ASSOCIATESHIP EXAMINATION

TECHNOLOGY AND DATA ANALYTICS IN FINANCIAL SERVICES

LEVEL III

APRIL 2025

(NEW SYLLABUS)

NB

1. Read carefully the instructions on the cover of the answer booklet.

2. Answer the questions as follows:

   SECTION A – MULTIPLE CHOICE QUESTIONS: Answer All Questions.
   (20 MARKS)

   SECTION B – ESSAY QUESTIONS: Answer Two Questions (40 MARKS)

   SECTION C - CASE/SCENARIO BASED QUESTIONS: Answer Two Questions
   (40 MARKS)

3. **Time allowed: THREE HOURS. An additional 15 minutes of reading time is allowed** at the beginning of the examination during which time candidates may write on this paper but not in the answer booklet.

4. Candidates must ensure that they answer the questions in the appropriate answer booklets and not on loose sheets which may be used only as supplementary sheets. Such answers will be cancelled.

5. Silent non-programmable electronic calculators may be used in this examination. Whether or not candidates use them, it is in their interest to show the basic figures from which their calculations are made.

6. DO NOT WRITE YOUR NAME ON THE ANSWER BOOKLET.

7. DO NOT OPEN THIS PAPER UNTIL YOU ARE INSTRUCTED TO DO SO.

SECTION A – MULTIPLE CHOICE QUESTIONS

ANSWER ALL QUESTIONS. EACH QUESTION CARRIES 1 MARK. TOTAL: 20 MARKS

1. Which of the following is not an objective of "Technology and Data Analytics in Financial Services"?
    A. To provide a detailed understanding of the evolving technology landscape in the Financial Services industry and the implications it has on the sector
    B. It aims to examine how the Fourth Industrial Revolution, with its significant advancements in technology, has transformed not just the Banking sector
    C. It aims to examine how the Fourth Industrial Revolution, with its significant advancements in technology, has failed to transform not just the Banking sector, but every industry across the globe
    D. It aims to examine how the Fourth Industrial Revolution, with its significant advancements in technology, is significantly influencing customer expectations and service delivery methods

2. Which category of persons is the course "Technology and Data Analytics in Financial Services" **not** designed for?
    A. Banking professionals
    B. Information Technology specialists in Banking
    C. Students of Financial Technology
    D. Anyone with an interest in Cybercrime implementation.

3. Which decade started the emergence of the Internet which enabled financial institutions to extend their services into the digital space?
    A. 1970s
    B. 1980s
    C. 1990s
    D. 2000s

4. Which of the following statements is **not** true about Connectivity in Banking?
    A. Allow customers access to their social media partners
    B. Customers access accounts and perform transactions anywhere and at anytime

C. Access to Online Banking platforms, Mobile Apps, and ATMs 24/7

D. Enable customers to check balances, transfer funds, pay bills

5. Robots equipped with Advanced Sensors and Machine Learning capabilities can perform repetitive and complex tasks with precision and speed. Which of the following statements is **not** true about robots?

A. They can assemble products

B. They handle materials and even operate alongside humans

C. They decrease production capacity

D. The automation reduces human errors

6. Which of the following is **not** a component of a well-structured Information Technology Function?

A. IT Leadership and Governance

B. Operating System Development and Maintenance

C. IT Operations and Infrastructure

D. Data Management and Analytics

7. Which of the following digital transformation is expressed by 'contactless cards, mobile wallets, and peer-to-peer payment apps which have revolutionized the way transactions are conducted in Banking'?

A. Mobile Banking

B. Online Banking

C. Digital Payments

D. Blockchain Technology

8. Which of the following is not a requirement for Data Repositories in Banking?

A. Scalability

B. Securicor

C. Performance

D. Disaster Recovery and Backup

9. Which of the following best explains strategic alignment?

    A. They should enable the bank to achieve its transformation objectives, whether it's improving customer experience, enhancing operational efficiency, or driving innovation

    B. They are readily adopted by the employees, which is crucial for the success of the transformation initiative

    C. They should be able to handle increasing volumes of data and users as the bank grows and evolves

    D. They should support the bank's mission, vision, and strategic objectives, and contribute to the desired future state of the organization

10. Ghanafo Bank PLC (Ghanafo) engaged Gambaga Consultancy Services PLC (GCS) on its high loan default rate. Based on analytics of data provided by Ghanafo, GCS advised Ghanafo that the best course of action is to adjust interest rates, change the terms of loans or increase outreach efforts to at-risk customers. In your opinion, what is the most likely Data Analytics technique employed by GCS?

