

NEW

Part-III 3-Tier

2019

COMPUTER SCIENCE

(Honours)

PAPER—VI

Full Marks : 100

Time : 4 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Group—A

Answer any *two* questions.

1. (a) What is object oriented programming ? How it is different from procedure oriented programming ?

:(Turn Over)

(b) Distinguish between object and class. In what order are the class constructors called when a derived class object is created ? Explain.

(c) Write a class ACCOUNT that represents your bank account and then use it. The class should allow you to deposit money, withdraw money, calculate interest, and send you a message if money is not sufficient in the account. Use constructor to provide initial amount in the account.

$$(2+3)+(2+3)+5$$

2. (a) Discuss the working of 2D Scaling with respect to origin and with respect to fixed (pivot) point with suitable example.

(b) Prove that two successive translations are additive.

(c) Apply midpoint circle algorithm to find the pixel values of the circle whose radius $r = 4$ and centre of the circle = $(0, 0)$.

$$5+5+5$$

3. (a) Construct minimum state DFA's for the following regular expression

$$(a/b)^* a (a/b) \quad 8$$

- (b) What is Multi-tape turing Machine ? 3

- (c) Draw the parse tree for the input "y+++y++". 4

4. (a) Write down the algorithm to check if a decomposition is loss-less or not. Given $R(A, B, C, D, E)$ with FD's

$$F = \{AB \rightarrow CD, A \rightarrow E, C \rightarrow D\}.$$

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

- (b) Draw an E—R diagram of the University admission system as per following rules :

- (i) There are three faculties Arts, Science and Commerce.

- (ii) Each faculties conducts UG Courses and PG Courses.
- (iii) There are various subjects in each UG and PG courses.
- (iv) The University prepares a merit list of students according to their marks in each subject categories. Clearly mention the generalization, specialization and aggregation. Find entities and show the relationship clearly. 7

Group—B

Answer any *five* questions.

- 5. (a) Explain Primitive type conversion and casting with examples.
- (b) How garbage collector plays its role ? Explain.

(c) Differentiate between thread and process ? How a thread is created ? Discuss. 2+2+(2+2)

6. (a) Write difference between FA and PDA.

(b) Design a DFA corresponding to regular expression

$$(a + b)^*aba(a + b)^* \quad 3+5$$

7. (a) Explain the following : (i) Key constraints (ii) Integrity constraints.

(b) Differentiate between where clause and group by clause. (2½+2½)+3

8. (a) Define translation and scaling with an example.

(b) Determine the form of the transformation matrix for a reflection about an arbitrary line with equation $y = mx + b$. 4+4

9. (a) Explain indirect Triple representations.
- (b) Translate the $Y = (C + D) * -a / b$ expression into quadruple, Triple and Indirect Triple representation.
- 2+(2+2+2)
10. Derive window port to viewport transformation matrix in clipping. 8
11. (a) Define 3NF and BCNF. 2+2
- (b) What is normalization ? Why do we use it ? 2+2
12. (a) Difference between method overloading and method overriding. 3
- (b) What is the difference between an interface and abstract class ? 3
- (c) What is wrapper class ? 2

Group—C

Answer any *five* questions.

5×4

13. What is JVM ? Give importance of JVM in java language.
1+3
14. Explain about the super keyword with examples. What is thread synchronization ?
2+2
15. Write regular expression to denote a language L, which accepts all the strings which begin or end with either 00 or 11.
4
16. Describe boundary fill algorithm for polygon with suitable example.
4
17. What is the difference between an interface and an abstract class ?
4
18. Explain the difference between raster scan and vector scan technology.
4

19. Differentiate between physical and logical data independence. 4
20. How applet differs from application in Java ? 4

[Internal Assessment : 10 Marks]
