POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2018
Programme: BE Full Marks: 100
Course: Applied Operating System Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is an operating system? Describe time sharing, real-time and distributed operating systems in brief. 8
   b) What is CPU bound and I/O bound processes? Explain blocking and non-blocking message passing and shared memory for Interposes communication. 7
2. a) Why is process synchronization needed? What problems may occurred if they are not synchronized? Describe Peterson's algorithm in detail 8
   b) What is deadlock? How do you determine the state of system is safe or unsafe using banker's algorithm for multiple resources type? 7
3. a) Assume you have the following jobs to execute with one processor, with the jobs arriving in the order listed here: 8

i	$T(P_i)$
0	80
1	20
2	10
3	20
4	50

Suppose a system uses SJN scheduling.

i. Create a Gantt chart illustrating the execution of these processes?
ii. What is the turnaround time for process p4?
iii. What is the average wait time for the processes?

   b) What are the internal and external memory fragmentations? How are they resolved in paging? Explain in detail. 7
4. a) What is internal and external fragmentation? Consider the following page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. 8

How many page faults would occur for the following replacement algorithms, assuming three and four frames? In each case which algorithm perform better?

i. LRU page replacement
ii. FIFO page replacement
iii. Optimal page replacement

   b) What are the different I/O techniques? Describe each in brief. 7
5. a) A disk has 8 sectors per track and spins at 600 rpm. It takes the controller 10 ms from the end of one I/O operation before it can issue a subsequent one. How long does it take to read all 8 sectors using the following interleaving systems? 7

i. No interleaving
ii. Single interleaving
iii. Double interleaving

   b) Explain the I/O in UNIX system. 8
6. a) What are the different files access methods? Explain in detail. 7
   b) What is file system interface? Explain different file allocation methods. 8
7. Write short notes on: **(Any two)** 2×5

a) System Call
b) User and kernel threads
c) RAID