

Certificate in Accounting and Finance Stage Examination

Data, Systems and Risks

24 August 2026

100 marks

3 hours and 15 minutes (including 15 minutes' reading time)



Instructions to examinees:

- (i) Answer all **SEVEN** questions.
- (ii) Answer in **black** pen only.
- (iii) Use the first page of the answer script to answer the Multiple-Choice Questions.

SECTION A

QUESTION 1

Select the most appropriate answer from the options provided for each of the following Multiple-Choice Questions (MCQs). Each MCQ carries **ONE** mark.

- (i) Each gold ring produced by Rhodonite Rings (RR) is weighed to the nearest 0.01 gram before being packaged for delivery, and the record of the weight of each ring is maintained. At the end of each month, RR's production manager calculates the average weight of all rings produced.

The weight recorded for each ring would be classified as:

- (a) Nominal data (b) Discrete data (c) Ordinal data (d) Continuous data
- (ii) Which of the following models classifies information into levels such as Public, Internal, Confidential, and Restricted?
- (a) Role-Based Classification Model (b) Sensitivity-Based Classification Model
(c) Lifecycle-Based Classification Model (d) Compliance-Based Classification Model
- (iii) Which of the following is **NOT** a typical task performed during diagnostic analytics?
- (a) Identifying the factors responsible for increased employee turnover.
(b) Analyzing production logs to determine reasons for increase in machine downtime.
(c) Forecasting revenue for the next financial year using historical sales data.
(d) Investigating why delivery times decreased during the holiday season.
- (iv) Pearl Accessories (PA) collected a large volume of social media data to understand customers' opinions regarding its products. During an internal review, PA found that some online comments were misleading, inaccurate, or biased.

Which characteristic of Big Data is most directly associated with this challenge?

- (a) Veracity (b) Velocity (c) Variety (d) Value
- (v) Which of the following statements about different types of Enterprise Resource Planning (ERP) systems is **NOT** correct?
- (a) Hybrid ERP systems allow organizations to store sensitive data on local servers while using cloud services for less critical functions.
(b) On-Premise ERP systems offer a higher degree of customization than Cloud ERP systems.
(c) Cloud ERP systems can be deployed more quickly than On-Premise ERP systems.
(d) Cloud ERP systems provide greater control over organizational data than On-Premise ERP systems.
- (vi) A Database Management System (DBMS) consists of several components that work together to manage a database. Which of the following is **NOT** a component of a DBMS?
- (a) Query processor (b) Transaction manager
(c) Operating system (d) Database engine

- (vii) Gypsum Insurance Limited uses a Database Management System (DBMS) to process insurance claims. While approving an insurance claim, a manager entered an approved claim amount of Rs. 150,000 that exceeded the coverage limit of Rs. 100,000 specified in the customer's insurance policy. The DBMS detected the violation and prevented the transaction from being completed.

Which ACID property of a DBMS is primarily demonstrated in the above scenario?

- (a) Atomicity (b) Consistency (c) Isolation (d) Durability

- (viii) Ekanite Engineering Limited has implemented a digital maintenance solution for its field technicians. While inspecting industrial machines, technicians wear smart glasses that overlay repair instructions, machine specifications, and safety warnings directly onto their field of view.

Which of the following technologies is demonstrated in the above scenario?

- (a) Augmented Reality (b) Quantum Computing
(c) Virtual Reality (d) Robotic Process Automation

- (ix) Sarcolite Automotive Limited manufactures autonomous vehicles that can sense their surroundings, make driving decisions, and operate with minimal human intervention. As a safety feature, each vehicle processes sensor data locally and applies the brakes within milliseconds to help prevent accidents.

Which key feature of edge computing is demonstrated in the above scenario?

- (a) Bandwidth efficiency (b) Reduced latency
(c) Scalability and flexibility (d) Enhanced privacy and security

- (x) Diaspore Industries (DI) has adopted a framework that standardizes IT service management practices. The framework focuses on optimizing IT service delivery and improving customer satisfaction through continual service improvement.

Which of the following frameworks has been adopted by DI?