    A. Descriptive Analytics

    B. Diagnostic Analytics

    C. Predictive Analytics

    D. Prescriptive Analytics

11. Which of the following Data Visualization techniques can a bank use to track the changes in interest rates over time?

    A. Bar Charts

    B. Histogram

    C. Line Graph

    D. Scatter Plots

12. There are various data types. Which of the following best describes Secondary Data?

    A. Numerical data that can be measured and analyzed using statistical methods

    B. Existing data collected by others, such as published research, datasets, and online resources

C. Non-numerical data that provides insights into people's attitudes, opinions, and behaviours

D. Original data collected directly from sources, such as surveys, interviews, and experiments

13. Which of the following is a commonly used Data Visualization tool in Banking?

A. MS Paint

B. Google Earth

C. Spreadsheet

D. Snapchat

14. How are Social Media and Digital Platforms revolutionizing customer interaction in Banking?

A. They are reducing the need for customer interaction.

B. They are enabling real-time interaction and personalization.

C. They are making customer interaction more impersonal.

D. They are not having a significant impact on customer interaction.

15. Robotic Process Automation (RPA) involves the use of software robots or 'bots' to automate routine, rule-based tasks. In Banking, RPA cannot be used to do one of the following. Which **one** cannot be used in Banking?

A. Account Closing

B. Account Opening

C. Loan Processing

D. Compliance Reporting

16. To mitigate risks, which of the following robust Data Protection measures could be implemented by banks?

A. Encryption

B. Two-Factor Authentication

C. Intrusion Detection Systems

D. All the above

17. Data Ethics encompasses moral obligations of which of the following activities?

    A. Gathering

    B. Protecting

    C. Using

    D. All the above

18. The primary objective of Security Controls in Banking Information Systems is to ensure the Confidentiality, Integrity, and Availability (CIA) of ………………………………

    A. Data

    B. Information

    C. People

    D. Information Technology Infrastructure

19. Security Controls to maintain confidentiality include which of the following?

    A. Redundant systems

    B. Failover procedures

    C. Regular maintenance

    D. None of the above

20. Which of the following is a Market Force?

    A. Competition

    B. Customer Expectations

    C. Regulatory Changes

    D. All the above

SECTION B – ESSAY QUESTIONS
ANSWER TWO QUESTIONS

QUESTION 1

The deployment of Data Analytics involves a series of steps and considerations to ensure that the insights derived from the analytics process are effectively used to drive Decision-Making and Strategy.

Faced with high loan default rate, Guyana Bank PLC has engaged you as a Consultant, to perform Data Analytics on the company's data to give them insights which they hope to use to drive their Decision-Making Strategy.

Required:

List and discuss six (6) steps involved in deploying a Data Analytics solution for Guyana Bank to address the high loan default rate. The steps must follow a logical order of how you will go about the assignment from beginning to end. **(20 marks)**

QUESTION 2

The Board Chairman of your bank has sent a memo to the Managing Director (MD) calling for staff redundancy. Part of the memo reads "The Role of staff in an increasingly digitalized bank has faded. It is without doubt that machines have replaced man. As the bank moves towards digitization, the role of humans will continue to diminish. Automation and Artificial Intelligence have streamlined operations, and the human element remains a drain on banks. Currently, most bank transactions are performed by machines; cash deposit, withdrawal, transfer, customer service chatbots, process automation, personalized banking and credit appraisals are also done by machines." At the next Board Meeting, the MD is expected to present a proposal on staff rationalization. As Head of Banking Operations Department, the MD has referred the memo to you for your comments and advice.

Required:

    a. With respect to the role of Humans in an Increasingly Digitalized Banking environment, comment on the issues raised by the memo and advise. **(8 marks)**

    b. State and explain two (2) ways in which you think humans excel more than machines? **(4 marks)**

    c. State and explain two (2) ways in which machines would be preferred to humans? **(4 marks)**

    d. Under these circumstances justify which of the two you think should be preferred? **(4 marks)**

[Total: 20 marks]

QUESTION 3

Everywhere, in the banking halls, classrooms, market places, lorry parks, farm gates, and in all manner of places there is talk of Artificial Intelligence (AI). The good side of AI has been trumpeted so much that many who do not know think that AI is an 'angel'. However, some who think they know say AI is the 'devil's incarnate'. The Chartered Institute of Bankers' Graduates have invited you to give a talk on "The Potentials and Pitfalls of AI in Banking" at their Auditorium. About 500 persons from all walks of life will be seated to listen to you.

