UG/II/CSC/H/III/18(New)

2018

COMPUTER SCIENCE

[Honours]

PAPER – III

Full Marks : 100

Time : 4 hours

The figures in the right-hand margin indicate marks

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

Illustrate the answers wherever necessary

[NEW SYLLABUS]

GROUP – A

Answer any **two** questions : 15×2

1. (*a*) What is semaphore ? Briefly describe how critical section problem can be solve using binary semaphore. $2 + 6$

(*b*) What is paging ? Why it is used ? 2 + 2

(*c*) State briefly, the difference between spooling and buffering. 3

2. (*a*) What is parameterized constructor ? Give an example. 4

(*b*) A friend function can not be used to over load the assignment operator '='. Explain why ? 3

(*c*) Describe the iterative waterfall model to develop a software. 6

(*d*) How is polymorphism achieved at compile time ? 2

3. (*a*) What are the differences between verification and validation ? 3

(*b*) What is hashing ? What is the need for hashing ? Explain open addressing technique to resolve hash clashes. 2 + 2 + 3

(*c*) Explain the term 'Quality Assurance'. 5

4. (*a*) Define linkedlist. What is overflow and underflow ? Illustrate your answer. 2 + 3

(*b*) What do you mean by internal and external sort ? Give examples. 2

(*c*) What is the difference between an array and a linked list ? 2

(*d*) Briefly describe Radix Sort technique by using an example. 6

GROUP – B

Answer any **five** questions : 8 × 5

5. (*a*) Define Time and space complexity of an algorithm. 3

(*b*) Suppose $p(n) = a_0 + a_1 n + a_2 n^2 + \cdots + \cdots + a_m . n^m$, $a_i^1 s$ are constants. Prove that $p(n) = O(n^m)$. 5

6. (*a*) What is process control block (PCB) ? Describe the information, the PCB contains, associated with a specific process. 1 + 3

(*b*) What are the differences between long-term and a short-term schedular ? 2

(*c*) What do you mean by threads ? 2

7. (*a*) Define queue. How a circular queue is implemented in a linear array ? 1 + 3

(*b*) What are advantages and disadvantage of recursion ? Give an example. 4

8. Write non-recursive algorithm for inorder traversal of a binary tree. 8

9. (*a*) What is starvation ? Explain the techniques to avoid starvation during scheduling. 2 + 2

(*b*) What is swapping ? Define external fragmentation. 2 + 2

10. (*a*) Build a heap from the following list of numbers : 4

44, 30, 50, 20, 60, 55, 77, 55

(*b*) Suppose the following sequence list the

nodes of a binary tree T in preorder and inorder, respectively : 4

Preorders : G, B, Q, A, C, K, F, P, D, E, R, H
Inorder : Q, B, K, C, F, A, G, P, E, D, H, R

11. (*a*) Explain destructor with an example. 4

(*b*) What are in-line function ? Explain with an example. 4

12. (*a*) What do you mean by context switching ? 2

(*b*) Consider the following processes to be executed using Round-Robin algorithm with a time slice = 2ms, and context switching time = 0 ms. Find the average turn around time and average waiting time. 6

Process	Arrival Time(ms.)	Next Burst(ms.)
P_0	0	10
P_1	1	6
P_2	3	2
P_3	5	6

GROUP – C

Answer any **five** of the following : 4 × 5

13. Write an algorithm that will delete last node from a circular linked list. 4

14. Write the differences between static linkage and dynamic linkage. 4

15. Write difference between Testing and Debugging. 4

16. Describe any one visibility specifier to a class member with suitable example. 4

17. What are the difference between logical DFD and Physical DFD ? 4

18. What is virtual function ? Give example. 4

19. Write an algorithm to evaluate an arithmetic expression using stack. 4

20. "A safe state is not a deadlock state. Conversely

a deadlock state is an unsafe state Not all unsafe states are deadlock".—Justify your answer. 4

[*Internal Assessment* : 10 Marks]
