CIT 752: OPERATING SYSTEM CONCEPTS　　　　　　　Credit: 2 units

INSTRUCTION: Answer Three Questions.　　**Question One is Compulsory**

TIME: 2 HRS

Question One

1a)　**Protection** and **security** is one of the responsibilities of operating system. Describe bold words and how a system can be protected and secured **(3 marks)**

1b) (i) Define a Process Control Block (PCB) *(1 mark)*
　　(ii) Examine the significance of the PCB in a modern operating system. *(2 marks)*
　　(iii) With the aid of diagram only, describe the components of a PCB *(4 marks)*

1c) Discuss briefly various techniques use for I/O (input output) operations. (8 marks)

1d) Consider the following set of processes to be scheduled for execution on a first come, first serve (FCFS) basis

Process	Arrival Time (sec)	Execution Time (sec)	Service Time (sec)
P0	0	3	0
P1	1	1	3
P2	2	6	6
P3	3	4	14

Compute the followings
　i.　Start time for each process　　　　　　　　**(2 Marks)**
　ii.　Finish time for each process　　　　　　　**(2 Marks)**
　iii.　Turnaround time for each process　　　　　**(2 Marks)**
　iv.　Average turnaround time　　　　　　　　**(2 Mark)**
　v.　Waiting time of each process　　　　　　　**(2 Marks)**
　vi.　Average Waiting Time　　　　　　　　　**(2 Mark)**
　vii.

Question 2

2a) Examine how deadlock can be corrected in operating system. (3 marks)

2b) What happened to operating system when a page fault occurs? **(5 marks)**

2c) Briefly discuss the objectives of memory management in operating system　**(12 marks)**