Required:

Prepare a paper to deliver on the topic "The Potentials and Pitfalls of AI in Banking". Your presentation must conclude with recommendations or criticism to guide banks in the adoption and utilization of AI in the Digital Transformation journey.   **(20 marks)**

QUESTION 4

Your senior brother, who is a little endowed academically, is worried that your bank is using Disruptive Technologies. He knows disruption is a disturbance or challenge which interrupts an event, activity or process. He is also aware that these Disruptive Technologies are not only transforming how banks operate but are also redefining their relationship with customers to a disruptive end. Consequently, your brother is very worried because to him there can be nothing good about anything disruptive. He is disturbed you may lose your job as a result of the disruption.

Required:

    a. Explain distinctively to your brother what Disruptive Technologies are in Banking.

(8 marks)

    b. Identify and explain any three (3) Disruptive Technologies in Banking.   **(3 marks)**

    c. Demonstrate in detail to your brother the implications of the Disruptive Technologies identified in (b) above.   **(9 marks)**

[Total: 20 marks]

SECTION C – CASE/SCENARIO BASED QUESTIONS
ANSWER TWO QUESTIONS

QUESTION 1

A laptop containing sensitive bank data was stolen from a staff's residence. The laptop was the property of Odwe Rural Bank PLC (Odwe). The laptop contained unencrypted personal data, including names, dates of birth, telephone numbers, National Identification Card numbers, Social Security numbers and account numbers. The Data Protection Manager (DPM) had taken the laptop home without authorization, to complete an assignment when the incident happened. The laptop was not encrypted, and the data was not password-protected. The theft occurred despite stringent policies prohibiting sensitive data removal from bank premises without authorization.

Somehow, the incident was never reported. It was revealed when the Central Bank (CB) came on inspection at Odwe. It was learnt that before the theft incident, the Head of Information Security had reported to Management that security controls were a subject of concern - the operating system, password system, and detection alerts at that time were reported as vulnerable to security breaches. When the laptop theft happened, some members in Management kept it quiet because they responded poorly and delayed the incident report. Odwe has faced various security weaknesses and challenges over the years, impacting the protection of sensitive bank data and operations. In terms of Management, there is decentralized management of IT Services Infrastructure. The Chief Information Officer (CIO) reported that there were "cultural impediments" preventing him from establishing a centralized IT Management. There was a lack of authority alignment and cooperation between the CIO and the Chief Information Security Officer (CISO), leading to challenges in effective decision-making and uniformed leadership.

Management Factors that contributed to the mishap were a lack of clear policies and procedures, unclear guidelines on data encryption, laptop usage, and remote work. There was inadequate oversight due to insufficient monitoring of employee compliance with security policies. Poor risk management also led to failure to identify and mitigate potential risks. Ineffective training rendered employees inadequately trained on data security and handling. Lack of accountability gave way to the non-compliance exhibited.

At the organizational level, there was a decentralized structure leading to lack of centralized control and coordination. Inadequate communication gave rise to insufficient information sharing among departments. Bureaucratic structures hindered swift decision-making and there

was insufficient funding for IT Security and training. Employees were not properly vetted or supervised.

Technologically, outdated encryption methods resulted in lack of robust encryption on laptops and data. Inadequate access controls were the result of weak passwords and lack of multi-factor authentication, unsecured data storage, sensitive data stored on unencrypted devices and insufficient network security were the reason why there were vulnerabilities in Odwe's Network and Data Transmission. Finally, there were inadequate tools and processes for detecting and responding to security threats and incidents.

Required:

    a. Identify four (4) measures that could have been undertaken by Odwe to prevent the laptop theft? **(4 marks)**

    b. Describe four (4) security weaknesses at Odwe. **(4 marks)**

    c. What six (6) Management, Organization and Technology factors contributed to the weaknesses at Odwe? **(6 marks)**

    d. Propose six (6) solutions to the security problem at Odwe? **(6 marks)**

[Total: 20 marks]

QUESTION 2

Customer satisfaction is good, but customer loyalty is even better. A satisfied customer is the one who sees you as meeting expectations. A loyal customer, on the other hand, wants to do business with you again and will recommend you to others. Customer Relationship Management (CRM) packages may help measure satisfaction, but not all of them can be used to benchmark loyalty, and the link is tenuous. A good Loyalty Program combines customer feedback and business information with sophisticated analytics to produce actionable results.

