



PAST PAPERS

Faculty	Department / Section/Division
Not Applicable	Learning Resource Centre

Past Papers

Faculty of Engineering and Technology
Department of Information Technology

**BSc (Hons) in software Engineering
(Year 1 – Semester I)**

**Semester End Examination
2021-2022**

Document Control & Approving Authority	Senior Director – Quality Management & Administration		
1 st Issue Date: 2017.011.30	Revision No.00	Revision Date: 18/01/2022	Validated by: Librarian

CINEC Campus
Faculty of Engineering and Technology
Department of Information Technology
BSc (Hons) in Software Engineering
IT_UGC_001/IT_IFLS_001



Year 1 Semester I

SEMESTER END EXAMINATION

Principles of Management & Economics Practice - GS1101

- There are EIGHT (08) questions in this paper.
- This paper contains six (06) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.04.23

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

Answer all multiple-choice questions below. There may be more than one correct answer.

- 1) Managers may perform specific behavior or actions depending on person and situation called the role.
 - (i) Mintzberg identified 3 roles : Inter-personnel, informational and decisional
 - (ii) Decisional role relates to lower Management
 - (iii) Decisional role relates to Top Management
 - (iv) Interpersonal role is better for a spokesman

(02 Marks)

- 2) Management is :
 - (i) An art of controlling people
 - (ii) Is a process of planning, organizing, leading and controlling
 - (iii) Is a process of organizing, planning, controlling and leading
 - (iv) Is an activity of moving up the employment hierarchy

(02 Marks)

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- 3) Select the correct statements about Organizational environment
- (i) Both customers and Government are part of the Micro environment
 - (ii) Political and technological environments are considered as macro factors
 - (iii) Goals and leadership are external environment factors
 - (iv) Micro environment is also called the Task environment
- (03 Marks)
- 4) Briefly discuss habits of highly reliable organizations in decision making
- (i) Are not tricked by their success.
 - (ii) Lose decision-making objectivity by focusing on the most recent events.
 - (iii) Creates unfounded meaning out of random events.
 - (iv) Defer to the experts on the front line.
- (02 Marks)
- 5) Identify correct statement (s) about functions in a Business:
- (i) A business can survive with finance and R&D in the long run
 - (ii) A stable business can have only the HR, Marketing, sales and Finance
 - (iii) R &D is not a compulsory function for the business continuation
 - (iv) Marketing and sales are totally separate activities in a modern business
- (02 Marks)
- 6) Choose What is right about Efficiency and effectiveness
- (i) Effectiveness focus on resource usage
 - (ii) Effectiveness is about high achievement of goals
 - (iii) Wastage of resources is a sign of low efficiency
 - (iv) Management should aim for high efficiency and low effectiveness
- (02 Marks)
- 7) Strong understanding of External Factors is compulsory for a manager. Select incorrect statements (s)
- (i) External factors can also be grouped as General, Industry and Competitor
 - (ii) Macro External factors are also same as General factors
 - (iii) General factors are further described by PESTEL
 - (iv) Both Macro and Micro environments are regrouped as General, Industry and Competitor
- (02 Marks)

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- 8) Which statement is correct for nominal GDP?
- i. Nominal GDP is calculated based on current prices.
 - ii. Nominal GDP is calculated based on the base prices.
 - iii. Data on Nominal GDP shows an accurate picture of the economy as compared to real GDP.

- (i) Only ii, iii
- (ii) only ii
- (iii) only i
- (iv) i, iii

(03 Marks)

- 9) Real GDP is a measure of a country's...

