UG/II/CSC/H/III/17 (New)

2017

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

[Long answer type questions]

Answer two questions from this Group : 15 × 2

1. (*a*) Suppose *A*, *B*, *C*, *D*, *E*, *F*, *G*, and *H* are 8 data items which are assigned weights as follows :

Data item	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
Weight	20	3	8	16	2	8	23	3

Construct a tree with minimum weight path length using above data and Huffman's algorithm. [Explain each step separately] 5

(*b*) The inorder and post-order traversal sequence of nodes in a binary tree are given below :

Inorder : *D B F E A G C L J H K*

Post-order : *D F E B G L J K H C A*

Construct the tree. 5

(*c*) Describe internal and external memory fragmentation with illustrative examples. 5

2. (*a*) Describe the COCOMO Model in details with an example for Software Cost Estimation. 10

(*b*) Define operator overloading. Write the general rules for operator overloading. 5

(*Continued*)

3. (*a*) Write algorithm for inserting and deleting nodes in a BST. Explain them with the help of an example each. 5

(*b*) What is the basic advantage of paging ? Is it possible to have any type of fragmentation in paging ? Justify your answer. What is fence register ? 2 + 2 + 1

(*c*) Write an algorithm to insert an element into a binary tree. 5

GROUP – B

[Semi-long answer type questions]

Answer **five** questions from this Group : 8 × 5

4. (*a*) What is stack ? Write an algorithm of PUSH ( ) and POP ( ) operations associated to a stack. 1 + 2 + 2

(*b*) What is dummy header ? Discuss it's usefulness. 1 + 2

5. (*a*) How we resolve the collision ? What is linear probing ? How it differ from quadratic probing ? 4

(*b*) What is threaded binary tree ? Mention its advantage and disadvantages. 4

6. For the processes listed below, draw a chart illustrating their execution using : 8

(*a*) FCFS

(*b*) SJF

(*c*) SRT

(*d*) RR (quantum = 2)

Process	Arrival Time	Processing Time
A	0·000	4
B	2·001	7
C	3·001	2
D	3·002	2

7. (*a*) Differentiate between Black Box Testing and White Box Testing. 4

(*b*) Describe Alpha testing, Beta testing Acceptance testing. 4

8. Construct a B tree of order 3 with the following set of data and insert them in the order as they appear : 8

30, 60, 50, 40, 10, 70, 20, 80, 90

9. (*a*) What is process ? Discuss about the different process states. 2 + 2

(*b*) What is starvation ? How this problem is resolved ? 2 + 2

10. (*a*) Deduce the average time complexity of binary search algorithm. 3

(*b*) Suppose a queue is implemented by an array. Write an algorithm to insert a new element at the K'th position of the array. 5

11. (*a*) Explain with examples the differences between preemptive and non-preemptive priority *scheduling.* 3

(*b*) Distinguish between starvation and deadlock. 3

(*c*) What is thread ? 2

GROUP – C

[Short answer type questions]

Answer **five** questions from this Group : 4 × 5

12. What is dequeue and priority queue give one example of each. 4

13. Differentiate between validation and verification in light of software engineering point of view. 4

14. Show the selection sort of the following data : 4

78, 23, 29, 3, 71, 24, 80, 105

15. What is SDLC ? What is Data Dictionary ? Explain in brief. 4

16. Write an algorithm to convert an infix arithmetic expression in it's equivalent posifix form. 4

17. How is a circular queue implemented in a linear array. 4

18. What do you mean by safe state ? What is dead lock ? 2 + 2

19. Write short note on quality assurance. 4

[*Internal Assessment* : 10 Marks]