RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2014

SECOND YEAR

Date : 23/05/2014 **COMPUTER SCIENCE (Honours)**

Time : 11 am – 2 pm Paper : IV Full Marks : 75

[Use a Separate Answer Book for each group]

Group – A

1. Answer **any one** question : [1×5]
   a) Explain the role of Kernel in operating system design.
   b) Discuss the job of semantic analyzer in compiler design.

Answer **any four** questions from the following : [4×10]

2. a) Explain properties of a distributed operating system.
   b) Explain process control block with proper diagram.
   c) Explain the Monolithic structure of operating system. [5+3+2]

3. a) Explain various process states.
   b) Assume that you have following jobs to execute with one processor :

Process ID	Burst Time	Arrival Time
A	7	1
B	5	0
C	9	2
D	3	3
E	4	5

   Calculate average waiting time and average turn around time using Round Robin Schedulling algorithm with time Quantum 2 unit.
   c) Explain the problems with Priority Schedulling & how the solution of problem is done? [4+4+2]

4. a) What is the use of shell in OS?
   b) Give the solution of producer-consumer problem using semaphore.
   c) Consider the following statements :
   S1 : a = x+y
   S2 : c = a+1
   S3 : d = a–1
   S4 : e = c+a
   S5 : f = e–1
   S6 : g = e+d
   S7 : t = f+g
   Schedule the statements with necessary semaphores so that maximum parallelism is achieved. [1+4+5]

5. a) What do you mean by binary and counting semaphore?
   b) Explain how deadlock can be prevented.
   c) Give one deadlock detection and recovery technique. [2+4+4]

6. a) Explain internal and external fragmentation.
   b) For a paged system, TLB hit ratio is 0·9. Let the RAM access time be 20ns and the TLB access time be 100ns. Find out effective memory access time with TLB.
   c) Explain virtual memory with suitable diagram. [4+2+4]

7. a) Explain the problem of "Belady's Anamaly" with an example.
   b) Explain spooling.
   c) Briefly explain common types of security violation in information technology. [3+3+4]

8. a) What do you mean by cross compiler?
   b) Explain the work of Loader and linker.
   c) Draw the simplified flow chart of Pass1 and Pass2 of an assembler. [2+4+4]

Group – B

Answer **any one** question from the following :

9. a) What do you mean qualifier class, nested class and local class?
   b) Explain how constructor and destructor are invoked in Multiple inheritance with example in C++.
   c) Explain the concept of Template in C++ with an example.
   d) What do you mean by "Handling an Exception"? How a single catch block is sufficient to catch all possible exceptions? [3+2+2+(1+2)]

10. a) Explain the concept of "Polymorphism" with a suitable example.
   b) State the significance of using pure virtual destructor.
   c) What is a Friend function? Explain the concept of "using" keyword with respect to namespace.
   d) Why we cannot create an object of an Abstract Class? [2+3+(1½+1½)+2]

Group – C

Answer **any two** questions from the following :

11. a) Derive the transformation matrix to rotate an object by 45° about the origin. What will be the effect of applying this matrix operator on the point P(3,–5)?
   b) Write a short note on Morphing. [(4+3)+3]

12. a) Define Perspective and Parallel Projection with example.
   b) Discuss DDA Line drawing algorithm for any slopes. [(2+2)+6]

13. Make comparative study on **any two** of the following : [2×5]
   a) Window vs. Viewport
   b) Interlaced display vs. Non-interlaced display
   c) Raster Scan vs. Vector Scan display

14. Write short note on **any two** of the following : [2×5]
   a) Animation
   b) Homogeneous coordinate system
   c) 2D Rotation with respect to a Arbitary Pivot Point.
   d) B-Spline Curve