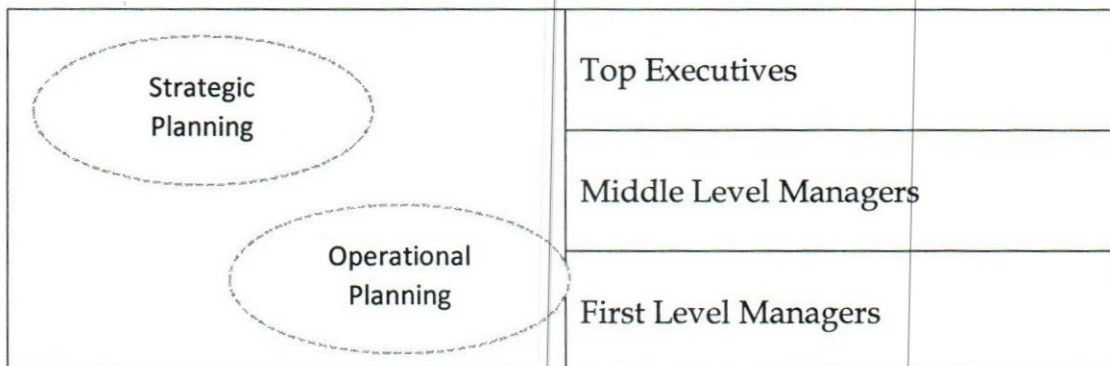
- (i) Wealth.
- (ii) Money.
- (iii) Economic transactions.
- (iv) Physical output.

(02 Marks)

Question 02

(20 Marks)

- a) Identify the most vital element supportive for Decision making and describe its main characteristics (04 Marks)
- b) Level of planning involved within the management hierarchy of an organization varies according to planning type.



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- (i) Draw the best shape to represent involvement of Operational Planning from First-Level to top-Executives. (04 Marks)
- (ii) Write a brief description on the level of involvement of both Strategic and Operational planning between the 3 levels of Management. Identify an example for each. (12 Marks)

Question 03

(20 Marks)

Top management of a business organization must consider larger market share and growth rate when developing business strategy. Cash cows and Stars are the preferred corporate profiles anticipated by Managers. Yet a business can end-up with profiles different from above based on anticipated growth rate and Market share.

- (i) Draw a suitable Matrix to show all possibilities considering anticipated growth rate and Market share. (05 Marks)
- (ii) Describe each of the profiles identified in the matrix with an example from Sri Lanka or global business organisations. (12 Marks)
- (iii) Identify three (03) types of corporate strategies (03 Marks)

Question 04

(20 Marks)

- a) Identify and describe main functions of Human Resource Management. (06 Marks)
- b) Briefly describe two (02) of the primary environmental factors affecting Human Resource Management in Sri Lanka with examples (04 Marks)
- c) Briefly discuss three (03) selection devices of your choice ranking them as per their importance. Mention why they are important as well. (06 Marks)
- d) Explain the importance of De-recruitment and Exit interviews (04 Marks)

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Question 05**(20 Marks)**

A research shows that only 38% of people like to leave their comfort zone. When these people are presented with a change, they think that it is exiting. Those positive interpretations of change result in positive emotional reactions, such as happiness and satisfaction, which result in greater employee productivity.

The other 62%, however, look at that same exact statement and immediately feel fear and discomfort. They may think, "Oh great, this change will have an effect on my career growth." or "I will not do what I like doing any more." or "Will they keep me in?"

Provide a critical discussion identify types of changes, forces of changes and the Calm waters metaphor.

Question 06**(20 Marks)**

- a) When scarce resources are used, actors are forced to make choices that have an opportunity cost.
- (i) Describe the term 'Scarcity' and importance of Trade-offs. (05 Marks)
- (ii) In business, cost of a product or service may include the loss of opportunity. Describe this concept in economic terms. (04 Marks)
- b) A country's economic system is made up of institutions and decision-making structures that determine economic activity
- (i) Identify major economic systems operating in the world (04 Marks)
- (ii) Identify and discuss the most basic economic system from above highlighting it's advantages (07 Marks)

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Question 07**(20 Marks)**

Primary goal of central banks is to provide their countries' currencies with price stability by controlling inflation. A central bank also acts as the regulatory authority of a country's monetary policy and is the sole provider and printer of notes and coins in circulation. Time has proved that the central bank can best function in these capacities by remaining independent from government fiscal policy and therefore uninfluenced by the political concerns of any regime. A central bank should also be completely divested of any commercial banking interests.

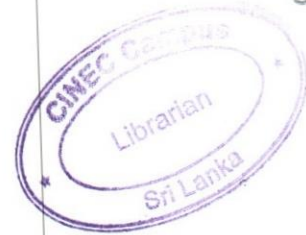
Write a brief essay of maximum 300 words on the Central Bank of Sri Lanka highlighting its key roles, functions and importance.