This is why Information Technology (IT) has to take the lead in loyalty. IT is just about the only department that can coordinate between Business Processes, External Data-Analytic Vendors and the Executives who can translate output into action. Ten years ago, Kofi PLC started work with Ama Inc. to gather customer experience data. Initially, these were phone surveys with cycle times of two months that were used to generate reports. As a beta customer,

Kofi replaced the phone surveys with SmartLoyalty service, which includes an e-mail solicitation that directs willing customers to a website.

So, in 1999, Stanley offloaded the analytics to Teradata, the NCR Corp. database designed for large data sets and parallel architectures. ''And the performance improvement was stunning,'' he says. Harrah's now does near-real-time analysis: As customers interact with slot machines, check into casinos, or buy meals, they receive reward offers based on the predictive analyses. The data revealed other trends as well.

When CDW began using SmartLoyalty, Samuels already had a rich source of market research reports. ''The problem was that all this information was on thousands of sheets of paper, and there was no way to get it quickly to the right decision-makers,'' he explains.

That's where IT closes the loop. Aberdeen's Watkins puts it this way: "With good customer loyalty technology, IT can wire the voice of the customer back into the enterprise."

Required:

a. Identify and explain the two (2) types of Information System used in the passage.

(4 marks)

b. Quote a sentence that references each of the Information Systems Types.   **(4 marks)**

c. What Data Analytic Technique is used in the passage?   **(4 marks)**

d. Examine the role Data Analytics play in the passage?   **(8 marks)**

[Total: 20 marks]

QUESTION 3

Casanova PLC has a business strategy. The strategy is part of a larger companywide Management System that focuses on operational excellence. The program requires all Casanova Branches and Departments to adopt a continuous improvement perspective, directed by guidelines, metrics, and targets that are reviewed and adapted yearly. Apart from process efficiency, Casanova focuses on metrics related to safety, risk, and the environment. All staff participate in operational excellence activities, and Managers receive specific operational excellence training to support the continuous improvement effort.

Casanova was to reengineer its end-to-end core processes, from the acquisition of raw materials through manufacturing and distribution of final products to Casanova customers. To accomplish this task, Casanova collaborated with a consulting company to create a model of

the existing processes. The objective was to radically improve the existing processes to reflect Casanova's business goals. In other words, Casanova's strategy was not to analyze the existing processes to identify specific areas to improve. Rather, the project identified the desired outputs and then examined the supporting processes, utilizing Business Process Reengineering (BPR). As an added benefit, this holistic approach led the company to examine the interdependencies between processes executed in different Departments. Adopting this holistic perspective ultimately improved the company's overall performance. In the 2020 Annual Report, Casanova claimed that the BPR project saved the company GHS 3billion.

Abongo Boys PLC (ABs) started business in the year 1990 from a single room in a rented boys quarters. ABs vision was to provide "best product with lowest rates". AB has lived up to that promise. Within 30 years, they have become the best in the country; smallest in terms of workforce, largest in terms of production capacity, productivity and packaging with excellent customer service. Customers say they are very satisfied with AB. AB has become a well-known enterprise with over 300 fleet of cars.

AB manufactures 10,000 tons of cement a day and has the capacity to deliver 3,000 tons each day in Ghana and 5,000 tons to neighboring countries; other transporters deliver the remaining 2,000 tons. AB has been able to maintain leadership in production quality and excellent customer services delivery, by investing heavily in Strategic Information System (SIS), despite stiff competition from Cement Co-ops and Ghancem. AB spends more than GHS200,000 each year to maintain its Strategic Information System infrastructure and high level of customer service while keeping costs low and streamlining its overall operations.

Required:

    a. What are Strategic Information Systems (SIS)? **(3 marks)**

    b. Without restricting yourself to the passage, identify any four (4) Strategic Business Objectives you know. **(4 marks)**

    c. Explain the strategic business objectives of Casanova and Abongo Boys? **(4 marks)**

    d. Examine the two (2) business models each of Casanova and Abongo Boys?

        (4 marks)

    e. i) What is Business Process Reengineering (BPR)? **(1 mark)**

        ii) Propose four (4) benefits of BPR to improve Casanova's overall performance?
        (4 marks)
        [Total: 20 marks]