

Day: **Friday**  
Date: **10/11/2017**

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

**W-2017-1610****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) Both sections should be written in **SEPARATE** answer book.

**SECTION - I**

- Q.1** Differentiate between: (15)
- a) Shortest Job First and Shortest Remaining Time Next
  - b) Real Time Operating System and Online Operating System
  - c) Implicit tasking and Explicit tasking
- Q.2** Explain the following: (15)
- a) Process concept
  - b) Process state
  - c) Process control block
- Q.3** What is segmentation? What are the advantages of segmentation? Also explain segmentation with paging. (15)
- Q.4** Discuss producer-consumer problem and give the possible solutions for this problem. (15)
- Q.5** What do you mean by file system? Explain various file access methods with their merits and demerits. Also give the file structure. (15)
- Q.6** What is semaphore? Describe characteristics and queuing implementation of semaphore in detail. (15)
- Q.7** Write short notes on the following : (15)
- a) Conditional critical region
  - b) Disk space management
  - c) Demand paging

**SECTION - II**

- Q.8** What is deadlock? What are the conditions for occurrence of deadlock? How to avoid it? (20)
- Q.9** Consider the following case: (20)

Processes	Arrival time	Execution time (min.)
P1	10:00	9
P2	10:03	3
P3	10:08	4
P4	10:09	2

Calculate average waiting time and turnaround time in case of:

- a) First come first served
- b) Shortest remaining time next

- Q.10** Consider the main memory with four page frames. Assume that all the page frames are initially empty. The pages are referenced in the order given below. (20)
- 1, 2, 3, 3, 1, 2, 3, 1, 0, 1, 3, 2, 1
- Compute the total number of page faults in case of:
- i) FIFO
  - ii) LRU with matrix

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**B.C.A. SEM-III (2014 COURSE) CBCS : WINTER - 2017**  
**SUBJECT : SOFTWARE ENGINEERING**

Day : **Monday**  
Date : **13/11/2017**

**W-2017-1611**

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

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**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 the **SEPARATE** answer books.
  - 3) Figures to the right indicate **FULL** marks.
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**SECTION – I**

- Q.1** What is Software Engineering? Explain in detail concepts of software engineering and its application to software development area. **[15]**
- Q.2** Explain in detail various testing methods. What are drawbacks of black box testing? **[15]**
- Q.3** Explain in detail software development life cycle for any business software. Explain software requirement stage with example. **[15]**
- Q.4** What are the characteristics of SRS? Explain drawbacks of function oriented modeling in short. **[15]**
- Q.5** Explain feasibility study in detail with example for the same. **[15]**
- Q.6** What are E-R diagrams required for Software Development? Draw and explain various levels of E-R diagrams for Business Organization Software. **[15]**
- Q.7** How quality of software is defined and decided? Explain various means to improve quality of Software. **[15]**

**SECTION – II**

- Q.8** Explain software maintenance and feedback stage for software's. How to manage feedback from customers for software maintenance? **[20]**
- Q.9** Explain in detail spiral model and waterfall model with their brief concepts. **[20]**
- Q.10** Write short notes on **ANY TWO** of the following: **[20]**
- a) Software Design Stage
  - b) Software Project Management
  - c) Qualities of Team Leader

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**B.C.A. SEM-III (2014 COURSE) CBCS : WINTER - 2017**

**SUBJECT: DATA STRUCTURE**

Day: **Wednesday**

Date: **15/11/2017**

**W-2017-1612**

Time: **02.00 PM TO 05.00 PM**

Max Marks. 100

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**N.B.**

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

- Q.1** What is Queues? Explain types of queues. (15)
- Q.2** Explain simple search with example. (15)
- Q.3** Explain the different tree traversal. (15)
- Q.4** What is data structure? Explain types of data structure. (15)
- Q.5** What is stack? Explain array implementation of stack. (15)
- Q.6** What is a structure? Explain memory allocation for structure. (15)
- Q.7** Write short notes on any **THREE** of the following: (15)
- a) Binary tree
  - b) Atomic data
  - c) ADT
  - d) Quick sort

**SECTION - II**

- Q.8** Write a C program to find Row-wise sum and column – wise sum of matrix. (20)
- Q.9** Write a C program for implementing insertion sort to arrange list of integers in descending order. (20)
- Q.10** What is linked list? Explain inserting a node and deleting a node to a list with example. (20)

Day : **Friday**  
Date : **17/11/2017**

**W-2017-1613**

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) Use of non-programmable **CALCULATOR** is allowed.
- 4) Figures to the right indicate **FULL** marks.

**SECTION – I**

**Q.1 a)** Prove by mathematical induction: **[08]**

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

**b)** Let  $a = 48$  and  $b = 356$ : **[07]**

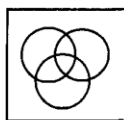
- i) Using Euclidean algorithm find gcd.
- ii) Using gcd find LCM.

