

**PUNJAB PUBLIC SERVICE COMMISSION**  
**COMBINED COMPETITIVE EXAMINATION**  
**FOR RECRUITMENT TO THE POSTS OF**  
**PROVINCIAL MANAGEMENT SERVICE, ETC.**

**COMPUTER SCIENCE (OPTIONAL) PAPER-II**

**TIME ALLOWED: 3 HOURS**

**MAXIMUM MARKS: 100**

**Note:** Attempt Any FIVE questions. All questions carry equal marks.

- Q.1:** (a) Illustrate the logic of Context Sensitive Grammars with the help of two examples. (10)
- (b) Write the formal definitions of the following with an example of each:
- Deterministic Finite Automation (5)
  - Pushdown automation (5)
- Q.2:** (a) Which Numerical method is preferred for finding the approximate solution of integrating a function whose behavior is like a polynomial of 2nd Degree? Give complete statement of this method. (5)
- (b) Write the Algorithm of the above method. (5)
- (c) Find a Polynomial which passes through the points A(-1,5), B(3,13), C(5,29). (10)
- Q.3:** (a) What are the six phases of Database design? Describe briefly first two phases. (10)
- (b) A schema is a cognitive framework or concept that helps organize and interpret the information. Illustrate the Relational Database Schema of an organization with at least three entities. (10)
- Q.4:** (a) Discuss the following phrase with the help of an example: (60-100 words) (10)
- "Debugging is taken as an art but it is a scientific process".
- (b) Describe the white box software testing. What are the major factors that make the Test a successful one? (10)
- Q.5:** (a) Compare between compilers and Interpreters. (10)
- (b) Write a short note on the Parsing techniques. (10)
- Q.6:** (a) Discuss the three types of Entity Relationships. (6)
- (b) The spiral model is an evolutionary software process model. Discuss its six task regions. (14)
- Q.7:** Write short notes on the following:
- Normalization (5)
  - Transaction Processing (5)
  - Data Warehousing and Data Mining (10)
- Q.8:** (a) What is an Expert system? How are expert systems used in different application areas? (10)
- (b) Describe any three heuristics links regarding different models. (6)
- (c) What is backward chaining process? Give a general description with requirements. (4)
- Q.9:** (a) Compare the number of operations performed in NLN (Nicholl -Lee - Nicholl) algorithm to both Cohen-Sutherland and Lian-Barsky line clipping algorithms for several different orientations relative to clipping window. (10)
- (b) Write down the capabilities of Raster Methods (System) for Transformation. Also describe the typical raster functions often provided by Graphical Packages. (10)