Question 08**(20 Marks)**

- a) Differentiate Micro and Macro Economics with examples (10 Marks)
- b) Economics two theories which are struggling to meet with an Equilibrium
- (i) Identify the economic term that describe the inability to supply goods at the currently demanded price and limited availability of resources. (03 Marks)
- (ii) Which economic term describes limited availability of resources? Describe its economy law in one sentence (03 Marks)
- (iii) Describe law of Demand briefly. (04 Marks)

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Principles of Management & Economics Practice - GS1101

- There are EIGHT (08) questions in this paper.
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Date: 2021.12.17

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

Answer all multiple-choice questions below. There may be more than one correct answer.

- 1) Businesses have common functional areas and resources. Which of following are incorrect statement?
 - (i) Marketing is compulsory function for any Business
 - (ii) Human Resource is the most valuable for most organizations
 - (iii) Finance, Marketing, Warehouse and Sales are key functions
 - (iv) Design and development of services is not part of Production function

(02 Marks)
- 2) Core Concepts of Management is a notion or an idea, and in this context it refers to the key terms used to define and understand what management is. Incorrect statements are:
 - (i) Efficiency means doing the right thing
 - (ii) Effectiveness means the ability to determine appropriate objectives
 - (iii) Effectiveness means doing the right thing
 - (iv) Efficiency refers to Getting the most output from the least amount of inputs

(02 Marks)

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- 3) Select the incorrect statements functions of Management
- (i) Choosing appropriate organizational goals and courses of action to best achieve those goals is called planning
 - (ii) Controlling refers to establishing task and authority relationships that allow people to work together to achieve organisation's goals
 - (iii) Motivation, coordination and energizing HR to work together and achieve goals is the leadership
 - (iv) Establishing accurate measuring and monitoring systems is not a part of controlling function.
- (02 Marks)
- 4) Traditional Management level pyramid is still applicable for modern organisations. Correct statements are:
- (i) Middle managers operate on top of first line managers
 - (ii) Supervisor, shift managers and department managers are middle level management.
 - (iii) Executive vice president is a top level manager.
 - (iv) Top level management are responsible for planning effecting the entire organisation.
- (02 Marks)
- 5) Identify incorrect statement (s) about functions in a Business:
- (i) A business can survive with finance and R&D in the long run
 - (ii) A stable business can have only the Marketing and Finance
 - (iii) R &D is a compulsory function for the business continuation
 - (iv) Marketing and sales are inter-related activities in a modern business
- (02 Marks)
- 6) Choose What is not right about Efficiency and effectiveness
- (i) Efficiency focus on goal achievement
 - (ii) Effectiveness focus on resource usage
 - (iii) Effectiveness is about low achievement of goals
 - (iv) Wastage of resources is a sign of low efficiency
 - (v) Management should aim for high efficiency and low effectiveness
- (02 Marks)

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7) Strong understanding of External Factors is compulsory for a manager. Select correct statements (s)

- (i) Macro External factors are also same as General factors
- (ii) External factors can also be grouped as General, Industry and Competitor
- (iii) General factors are further described by PESTEL
- (iv) Both Macro and Micro environments are regrouped as General, Industry and Competitor
- (v) Industry environment is an external factor group

(02 Marks)

8) Inflation refers to Increase in average **Price Level** of all goods and services. Which statements are incorrect?

- i. Inflation causes decline in Purchasing power of the Currency.
- ii. Demand-pull and Cost-push are 2 types of Inflation.
- iii. Inflation does not leave any winners.
- iv. Savers will become losers during inflation.

- (i) Only ii, iii
- (ii) only ii
- (iii) only iii
- (iv) iii and iv

(02 Marks)

9) Central Bank is a vital component of the Economy and Monetary system of the Country. Select the correct statement (s)

- (i) Reserve requirement and Interest rate on Bank reserves is the key factor effecting savings and loans.
- (ii) Open Market operations is tool of the Private Sector Businesses to control the economy.
- (iii) Full employment is not a part of Fiscal Policy
- (iv) Price Stability is a part of Fiscal Policy
- (v) Debt and Deficit both refers to Government dues

(02 Marks)

10) GDP is the primary tool to measure Economic Growth of a Country. Select correct statement(s)

- (i) Considers value of all items produced by the people of the Country.
- (ii) It considers only the new items produced within the current year