- (a) Information Technology Infrastructure Library (ITIL)
(b) Control Objectives for Information and Related Technology (COBIT)
(c) NIST Cybersecurity Framework (NIST)
(d) The Open Group Architecture Framework (TOGAF)

- (xi) Crystal Trading Limited is developing a new inventory management system. Management requires that business requirements must be documented, users must participate in system testing, and the system must be formally accepted before it is implemented.

Which of the following IT General Controls is primarily demonstrated in the above scenario?

- (a) IT operations controls (b) Role-based access controls
(c) Program development controls (d) Change management controls

- (xii) Which of the following best describes the primary purpose of automated risk scanners?

- (a) Identify security vulnerabilities and configuration weaknesses in IT systems through automated scanning.
(b) Encrypt sensitive information and generate periodic risk reports for senior management.
(c) Continuously monitor network traffic for suspicious activities and respond to security incidents.
(d) Block unauthorized access attempts and monitor compliance with the IT policies.

- (xiii) Wardite Global Corporation (WGC) operates across five continents. Each regional office maintains its own risk records in separate databases, resulting in fragmented risk information. Consequently, head office management is unable to obtain a consolidated view of enterprise-wide risks.

Which of the following Information and Communication Technology (ICT) solutions would best address the issue faced by WGC?

- (a) Incident response systems (b) Real-time monitoring tools
(c) Centralized risk repositories (d) Automated reporting systems

- (xiv) Dolomite Cement Limited launched an investigation after an attacker impersonating its Chief Financial Officer contacted the finance department by phone and attempted to persuade a senior employee to disclose his network username and password, claiming that the credentials were urgently required to resolve a critical issue.

Which of the following cybersecurity threats is illustrated in the above scenario?

- | | |
|---------------------|------------------------|
| (a) Data breaches | (b) Ransomware attacks |
| (c) Insider threats | (d) Social engineering |

- (xv) Turquoise Hospital Limited (THL) requires system administrators to use dedicated administrative accounts when performing system administration tasks instead of their standard user accounts. All administrative activities are automatically logged and periodically reviewed by the IT security team. In addition, elevated access is granted only for approved maintenance tasks and is revoked immediately after the task has been completed.

Which of the following IT General Controls has been implemented by THL?

- | | |
|-------------------------|----------------------------------|
| (a) User authentication | (b) Privileged access management |
| (c) Incident management | (d) Role-based access controls |

QUESTION 2

- (a) Sapphire Laboratories Limited (SLL) is a pharmaceutical manufacturer engaged in the production and distribution of prescription medicines across Pakistan. As part of its digital transformation strategy, SLL has recently implemented an integrated information system to support its business activities and provide reliable data for management reporting and business analytics.

Following implementation of the system, SLL's management has identified the following issues:

- (i) Two medicine batches have been assigned expiry dates that were earlier than their corresponding production dates. The system accepted these entries without generating any warning.
- (ii) A warehouse supervisor was able to modify laboratory test results that should only have been updated by authorised quality assurance personnel.
- (iii) After an unexpected hardware failure, certain production records could not be recovered because the most recent backup copy of the database was not available.
- (iv) A production batch was created for a medicine, and several quality test results were recorded for the batch. However, due to certain unavoidable reasons, the production batch was subsequently cancelled and the corresponding batch record was deleted from the Batch Master File by an authorized user. It was later found that the quality test result records still referenced the deleted production batch.
- (v) Following a software update, medicine dosage information stored in the production database was overwritten with incorrect values. The IT department was unable to restore the previous version of the data.

Required:

For each of the above issues, identify the type of data integrity that has been compromised. Also recommend the most appropriate control that SLL should implement to maintain data integrity, giving a brief justification for each recommendation. **(08 marks)**

- (b) SLL receives the following data from its internal operations and external stakeholders:

- Production records and sales invoices generated by SLL's in-house information system.
- Electronic purchase orders received from distributors in JavaScript Object Notation (JSON) format.
- Customer complaint emails describing adverse drug reactions.

Management intends to integrate the above data into a centralized repository to support reporting and business analytics.

Required:

Classify each of the above data items into the appropriate data category according to its structure and briefly explain each identified category. **(04 marks)**

QUESTION 3

- (a) Explain the **two** types of data independence and the benefits of each to a business entity. **(06 marks)**
- (b) Artificial Intelligence and automation technologies have transformed the way organizations perform business processes by improving efficiency and enabling systems to perform tasks that traditionally required significant human effort and intelligence.

