

2016

COMPUTER SCIENCE

[Honours]

PAPER – VI

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

GROUP – A

Answer any two questions : 15 × 2

1. Consider a hospital with a set of patients and a set of doctors. Associate with each patient, a log of various tests conducted.

(Turn Over)

- (i) Find out all entities of the above system with corresponding attributes.
 - (ii) Find out relationship among these entities.
 - (iii) Select appropriate primary and foreign key (if any).
 - (iv) Construct an E-R diagram of the system.
 - (v) Construct the appropriate tables for the E-R diagram. 3 + 2 + 2 + 5 + 3
2. (a) Write an algorithm for constructing NFA from regular expression.
- (b) Why symbol table is used in compilation phase?
- (c) What is the difference between system program and application program? 8 + 2 + 5
3. (a) Write down Bresenham's line-drawing algorithm.

- (b) Consider a line with end points (20, 10) and (30, 18). The line has a slope of 0.8. Determine successive pixel positions along the line path using Bresenham's line drawing algorithm.
- (c) Explain in detail the function of lexical analyzer. 5 + 6 + 4
4. (a) What is loader ? What is the function of it ?
- (b) Explain dynamic loading with example.
- (c) Consider a relation schema $R(A, B, C, D, E)$ with functional dependencies $BC \rightarrow D$, $A \rightarrow E$ and $B \rightarrow A$. Find out super key, candidate key and primary key. (2 + 3) + 5 + 5

GROUP – B

Answer any five questions : 8 × 5

5. (a) "Primary Key is one type of Integrity constraint" – Explain.
- (b) Explain different types of data models with examples. 3 + 5

6. (a) What is the difference between regular and context free grammar ?
- (b) Describe LCD technology. 4 + 4
7. (a) How we will construct the primary key of the weak entity set ?
- (b) What problems would arise if you do not design a table using normalization ?
- (c) Define BCNF. How does it differ from 3NF ? 2 + 3 +(1 + 2)
8. (a) Convert the following NFA into its equivalent DFA :
- (a/b)* abb
- (b) What are the benefits of Intermediate code generation ? 6 + 2
9. Write an SQL expression for each query considering database as

S(s#, SName, city, status)

P(P#, PName, colour, weight, city)

SP(S#, P#, Qty)

- (i) For all parts, get the part number (P#) with weight.
 - (ii) Get all combinations of supplier and part that are located to the same city.
 - (iii) Get the total number of suppliers.
 - (iv) Get all pairs at suppliers numbers located to the same city. 2 + 2 + 2 + 2
10. (a) Construct a finite automata that accept all possible string of 0s and 1s containing 011 as a substring.
- (b) Explain the circle generation concept in computer graphics. 5 + 3
11. (a) Find the FIRST and FOLLOW sets for the following grammar :
- bexpr \rightarrow bexpr or bterm | bterm
bterm \rightarrow bterm and bfactor | bfactor
bfactor \rightarrow not bfactor | (bexpr) | true | false.

- (b) Eliminate left recursion from the following grammar :

$$E \rightarrow E + T/T$$

$$T \rightarrow T * F/F$$

$$F \rightarrow (E)/id$$

6 + 2

12. (a) Explain indirect triple representations.

- (b) Translate the expression $Y = (C + D)^* - a/b$ into quadruple, triple and indirect triple representation.

2 + (2 + 2 + 2)

GROUP - C

Answer any five questions :

4 × 5

13. (a) What is debugger ?

- (b) Write down differences between object file and executable file.

2 + 2

14. Explain ambiguous grammar with an example.

How can you check it ?

2 + 2

15. What is the difference between DML and DDL ? 4

16. Define Aspect ratio and Resolution of a monitor. 4
17. Explain BCNF with an example. 4
18. Explain scaling of an object in 2D space. 4
19. Differentiate between sequential file organization and index sequential file organization. 4
20. What is a preprocessor ? What are the functions performed by preprocessors ? 4

[*Internal Assessment* : 10 Marks]