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- (iii) Intermediate goods are also considered in the calculation.
- (iv) Nominal GDP uses current prices to determine market value
- (v) China recorded the highest GDP growth in the first quarter of 2021
(02 Marks)

Question 02**(20 Marks)**

- (a) Describe the difference between External and Internal Environment of a Business Organisation in detail.
(10 Marks)
- (b) A careful analysis of organizational environment is necessary to diagnose SWOT (Strengths, Weaknesses, Opportunities and Threats). Select a popular Business organisation in Sri Lanka known to you and provide a brief SWOT analysis.
(10 Marks)

Question 03**(20 Marks)**

Decision making involves Identifying a problem and decision criteria and allocating weights to the criteria, Developing, analyzing, and selecting an alternative that can resolve the problem and Implementing the selected alternative.

- (i) Think of a regular and common problem or recent issue that happened in your surrounding. List and brief the 8 steps of Decision making using the event you identified as an example.
(16 Marks)
- (ii) List 2 types of Decision making conditions
(04 Marks)

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Question 04**(20 Marks)**

- a) List and describe 3 types of Goals (06 Marks)
- b) Write a short note not exceeding 300 words on types of Plans (04 Marks)
- c) Explain what MBO means and provide an example (04 Marks)
- d) Briefly explain how Strategic and Operational planning differs. Link them to levels of Management (06 Marks)

Question 05**(20 Marks)**

- a) Strategic Management involves Corporate and Growth strategies. Describe them in brief considering their main sub types (10 Marks)
- b) Briefly explain the role of Competitive advantage and its importance for a successful business. (05 Marks)
- c) List the competitive Forces (05 Marks)

Question 06**(20 Marks)**

- a) Write a summary of Assessment considerations for Human Resources in a business organisation. Job Description and Job Specification are just 2 of them (05 Marks)
- b) List and describe 3 factors effecting staffing of an organization (06 Marks)
- c) E-recruitment is a popular form of finding HR for modern organisations. Write a short note about its advantages and disadvantages. (04 Marks)
- d) List the stages of Team Development (05 Marks)

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Question 07**(20 Marks)**

- a) Briefly explain the law of Supply and Demand in Economics. Draw any diagrams if necessary. (06 Marks)
- b) Incentives are a main factor when people make decisions. Explain briefly with an example. (05 Marks)
- c) Explain the term 'market' in economic terms. (05 Marks)
- d) Mention 2 economic principles that effect interaction of people with markets (04 Marks)

Question 08**(20 Marks)**

- a) List the 2 types of economic systems (04 Marks)
- b) Briefly explain the difference between real world economies and the above 4 standard types (04 Marks)
- c) Briefly describe the term 'Scarcity' and list its 4 main factors (06 Marks)
- d) List and briefly describe 3 factors of Production (06 Marks)

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Computer Organization & Architecture - IT1102

- There are EIGHT (08) questions in this paper.
- This paper contains three (03) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
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Date: 2021.12.20

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

With an example, explain Distributive law

Question 02

(20 Marks)

(a) What is a Flag Register and explain the use of it? (10 Marks)

(b) How is Assembly Language different from a Machine Language? (10 Marks)

Question 03

(20 Marks)

(a) How is Commutative Law different from Association Law? Explain with an example (10 Marks)

(b) Explain how the Accumulator Register is different from the program counter? (10 Marks)

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Question 04

(20 Marks)

(a) Explain the Fetch, Decode, Execute operation with diagrams

(10 Marks)

(b) Briefly discuss Harvard Architecture

(10 Marks)

Question 05

(20 Marks)

(a) How are Synchronous Circuits different from Asynchronous Circuits? Explain with an example

(10 Marks)

(b) How is Shift Register different from Storage Register? Explain in detail

(10 Marks)

Question 06

(20 Marks)

(a) Is Duty Cycle the same as the Pulse Width? If different, explain with diagrams

(10 Marks)

(b) Compare and contrast differences between JK and T Flip Flops

(10 Marks)

Question 07

(20 Marks)

(a) Explain the operation of "K-Map" with an example

(10 Marks)

(b) "A Computer performs complex decompression and displays billions of outputs". Explain the statement in detail

(10 Marks)

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Question 08

(20 Marks)

