

B.C.A. SEM-III (2014 Course) CBCS : WINTER - 2018**SUBJECT: OPERATING SYSTEMS**

Day: Thursday
Date: 15/11/2018

W-2018-1832

Time: 02.00 PM TO 05.00 PM
Max. Marks: 100

N.B.:

- 1) Attempt any **FOUR** questions from Section –I and any **TWO** questions from Section –II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.

SECTION-I

- Q.1** Differentiate between:
a) Online operating systems and Real-time operating systems (08)
b) Implicit tasking and Explicit tasking (07)
- Q.2** a) What is system call? Give various categories of system calls. (08)
b) Explain the concept of virtual machines. Give its advantages. (07)
- Q.3** a) What do you mean by PCB? Explain its content. (08)
b) What is scheduler? Explain the role of scheduler in process management. (07)
- Q.4** a) What is page table? Give the structure of page table. (08)
b) Explain the concept of demand paging in brief. (07)
- Q.5** What is deadlock? Explain various strategies to deal with deadlock. (15)
- Q.6** a) What is file? Explain various operations performed on file. (08)
b) Explain structure of Hard disk in brief. (07)
- Q.7** Write short note on **ANY TWO** of the following: (15)
a) Second chance page replacement algorithm
b) File system structure
c) Conditional critical region

SECTION-II

- Q.8** Consider the following case: (20)

Processes	In-time (a.m.)	Runtime (Min.)
P ₁	10.00	7
P ₂	10.03	4
P ₃	10.04	2
P ₄	10.08	4

Calculate average waiting and turnaround time in case of:

- i) FCFS ii) SJF iii) SRTN

- Q.9** Consider hard disk with 100 tracks, currently serving request at track number 25 and moving outside. Following is the queue of request received to serve. (20)
86, 14, 19, 77, 94, 10, 48, 17, 46, 94, 70.
Calculate total track movements in case of : i) FCFS ii) SSTF
- Q.10** Consider the following page reference string: (20)
0, 2, 3, 4, 2, 1, 3, 6, 2, 4, 3, 2, 1.
Assume physical memory with four page frames initially empty. Find out number of page faults in case of : i) FIFO ii) LRU

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B.C.A. SEM–III (2014 Course) CBCS : WINTER - 2018
SUBJECT: SOFTWARE ENGINEERING

Day : Saturday
Date : 17/11/2018

W-2018-1833

Time: 02.00 PM TO 05.00 PM
Max. Marks: 100

N.B.:

- 1) Attempt **ANY FOUR** questions from Section – I and **ANY TWO** questions from Section – II.
- 2) Answers to both the sections should be written in **SEPARATE** answer books.
- 3) Figures to the right indicate **FULL** marks.

SECTION – I

- Q.1** Differentiate between: [15]
a) Program and software
b) Software engineering and software programming
c) Verification and Validation
- Q.2** a) Explain the concept software metrics in brief. [08]
b) Explain Planning and Execution Software Project Management. [07]
- Q.3** What is SRS? What are its characteristics? Discuss the structure of the SRS. [15]
- Q.4** a) Explain different testing types through which the user tests the software? [08]
b) Describe unit testing along with procedure. [07]
- Q.5** What is cost benefit analysis? Explain its importance and its process. [15]
- Q.6** What is maintenance? Explain importance of maintenance. Describe two types of maintenance. [15]
- Q.7** Write short notes on **ANY TWO** of the following: [15]
a) QC and QA
b) Waterfall model
c) Requirement elicitation techniques

SECTION – II

- Q.8** ABC auto Pvt. Ltd. Procures the material against the requisition received from stores purchase department, prepares a purchase order and sends a copy of it to stores for ready reference. Stores department receives the material; from the vendor and prepares GRN (Goods received Note). Inspection department records accepted and rejected quantity of an item in the same. Stores clerk updates the stocks of items for the accepted quantity mentioned in GRN. Draw Context Level Diagram and First Level Data Flow Diagram. [20]
- Q.9** a) Describe project scheduling techniques using GANTT and PERT Chart. [10]
b) Describe function oriented and object oriented techniques in detail. [10]
- Q.10** Draw class diagram and use case diagram for online railway reservation system. Make suitable assumption. [20]

B.C.A. SEM–III (2014 Course) CBCS : WINTER - 2018

SUBJECT : DATA STRUCTURES

Day : Wednesday

Date : 21/11/2018

W-2018-1834

Time : 02.00 PM TO 05.00 PM

Max. Marks : 100

N.B.:

