2017

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

[OLD SYLLABUS]

GROUP – A

Answer any **two** questions :   15 × 2

1. (*a*) Consider a student Administration system where students who apply for a course are registered in the system. Short listed

candidates are called for interview and their
marks recorded. Selected candidates are
admitted.

(*i*) List all entities of the above system with
corresponding attributes.   2

(*ii*) Write down relationship among these
entities.   2

(*iii*)Find out primary and foreign key of
these entities (if any).   2

(*iv*) Draw an E-R diagram of the system.   4

(*b*) Consider the following table :

Employee (Emp_Name, Dept_Name, Salary)

Write SQL statements for the following :

(*i*) Find the employee name who is getting
lowest salary.   1

(*ii*) Find all the department where more than
60 employees are working.   2

(*iii*)Find all employees whose salary is

higher than the *average salary* of their department. 2

2. (a) Write down predictive parsing table for the grammar : 6

   $$E \rightarrow T + E/T$$
   $$T \rightarrow int/int * T/(E)$$

   (b) Compare dynamic loading and dynamic linking. 5

   (c) Check whether the following grammar is LL(1) or not 4

   $$S \rightarrow iEt \, S\acute{S}/a$$
   $$\acute{S} \rightarrow eS/\epsilon$$
   $$E \rightarrow b$$

3. (a) What is the main utility of using data dictionary ? 2

   (b) What is constraints ? Write down different types of constraints. 1 + 3

   (c) Explain various mapping cardinality with example. 4

(d) Write down DDA line-drawing algorithm. 5

4. (a) What is Macro ? Write the basic tasks for any macroinstruction processor. 2 + 4

   (b) Differentiate between macros and subroutines. 4

   (c) Consider a relation $R(A, B, C, D, E)$ with FD's $AB \rightarrow CD$, $A \rightarrow E$, $C \rightarrow D$, that is decomposed into $R_1(A, B, C,)$, $R_2(B, C, D)$ and $R_3(C, D, E)$. Is it loss-less or not. 5

GROUP – B

Answer any **five** questions : 8 × 5

5. (a) Write short note on Direct view storage tube. 4

   (b) Explain window to viewport transformation. 4

6. (a) Compare triple, quadruple and indirect triple representations. 2

   (b) Translate the expression $A = (x + y)^* - z/w$ into quadruple, triple and indirect triple representation. 2 + 2 + 2

7. (a) Describe "Compile and go "loader. What is the disadvantage of it.   5

   (b) Compare linkage editor and linking loader.   3

8. (a) Convert the following NFA into its equivalent DFA :   6

   $$(x/y)^*xyy$$

   (b) What is the advantage of intermediate code generation ?   2

9. (a) Explain multivalued dependencies and 4NF, with an example.   2 + 2

   (b) Eliminate left recursion in the following grammar :   4

   $$S \rightarrow Aa \mid b$$
   $$A \rightarrow Ac \mid Sd \mid \epsilon$$

10. Explain two pass structure of Assembler. Convert the following moore machine to mealy machine :   4 + 4

	Next State		
	$a_0 = 0$	$a_1 = 1$	$01p$
$\rightarrow q_0$	q_0	q_1	0
q_1	q_1	q_2	1
q_2	q_2	q_3	0
q_3	q_3	q_0	0

11. (a) What do you mean by fixed-length record and variable length record ?　　2

   (b) Differentiate between Sequential File Organization and Index Sequential File Organization.　　4

   (c) Write short note on : OODB.　　2

12. Derive the composite transformation matrix for rotating an object about any arbitrary axis in three dimension.　　8

GROUP -- C

Answer any five questions :　　4×5

13. Briefly explain CRT.　　4

14. What is preprocessor ? What are the functions of it ? 4

15. Consider the grammar : 4

$$S \rightarrow a/\wedge/(T)$$
$$T \rightarrow T, S/S$$

Draw a parse tree for

$$(((a, a), \wedge, (a)), a)$$

16. Write short notes on : 2 + 2

    (i) Digitizer

    (ii) Light pen.

17. Explain about Bootstrap loader. 4

18. What role does CCD play in an image scanner ? 4

19. Differentiate between replication and fragmentation. 4

(*Turn Over*)

20. Write short notes on :　　　　　　　　　2 + 2

(*i*) Macroassembler

(*ii*) Cross assembler.

[*Internal Assessment* : 10 Marks]

———————