- (a) "ACC. MAR, MDR and IR" are some registers operating in a computer. Explain the given registers in detail. (10 Marks)
- (b) Explain System Buses in detail (10 Marks)

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Computer Organization & Architecture - IT1102

- There are EIGHT (08) questions in this paper.
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- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
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Date: 2021.04.22

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

Explain every status of a "flag" in a register with a diagram

Question 02

(20 Marks)

- (a) Explain the difference between "Assembly Language" and "High Level Language". (10 Marks)
- (b) "A Computer performs complex decompression and displays billions of outputs". Explain the statement in detail (10 Marks)



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Question 03 **(20 Marks)**

- (a) "ACC. MAR, MDR and IR" are some registers operating in a computer. Explain the given registers in detail (10 Marks)
- (b) Explain System Buses in detail (10 Marks)

Question 04 **(20 Marks)**

- (a) Explain "Von- Neumann" and "Harvard" Computer Architectures. (10 Marks)
- (b) Explain "Persistent Memory" in detail (10 Marks)

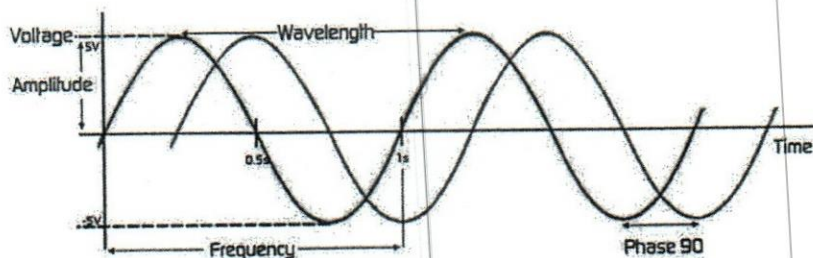
Question 05 **(20 Marks)**

- (a) Explain "SISO, SIPO, PISO, and PIPO" in details (10 Marks)
- (b) How is "Sine Wave Oscillator" different from "Square Wave Oscillator" (10 Marks)

Question 06 **(20 Marks)**

- (a) "Synchronous" and " Asynchronous" are two different circuits. Explain both circuits in detail (10 Marks)
- (b) Explain the diagram along with "Voltage, Amplitude, Frequency, Wavelength, Phase and Time" (10 Marks)

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Question 07

(20 Marks)

- (a) Compare "Duty Cycle, Frequency, and Pulse Width"
- (b) Explain the "types of Counters" and how it operates.

(10 Marks)

(10 Marks)

Question 08

(20 Marks)

- (a) How is "NAND Gate SR Flip Flop" different from "NOR Gate SR Flip Flop"
- (b) Explain the operation of "K-Map" with an example

(10 Marks)

(10 Marks)

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

General English - GS1103

- There are EIGHT (08) questions in this paper.
- This paper contains TWELVE (12) pages.
- Students should provide answers to all the questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.04.23

Time: 03 Hour

Question 01

Read the passage and answer the questions below. (15 Marks)

1. The average computer user has between 5 and 15 username/password combinations to log in to email accounts, social networking sites, discussion boards, news and entertainment sites, online stores, online banking accounts, or other websites. For people who use email or other internet applications at work, the number of required username/password combinations may surpass 30. Some of these accounts demand that you use a specific number of symbols and digits, while others require you to change your password every 60 days. When you add to this list the codes needed to access things like ATMs, home alarm systems, padlocks, or voicemail, the number of passwords become staggering. The feeling of frustration that results from maintaining a memorized list of login credentials has grown so prevalent that it actually has a name: password fatigue.



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2. Having to remember so many different passwords is irritating, but it can also be dangerous. Because it is virtually impossible to remember a unique password for each of these accounts, many people leave handwritten lists of usernames and passwords on or next to their computers. Others solve this problem by using the same password for every account or using extremely simple passwords. While these practices make it easier to remember login information, they also make it exponentially easier for thieves to hack into accounts.
3. Single sign-on (SSO) authentication and password management software can help mitigate this problem, but there are drawbacks to both approaches. SSO authentication can be used for related, but independent software systems. With SSO, users log in once to access a variety of different applications. Users only need to remember one password to log in to the main system; the SSO software then automatically logs the user in to other accounts within the system. SSO software is typically used by large companies, schools, or libraries.
4. Password management software, such as KeePass and Password Safe, is most often used on personal computers. These software programs—which have been built into many major web browsers—store passwords in a remote database and automatically “remember” users’ passwords for a variety of sites. The problem with both SSO authentication and password management software is that the feature that makes them useful is also what makes them vulnerable. If a user loses or forgets the password required to log in to SSO software, the user will then lose access to all of the applications linked to the SSO account. Furthermore, if a hacker can crack the SSO password, he or she will then