- 1) Attempt **ANY FOUR** questions from Section – I and attempt **ANY TWO** questions from Section – II.
 - 2) Answers to both the sections should be written in **SEPARATE** answer books.
 - 3) Figures to the right indicate **FULL** marks.
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SECTION – I

- Q.1** Define Abstract data type. Explain array as ADT. [15]
- Q.2** Explain the operation on doubly linked list. [15]
- Q.3** Explain any one application of stack. [15]
- Q.4** Explain features of Queue. Implement queue using linked list. [15]
- Q.5** Define binary tree. Explain different tree traversal techniques. [15]
- Q.6** Differentiate between: [15]
- a) Linear search and binary search
 - b) Breadth first traversal and depth first traversal on binary tree
- Q.7** Write notes on **ANY TWO** of the following: [15]
- a) Memory allocation for structure
 - b) Circular linked list
 - c) Atomic Data

SECTION – II

- Q.8** Write a C program to do arithmetic operations on two dimensional array (addition, subtraction, multiplication). [20]
- Q.9** Write an algorithm to sort given list of numbers using selection sort. Trace the same for following data set. [20]
40, 25, 12, 38, 52, 32, 20, 65.
- Q.10** Write a C program to implement stack operations. [20]

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B.C.A. SEM-III (2014 Course) CBCS : WINTER - 2018

SUBJECT : MATHEMATICS

Day : Saturday
Date : 24/11/2018

Time : 02.00 PM TO 05.00 PM
Max. Marks : 100

W-2018-1835

N. B. :

- 1) Attempt **ANY FOUR** questions from section – I and **ANY TWO** questions from section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer books.
- 4) Use of non-programmable calculator is **ALLOWED**.

SECTION – I

Q. 1 a) Construct truth table for: **(08)**

$$(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R) \Rightarrow R$$

b) Let : **(07)**

$$R = \{(a, a), (a, b), (b, b), (c, c), (c, b)\}$$

$$\text{on } A = \{a, b, c\}$$

Find the symmetric closure of R.

Q. 2 Define term 'Matrix' with their suitable examples and types. **(15)**

Q. 3 a) Show that, the function $f : R \rightarrow R$ defined as: **(07)**

$$f(x) = 3x + 4 \text{ for all } x \in R \text{ is one-one onto}$$

b) Implement $(x + y) \cdot (u + v)$ with NAND gates. **(08)**

Q. 4 a) Verify for two matrices $AB \neq BA$ with suitable example. **(07)**

b) For any three non – empty set A, B, C prove that **(08)**

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

Q. 5 a) Define 'Power Set' and write the power set for **(07)**

$$X = \{1, 2, 3\} \text{ find its cardinality.}$$

b) Use the principle of mathematical induction to verify **(08)**

$$p(n) = 1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

Q. 6 a) Find the domain and range of the following functions: **(08)**

i) $y = x^2$

ii) $y = \frac{x}{1-x}$

P. T. O.

- b) Let $A = \{1, 2, 3\}$. Let R and S be the relations on A defined as follows: (07)

$$R = \{(a, b) : a < b\}$$

$$S = \{(a, b) : a > b\}$$

Find $R \circ S$ and $S \circ R$

- Q. 7 Write short notes on **ANY THREE** of the following: (15)

- Contradictions pattern of logic
- Venn diagrams
- Invertible functions
- Division Algorithm

SECTION – II

- Q. 8 In a survey of the usage of three tooth pastes A, B, and C. It is found that 60 people like A, 55 like B, 40 like C, 20 like A and B, 35 like B and C, 15 like A and C and 10 like all the three tooth pastes. (20)

Find the following:

- Number of persons included in the survey.
- Number of person who like tooth paste A only.
- Number of persons who like tooth paste A and B but not C.
- Draw Venn diagram to depict the solution.

- Q. 9 a) Define equality of matrices and find $AB + CB$ (10)

for

$$A = \begin{bmatrix} 2 & 3 & -1 \\ 0 & 2 & 1 \\ -1 & 2 & -2 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 3 & 2 \\ 3 & 1 & 0 \\ -1 & 0 & -1 \end{bmatrix} \quad C = \begin{bmatrix} 1 & -1 & 0 \\ 1 & -1 & 2 \\ 3 & -3 & 0 \end{bmatrix}$$

- b) Find G. C. D. of the following by using Euclidean Algorithm (10)
- 152, 80
 - 45, 34

- Q. 10 a) Define set with their different types and suitable example of each type. (10)

- b) Construct truth table for $P \vee (\sim Q \rightarrow R)$ (10)

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