Required:

- (i) Explain any **three** features of Robotic Process Automation and discuss the potential benefits that each feature can provide to a large organization. **(05 marks)**
- (ii) Identify any **three** types of intelligent agents and briefly explain how each type operates. **(05 marks)**
- (c) Peridot Manufacturers (PM) recently implemented an Enterprise Resource Planning (ERP) system to integrate its business processes, improve inventory management, and enhance decision-making. Before approving further digital transformation initiatives, PM's management wants to evaluate the return on its Information and Communication Technology (ICT) investment in the ERP system.

Required:

Discuss the financial and non-financial factors that should be considered by PM as part of its evaluation. **(05 marks)**

SECTION B

QUESTION 4

Fuchsite Retail Limited (FRL) is a large retail chain in Pakistan that relies on a centralized Enterprise Resource Planning (ERP) system to manage procurement, inventory, sales, payroll, and supplier payments.

As part of its digital transformation strategy, FRL has recently introduced the following technologies:

- (I) FRL deployed Internet of Things (IoT) enabled smart shelves and warehouse sensors to automatically monitor inventory levels and transmit real-time stock information to the ERP system. To facilitate rapid deployment, many devices were installed using their default factory settings and connected to the same network as the ERP system. The installed devices continuously collect, transmit and store sensitive inventory data without encryption to support inventory replenishment decisions.
- (II) FRL implemented an AI-powered procurement system trained with historical procurement data to recommend purchase quantities for inventory items. The system generates purchase recommendations without explaining the underlying rationale and procurement managers generally approve the recommendations without formal review because doing so reduces time required to make purchasing decisions.

Required:

- (a) Identify and briefly explain any **three** potential IoT risks arising from the introduction of technology in (I) above. Also recommend an appropriate mitigation strategy for each identified risk. **(06 marks)**
- (b) Identify and briefly explain any **three** potential AI-related risks arising from the introduction of technology in (II) above. Also recommend an appropriate mitigation strategy for each identified risk. **(06 marks)**

FRL is considering to outsource some of its IT functions to a third-party service provider. Before entering into the outsourcing arrangement, management wants to understand the associated risks and appropriate mitigation strategies.

Required:

- (c) Identify any **four** risks associated with outsourcing IT functions to a third-party service provider. Recommend an appropriate mitigation strategy for each identified risk. **(05 marks)**

QUESTION 5

- (a) For the purpose of reviewing database normalization, three database tables, namely Table 1, Table 2, and Table 3, have been obtained from three independent companies. Each table is accompanied by additional information and reviewer comments that identify the normalization issues.

Table 1	Customer ID	Customer Name	Product	Gender	Contact
	C001	Ali Khan	Brown rice, Oil	Male	02582563113
	C002	Sarah Bilal	Oil, Shampoo	Female	01118565449
	C003	Ahsan Zia	Wheat flour, Soap	Male	06589811234
	Additional information: Customer ID is the primary key. Reviewer comments: The Product column requires normalization.				

Table 2	Sale ID	Product ID	Product Name	Unit Price	Sale Date
	S101	P001	White Rice	250	10-Jul-2026
	S101	P002	Brown Sugar	180	10-Jul-2026
	S102	P001	White Rice	250	11-Jul-2026
	Additional information: Sale ID and Product ID together form the composite primary key. Reviewer comments: Product Name and Unit Price depend only on Product ID.				

Table 3	Supplier ID	Supplier Name	Supplier Address	Supplier City	E-mail
	S001	Fresh Farms	The Mall Road	Lahore	ff@sup.com
	S002	Organic Foods	Tariq Road	Karachi	of@sup.com
	S003	Healthy Valley	Margalla Road	Islamabad	hv@sup.com
	Additional information: Supplier ID is the primary key. Reviewer comments: Supplier City depends on Supplier Address.				

After the normalization issues have been addressed, the data will undergo an Extract, Transform, and Load (ETL) process before being integrated into the respective company's centralized data warehouse.