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have access to all of the linked accounts. Users who rely on password management software are susceptible to the same problems, but they also incur the added threat of passwords being compromised because of computer theft. Although most websites or network systems allow users to recover or change lost passwords by providing email addresses or answering a prompt, this process can waste time and cause further frustration. What is more, recovering a forgotten password is only a temporary solution; it does not address the larger problem of password fatigue.

5. Some computer scientists have suggested that instead of passwords, computers rely on biometrics. This is a method of recognizing human users based on unique traits, such as fingerprints, voice, or DNA. Biometric identification is currently used by some government agencies and private companies, including the Department of Defense and Disney World. While biometrics would certainly eliminate the need for people to remember passwords, the use of biometrics raises ethical questions concerning privacy and can also be expensive to implement. The problems associated with SSO, password management software, and biometrics continue to stimulate software engineers and computer security experts to search for the cure to password fatigue. Until they find the perfect solution, however, everyone will simply have to rely on the flawed password system currently in place.



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1. According to the passage, what is meant by "password fatigue"? (2 Marks)

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2. Why having to remember so many different passwords can be dangerous. (2 Marks)

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3. What are the two approaches suggested in the passage to mitigate the above problem? (1 Marks)

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.....

4. Write two drawbacks of SSO authentication. (2 Marks)

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.....
.....

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5. Write the main idea of the 4th paragraph? (2 Marks)

.....
.....
.....

6. According to the passage, is allowing to recover or change a lost password a great solution? Give reasons for your answer. (2 Marks)

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7. What is meant by biometrics? (1 Marks)

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8. Write one advantage and a disadvantage of using biometrics. (1 Marks)

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9. Suggest a suitable title for this passage. (2 Marks)

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.....
.....



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Question 02

Rewrite these sentences in passive voice.

(15 Marks)

1. The company is calling me for the interview.

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2. The villagers considered Sarath a good social worker.

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3. My grandfather will sell the land.

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4. The government imposed curfew since last Friday.

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5. Everyone in the room speaks three languages.

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6. The teacher asked all the students to bring their workbooks.

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.....

7. Mala has ordered a beautiful necklace from eBay.

.....
.....

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8. Children must write grammatically correct sentences.

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9. The government took steps to eradicate Dengue.

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10. The accountant requested a detailed summary of sales yesterday.

.....

11. I will never forget this experience.

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12. The tiger was chasing the deer.

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13. She has written a novel.

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14. I did not beat him.

.....
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15. He always bullies someone.

.....
.....



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Question 03

Fill in the blanks with the correct form of the verb given in brackets.

(15 Marks)

A conversation between two concerned parents:

Ann: (1) you(read) about the accident involving two teenagers last night?

Bob: Yes, I (2) (hear) the sports car they (3) (drive) crashed into a lamp post. Both of them (4) (die) on the spot. It (5) (be) such a tragedy. They (6) (be) so young.

Ann: Yes, it (7)..... (be) I think government (8) (raise) the age of driving in near future.

Bob: (9)..... you (think) that would help?

Ann: Definitely. If the age limit was raised to 21, I (10) (feel) there would be fewer accidents. This is because young adults at that age (11) (be) generally more mature and responsible. As a result, they are sensible enough to show off their sporty cars by driving recklessly at breakneck speeds. Furthermore, I (12) (not think) they would (13) (take) unnecessary risks. Hopefully, they would value their and the lives of the others as well.

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Bob: I guess you are right.

Ann: I always (14) (tell) my son not to drive recklessly. I know he
(15) (not like) to listen to this, but I continue to do so.

Bob: I think that's the right thing to do. Thank you for the advice.

Question 04

Complete the sentences with the correct form of the adjectives given.

