

Reg. No. : .....

**D 1672      Q.P. Code : [07 DSC 02/07 DIT 03]**

(For the candidates admitted from 2007 onwards)

**B.Sc. DEGREE EXAMINATION, MAY 2014**

**First Year**

**Part III — Computer Science/Information Technology**

**DATA STRUCTURES AND C PROGRAMMING**

**Time : Three hours      Maximum : 100 marks**

**Answer any FIVE questions.**

**(5 × 20 = 100)**

1. (a) Explain the various problem solving techniques.  
(b) Describe the structure of 'C' program with an example.
2. Explain the various types of control statements with examples.
3. Explain the various string handling functions with examples.

4. Illustrate with examples, about pointers, pointer declarations and bring out the differences between an integer pointer and a string pointer.
  5. (a) Write a recursive function to find the factorial of a given number.  
(b) What are bitwise operations? What instructions support such operations?
  6. Explain with examples, the binary tree traversal methods.
  7. Explain with examples, the insertion and deletion of an element into a stack.
  8. Explain in detail on Heap Sort method with an example.
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Reg. No. : .....

D 1522

Q.P. Code : [07 DSC 03/  
07 DIT 01]

(For the candidates admitted from 2007 onwards)

B.Sc. DEGREE EXAMINATION, MAY 2014.

First Year

Part III — Computer Science/Information Technology

Allied — MATHEMATICAL FOUNDATIONS FOR  
COMPUTER SCIENCE

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

1. (a) Find the eigen values of the following matrix.

$$\begin{pmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{pmatrix}$$

- (b) Find the rank of the following matrix

$$\begin{pmatrix} 1 & 1 & -1 & 1 \\ 1 & -1 & 2 & -1 \\ 3 & 1 & 0 & 1 \end{pmatrix}$$

(10+10)

2. (a) Find the inverse of the following matrix

$$\begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{pmatrix}$$

- (b) (i) State any four properties of determinant of matrix
- (ii) Find the determinant value of the following matrix

$$\begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{pmatrix}. \quad (10+4+6)$$

3. (a) State the laws of set theory.

- (b) Define the following terms

- (i) Power set
- (ii) Duality principle
- (iii) Min set
- (iv) Max set
- (v) Partition of a set. (5+15)

4. (a) Prove that  $A - (B \cup C) = (A - B) \cap (A - C)$ .
- (b) In a medical examination of 300 students, 65 were suffering from liver trouble, 38 had eye trouble and 30 students were anaemic. If 15 students had both liver and eye trouble, 10 had liver trouble and anaemic, 12 had eye trouble and anaemic and 8 students had all the three. Find out how many students were free from any of the three troubles. (10+10)
5. (a) Construct the truth table for the following compound proposition and give your interpretation.
- (i)  $(p \leftrightarrow q) \leftrightarrow ((p \wedge q) \vee (\neg p \wedge \neg q))$
- (ii)  $(\neg p \leftrightarrow \neg q) \leftrightarrow (p \leftrightarrow q)$ .
- (b) Show that  $(a \vee b)$  follows logically from the premises  $p \vee q$ ,  $(p \vee q) \rightarrow \neg r$ ,  $\neg r \rightarrow (s \wedge \neg t)$  and  $(s \wedge \neg t) \rightarrow (a \vee b)$ . (6+6+8)
6. (a) Show that the premises
- “One student in this class knows how to write JAVA program”
- “Every one who knows how to write programs in Java can get a high paying job”.
- Imply the conclusion “some one in this class can get a high – paying job”.
- (b) Explain the concept of equivalence relation on a set. (12+8)

7. (a) If  $R, S, T$  are relations on the set  $A = \{0, 1, 2, 3\}$  defined by  $R = \{(a, b) / a + b = 3\}$

$$S = \{(a, b) / 3 \text{ is a division of } (a + b)\}$$

$$\text{and } T = \{(a, b) / \max(a, b) = 3\}$$

Find  $R.T, T.R$  and  $S.S$ .

- (b) If  $f, g, h: R \rightarrow R$  are defined by

$$f(x) = x + 2g(x) = \frac{1}{x^2 + 1} \text{ and } h(x) = 3$$

Find  $g, h, f$  and  $h.g.f$ . (10+10)

8. (a) Explain the various types of graph.

- (b) Explain tree, binary tree and its properties. (10+10)