Required:

- (i) Evaluate each table independently and explain how it should be modified to achieve the next applicable normal form (First Normal Form, Second Normal Form, Third Normal Form), as appropriate. **(06 marks)**
- (ii) Explain each stage of the ETL process and highlight the importance of ETL in data integration. **(04 marks)**
- (b) Feldspar Supermarkets (FS) is implementing a Big Data analytics initiative to strengthen its position as a leading supermarket chain. The initiative is intended to help FS better understand customer preferences and sales trends. As part of this initiative, FS needs to identify appropriate methods for collecting large volumes of data to support analytical and strategic decision-making.

Required:

Briefly explain **four** methods of Big Data collection that FS could adopt.

(04 marks)

QUESTION 6

- (a) Sodalite Management (SM) sells tickets for concerts and sporting events through its online ticketing platform. As online ticket sales are SM's primary source of revenue, maintaining a responsive and reliable platform during periods of peak demand is critical to its operations. Demand increases significantly when tickets for popular events are released, with thousands of customers attempting to access the platform simultaneously. During these periods, users experience slow response times and occasional transaction failures.

SM currently hosts its ticketing application, database, and payment processing services on a single high-specification server. To improve performance, SM has repeatedly upgraded the server's processing power, memory, and storage capacity. The server is now approaching its maximum hardware capacity.

During the recent launch of ticket sales for a high-profile event, a hardware failure caused the platform to become unavailable for several hours, preventing customers from purchasing tickets. As a result, SM received a significant number of customer complaints and incurred substantial revenue losses.

Required:

- (i) Identify and explain the scaling approach currently adopted by SM. Also discuss **two** advantages and **two** limitations of SM's scaling approach. **(05 marks)**
 - (ii) Recommend the most appropriate scaling approach for SM and explain any **three** advantages of the recommended approach. **(04 marks)**
- (b) The following organizations are seeking to select the most appropriate cloud service model for their business requirements:
- (i) Jet Systems Limited (JSL) develops custom web and mobile applications for a large number of clients. JSL wants its IT team to focus on writing and testing application codes rather than managing servers, operating systems, databases, or networking infrastructure.
 - (ii) Opal Research Institute (ORI) conducts scientific research involving large-scale data analysis. Researchers require specialised scientific software and operating systems for their research applications. As computing requirements fluctuate throughout the year, ORI wants computing resources that can be provisioned quickly and charged based on actual usage.
 - (iii) Zircon Coffee (ZC) operates several branches located in Karachi. ZC's management wants employees to access email, payroll, accounting, and inventory software from any branch using an internet connection. ZC does not want to install, maintain, or update these applications on individual computers at each branch.

Required:

Identify the most appropriate cloud service model for each of the above organizations and explain how the identified models work. Also discuss any **two** key features of each identified model.

(06 marks)**QUESTION 7**

Ulexite Logistics Limited (ULL) provides transportation, warehousing, and distribution services to manufacturers and retailers across Pakistan. ULL uses a Logistics Management System (LMS) to support its business operations.

To improve operational efficiency and support business growth, ULL's management recently assessed the adequacy of the company's Information and Communication Technology (ICT) processes and controls supporting LMS and identified the following issues:

- (i) Customers frequently contact the customer service department to inquire about the location of their shipments because the online shipment tracking portal linked to LMS is often not updated with the latest delivery status.
- (ii) To complete data entry more quickly at the end of each shift, warehouse employees frequently share their user IDs and passwords with colleagues when updating LMS.
- (iii) Following the implementation of LMS, employees at different branches perform similar tasks using different procedures, resulting in inconsistent operational records.
- (iv) LMS has not been formally evaluated since its implementation to determine whether it continues to meet ULL's changing operational requirements.
- (v) Branch managers continue to maintain separate records outside LMS because they consider the information generated by the system to be incomplete or unreliable.
- (vi) Several routine shipment processing activities require employees to repeatedly enter the same information into different screens within LMS, increasing processing time and the likelihood of errors.

Required:

With reference to the issues mentioned above, identify and explain any **three** improvements that ULL should implement to strengthen its ICT processes and controls supporting LMS. Clearly relate each improvement to the relevant issue(s).

(06 marks)**(THE END)**