(10 Marks)

eg- My brother is taller than me. (tall)

My brother is the tallest in his class. (tall)

1. Sashi used to cry her sister when she was a baby. (loud)
2. This is one of mobile phones. (robust)
3. Climbing mountains does not seem as bungee jumping. (exciting)
4. This dress is in the shop. (beautiful)
5. I wanted phone in the shop. (new)
6. The book is the movie. (exciting)
7. My car is yours. (modern)
8. My dog is hers. (young)
9. This year is the last year. (terrible)
10. She was girl in the room. (silly)



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Question 05

Fill in each blank with the prepositions given in the list. You may use a preposition more than once if needed. (10 Marks)

(in, after, since, on, at, until, before, until, from, by, to, during)

1. I am meeting my friend three the afternoon.
2. This project should be completed next May.
3. My father is still the seventieth century. He doesn't allow me to go out six the evening.
4. Our prize-giving will be held 19th February 2.00 p.m.
5. He will complete the report the long weekend June.
6. My father was born the fifth of February 1935.
7. I will wait you finish all your work.
8. The lecture will be 8.00 10.00
9. He has been studying four the morning.
10. We light Vesak lanterns Vesak day.

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Question 06

Mahesh and Vimesh are at college. They are looking for their friend Leela. Fill in the blanks using the phrases given below. (5 Marks)

Well, here comes...
She may be practicing.
It's a nice day.
I thought...
She might be having...

Mahesh: I can't find Leela. Have you seen her?

Vimesh: She might be in the music room. (1).....

Mahesh: No, she isn't there. (2)..... she might be with you.

Vimesh: (3).....She may be on the lawn or

(4).....a coffee in the canteen.

Badma: No, I've looked there.

Vimesh: (5).....Raja. He might know.



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Question 07

Write an official letter on behalf of the students of your department/faculty to the Senior Consultant of your campus inviting him to be the Chief Guest of the Annual Talent Show of the faculty.

(15 Marks)

Your letter should include the following:

- State strongly why you want this person to be the Chief Guest.
- Give details of the function specially date, time and venue.
- Make a request on confirmation of the participation.

Question 08

Write an essay on any given topic below. Word count - (200-250)

(15 Marks)

- The Impact of Mass Media on Our Lives.
- The Impact of a Global Pandemic on Our Lives.
- The Role of Information and Technology in a Global Pandemic.

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Mathematics for Computing I - MA1101

- There are EIGHT (08) questions in this paper.
- This paper contains SIX (06) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.04.21

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

I. Let $U = \{\text{Positive integers}\}$, $A = \{1, 3, 5, 7, 9\}$ and $B = \{2, 4, 6, 8, 10\}$. State whether each of the following is TRUE or FALSE. (04 Marks)

- (a) $5 \in A$
- (b) $1 \in B$
- (c) $-2 \notin U$
- (d) $B \subseteq U$

II. Solve the equation.

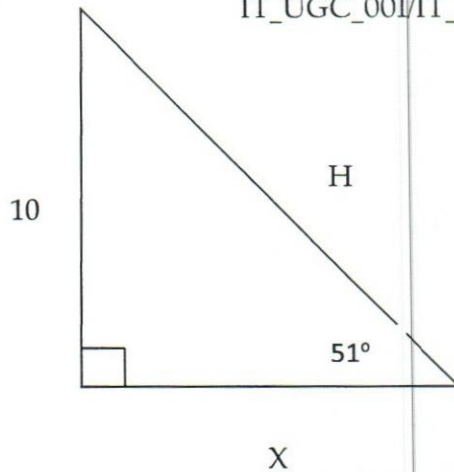
(04 Marks)

$$\frac{5}{2-x} + \frac{x-5}{x+2} + \frac{3x+8}{x^2-4} = 0$$

III. Ben opened his Math book and noticed that product of the two pages in front of him was equal to 1122. What were the numbers of those pages? (04 Marks)

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IV.



Find X and H in the right triangle.

(04 Marks)

- V. The general term of a sequence is given by $a_n = -4n + 15$. What is the sequence? (Prove it). Find its 15th term and the common difference. (04 Marks)

Question 02

(20 Marks)

Isuri starts saving money by depositing Rs. 5 in her till the first day. After that, every day, she deposits Rs. 2 more than the amount she deposited in the till on the previous day.

