same resources
   (D) None of the above

b. Suppose that a process is in 'BLOCKED' state waiting for some I/O service. When the service is completed, it goes to the

   (A) RUNNING State   **(B)** READY state
   (C) SUSPENDED state   **(D)** TERMINATED state

c. In which of the following scheduling policy does the context switching never take place

   (A) Round Robin   **(B)** Pre-emptive
   (C) Shortest Job First   **(D)** FCFS

d. Which of the following system software resides in main memory always?

   (A) Loader   **(B)** Text Editor
   (C) Linker   **(D)** Assembler

e. When exceptional condition occurs outside the CPU the hardware signal given is

   (A) Reset   **(B)** Interrupt
   (C) Hold   **(D)** Wait

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f. Privileged instruction can be executed

(A) Only in monitor mode   (B) only in user mode
(C) Both in user and monitor mode   (D) none of the above

g. Data transfer to and from main memory is done in the form of

(A) Byte   (B) bit
(C) Nibble   (D) word

h. Page faults occurs when

(A) the page is corrupted by system software
(B) the page is in the main memory
(C) the page is not in the main memory
(D) one tries to divide a number by 0

i. Which of the following is a real time system?

(A) An on-line railways reservation system
(B) Payroll processing system
(C) A process control system
(D) Aircraft control system

j. Which of the following service is not supported by operating system?

(A) Protection   (B) Compilation
(C) Accounting   (D) I/O operation

PART A
Answer at least TWO questions. Each question carries 16 marks.

Q.2 a. Discuss about the real time operating system and its type.   **(5)**

b. What is process? What are the major activities of an operating system in regard to process management?   **(5)**

c. What is process control block (PCB)? Discuss the different components of a process control block.   **(6)**

Q.3 a. What are the criteria used in CPU scheduling? Discuss different types of CPU scheduling algorithms.   **(4+6)**

b. Consider the following set of processes, assumed to have arrived at time 0, in the order P_1, P_2, ..., P_s, with the length of the execution requirement (Xi) given in milliseconds.

Process	Xi
P_1	10
P_2	1
P_3	2
P_4	1
P_5	5

Using Shortest Job Next (SJN) scheduling:
(i) Find the turnaround time and weighted turnaround time of each process.
(ii) Find the throughput. **(3+3)**

Q.4 a. How monitor is useful in process synchronization? **(4)**

b. Explain any two popular file sharing modes. What are the two important issues with mutable files? **(4)**

c. What are semaphores? Illustrate a critical section implementation using a binary semaphore. **(8)**

Q.5 a. What is virtual memory? How paging is useful in virtual memory management? **(8)**

b. Discuss about the following page replacement policy:
(i) FIFO
(ii) Optimal
(iii) LRU **(6)**

c. What is the difference between physical and logical address? **(2)**

PART B
Answer at least TWO questions. Each question carries 16 marks.

Q.6 a. What is the role of a language processor development tools? Discuss in detail about the LEX and YACC generator. **(3+3+3)**

b. What is programming language grammar? Define the different type of language grammar. **(2+5)**

Q.7 a. How flow control is implemented in a macro expansion? Define macro expansion algorithm. **(4)**

b. Discuss top down parsing in detail. **(8)**

c. What do you mean by program relocation? **(4)**

Q.8 a. Discuss the concept of Assembly language programming. **(8)**

b. Explain the design of a two pass assembler. **(8)**

Q.9 a. Write a short note on compilation of control structures. **(3)**

b. Define static and dynamic memory allocation. How compiler allocates memory for a 2-dimentional array? **(4+3)**

c. What are the issues involved in code generation of an expression? **(6)**