**Q.2 a)** Let  $x = \{1, 2, \dots, 8, 9\}$ . Determine why and whether or not each of the following is a partition of  $x$ . **[08]**

- i)  $\{\{1,3,6\}, \{2, 8\}, \{5, 7, 9\}\}$
- ii)  $\{\{2, 4, 5, 8\}, \{1, 9\}, \{3, 6, 7\}\}$
- iii)  $\{\{1, 5, 7\}, \{2, 4, 8, 9\}, \{3, 5, 6\}\}$
- iv)  $\{\{1, 2, 7\}, \{3, 5\}, \{4, 6, 8, 9\}\}$

**b)** Relation  $R$  is defined over set  $A = \{1, 2, 3, 4\}$  where  $R = \{(1, 2), (1, 4), (2, 3), (3, 1)\}$ . Check if the given  $R$  is symmetric if not find its symmetric closure. **[07]**

**Q.3 a)** Using Venn diagram represent sets  $A, B, C$  which are subsets of ' $U$ ' and represented as follows shade the area for the following: **[07]**



- i)  $A \cup (B \cap C)$       ii)  $A' - (B \cap C)$       iii)  $A - (B \cap C)'$

**b)** Let  $a$  and  $b$  be two integers and suppose function  $Q(a, b)$  is defined recursively as :  $Q(a, b) = 5$  if  $a < b$ ,  $Q(a, b) = (a - b, b + 2) + a$  if  $a \geq b$ . Find  $Q(5, 3)$  and  $Q(15, 2)$ . **[08]**

**Q.4** For sets  $U = \{A, \dots, Z\}$ ,  $A = \{A, P, L, E\}$ ,  $B = \{A, E, R, O, P, L, N\}$ ,  $C = \{A, R, T, I, F, C, L\}$ . Perform following set operations on above sets: **[15]**

- a)  $A \cup B \cup C$       d)  $(A \cup B) - (A \cap B)$       g)  $A' \cup B'$
- b)  $(A \cup B \cup C)'$       e)  $(A \cup B \cup C) - A$
- c)  $A - (B \cup C)$       f)  $(A \cup B) \cap (B \cup C)$

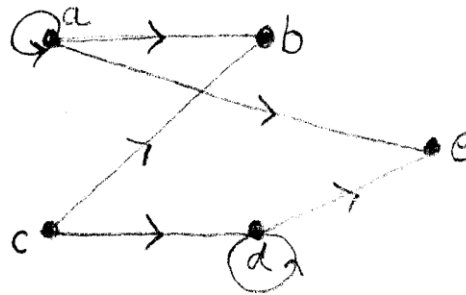
**Q.5 a)** Determine whether the given Relation  $R$  is equivalence or not defined on set  $A = \{1, 2, 3\}$   $R = \{(1, 1), (1, 2), (2, 2), (2, 3), (3, 1)\}$ . **[08]**

**b)** With the help of truth table prove that: **[07]**

$$p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r).$$

Q.6 a) For the given matrix  $A = \begin{bmatrix} 2 & 9 \\ 4 & 3 \end{bmatrix}$ . Find  $A^2$  and  $A^3$ . [08]

b) From the given diagram define R. Determine whether it is reflexive if not find its reflexive closure. [07]



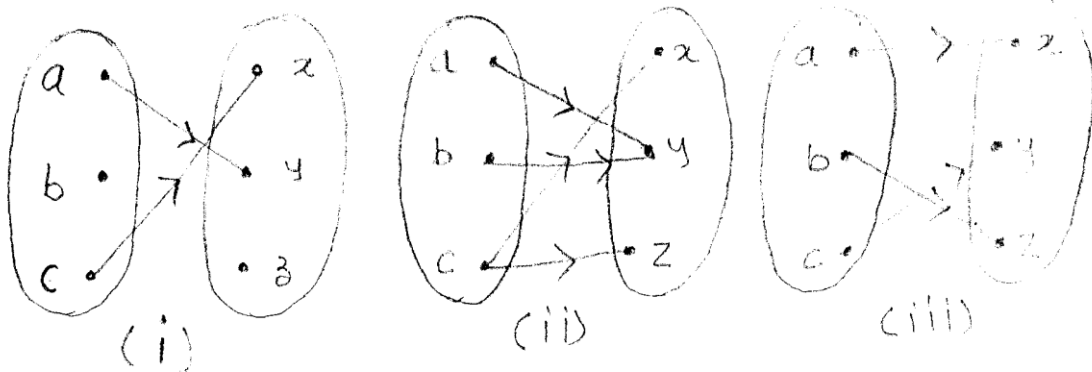
Q.7 a) Let  $V = \{1, 2, 3, 4\}$  and let  $f = \{(1, 3), (2, 1), (3, 4), (4, 3)\}$  and  $g = \{(1, 2), (2, 3), (3, 1), (4, 1)\}$ . Find  $f \circ g$ ,  $g \circ f$ ,  $f \circ f$  and  $g \circ g$ . [07]

b) Express each Boolean expression  $E(x, y, z)$  as a sum of products and then complete sum of products form: [08]

i)  $E = (x + y'z)(y + z')$       ii)  $E = y(x + yz)'$

## SECTION - II

Q.8 State whether or not each diagram in figure defines a function from  $A = \{a, b, c\}$  into  $B = \{x, y, z\}$ . [20]



Q.9 a) Write a note on : Partial Order in Relations. [10]

b) State and prove fundamental theorem of Arithmetic. Every integer  $n > 1$  can be expressed uniquely as a product of primes. [10]

Q.10 a) Construct truth table for:  $p \rightarrow \neg q$ ;  $\neg p \leftrightarrow \neg q$ . [10]

b) The total number of students appeared for an examination are 200. 110 passed in Science and 130 passed in Maths. If 80 of them have passed in both Science and Maths, find the number of students who have failed in both the subjects. [10]