

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*

[NEW SYLLABUS]

GROUP – A

Answer any two questions : 15 × 2

1. Consider an organization that undertakes several projects. Each project can employ one or more employees and each employee can work on one or more projects. Each project is undertaken on

(Turn Over)

the request of a client. A client can request for several projects and each project has only one client. A project can use a number of items and an item may be used by several projects.

- (i) Find out all entities of the system with corresponding attributes. 3
- (ii) Find out relationship among these entities. 2
- (iii) Select appropriate primary and foreign key (if any). 2
- (iv) Construct an E-R diagram. 5
- (v) Construct the appropriate tables for the E-R diagram. 3
2. (a) Reduce the following grammar to CNF –
 $S \rightarrow abSb \mid a \mid aAb, A \rightarrow bS \mid aAAb.$ 6
- (b) Find a grammar generating the language –
 $L = \{ a^n b^n c^i \mid n \geq 1, i \geq 0 \}$ 6
- (c) What is DFA? 3

3. (a) Why do we use packages in java ? How packages are created in Java ? Explain the four important packages of java. $2 + 2 + 3$
- (b) What is interface ? Write the major difference between an interface and a class. $2 + 3$
- (c) Define DAG. 3
4. (a) Write down mid point circle drawing algorithm. 7
- (b) Consider a circle with radius 10 and circle center (0, 0). Demonstrate the mid point circle algorithm by determining positions along the circle octant in the first quadrant. 8

GROUP - B

Answer any five questions : 8×5

5. (a) Construct a DFA accepting all strings over $\{a, b\}$ ending in ab . 5
- (b) Let L be the set of all palindromes over $\{a, b\}$. Construct a grammar G generating L . 3

6. (a) If G is the grammar $S \rightarrow SbS/a$, show that G is ambiguous considering the string $abababa$. 5
- (b) Let G be the grammar $S \rightarrow OB/1A$, $A \rightarrow O/OS/1AA$, $B \rightarrow 1/1S/OBB$. Find the left most and right most derivation for the string 00110101 . 3
7. (a) Distinguish partial and full functional dependency with examples. 3
- (b) Explain various anomalies or pit falls in relational database. 5
8. Write down the algorithm to check if a decomposition is loss-less or not. Given $R(A, B, C, D, E)$ with FDS
- $$F = \{AB \rightarrow CD, A \rightarrow E, C \rightarrow D\}.$$
- verify the decomposition of R into $R_1(A, B, C)$, $R_2(B, C, D)$, $R_3(C, D, E)$ is loss-less or not. 4 + 4
9. (a) Write down the difference between method overloading and method overriding with example. 6

- (b) What is protected access modifier ? 2
10. Define window and viewport. Derive the transformation matrix for window to viewport transformation. 4 + 4
11. (a) Describe the complete life cycle of a thread. 4
(b) What is super class constructor ? Explain the advantages of super keyword. 4
12. (a) Describe three level architecture of data abstractions. 4
(b) Explain ACID properties of transaction. 4

GROUP – C

Answer any five questions : 4 × 5

13. What are the different type of grammars based on Chomsky classification ? 4
14. Explain Wrapper class. 4
15. Write down differences between LED and LCD technology. 4

16. Write short notes on : 2 + 2
- (i) JPEG
 - (ii) MPEG
17. Describe the characteristics of OODB(Object -Oriented Database). 4
18. Write down DDA line drawing algorithm. 4
19. Define Aspect ratio and Resolution of a monitor. 4
20. Describe the JVM. 4

[Internal Assessment : 10 Marks]