- I. Write, in terms of n , an expression for S_n , the total amount of money in the till at the end of the n^{th} day, and thereby find the amount of money she deposits in the till on the 26th day. (04 Marks)
- II. Write, in terms of n , an expression for S_n , the total amount of money in the till at end of the n^{th} day and by simplifying it, show that $S_n = n(n + 4)$.

(05 Marks)

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- III. In order that the amount of money in the till at the end of the 30th day is Rs.1100, Isuri deposits, from the 27th day, x rupees more than the amount deposited on the previous day.

Show that the amount of money in the till at end of the 26th day is Rs. 780.

(06 Marks)

- IV. Write down an equation in x and find the value of x by solving it.

(05 Marks)

Question 03

(20 Marks)

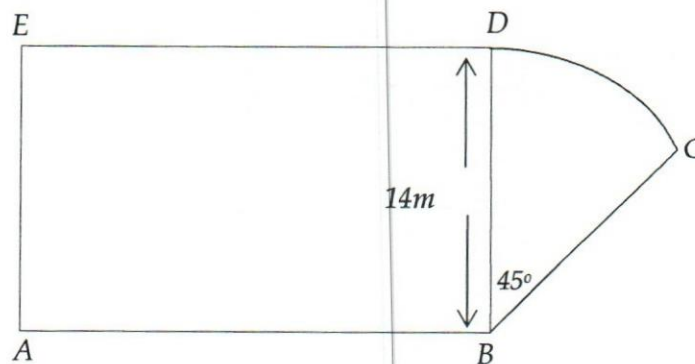
The given figure is a sketch of a garden consisting of a rectangular Part ABDE and a part BCD in the shape of a sector of a circle with angle at the corner 45° .

Here $BD = 14$ m.

Use $\frac{22}{7}$ for the value π in the following calculations.

- I. Find the area of part BCD.

(05 Marks)



The area of the part ABDE is four times the area of the part BCD.

- II. Find the length of AB.

(03 Marks)

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III. Find the length of the arc DC. (06 Marks)

IV. Find the perimeter of the garden. (06 Marks)

Question 04 (20 Marks)

I. The prices of the entrance tickets to an art exhibition are given below.

For an adult - 225 rupees

For a child - 150 rupees

A group consisting of adults and children has decided to attend this exhibition together. The number of children in this group is five more than twice the number of adults. The total cost of the entrance tickets for this group is 6525 rupees.

a. Construct a pair of simultaneous equation by taking the number of adults in this group as x and the number of children as y . (04 Marks)

b. Solve the pair of simultaneous equations and find separately, the number of adults and the number of children in the group. (06 Marks)

II. Solve the inequality $225p + 3750 \leq 5500$ and find the maximum integral value that p can take. (10 Marks)

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Question 05
(20 Marks)

If $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -5 \\ 2 & 1 \end{bmatrix}$

Find the following.

- I. $A+B$
- II. $2A+3B$
- III. AB
- IV. Determinant of $A-B$
- V. B^{-1}

(04 Marks)

(04 Marks)

(04 Marks)

(04 Marks)

(04 Marks)

Question 06
(20 Marks)

- I. The function f is defined by

$$f = \begin{cases} 1 - x, & x < 0 \\ 1, & x = 0 \\ x + 1, & x > 0 \end{cases}$$

Draw a graph of $f(x)$

(10 Marks)

- II. Find the domain and the range of the real function.

(05 Marks)

$$f(x) = \frac{x}{1+x^2}$$

- III. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real function. Find $(f + g)(x)$ and $(f \cdot g)(x)$.

(05 Marks)

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Question 07**(20 Marks)**

Prove the following

- I. $\cos^4 A - \sin^4 A + 1 = 2 \cos^2 A$ (04 Marks)
- II. $\sqrt{\frac{1-\sin A}{1+\sin A}} = \sec A - \tan A$ (04 Marks)
- III. $\frac{\operatorname{cosec} A}{\cot A + \tan A} = \cos A$ (04 Marks)
- IV. $\frac{1-\tan A}{1+\tan A} = \frac{\cot A-1}{\cot A+1}$ (04 Marks)
- V. $\frac{1+\tan^2 A}{1+\cot^2 A} = \frac{\sin^2 A}{\cos^2 A}$ (04 Marks)

Question 08**(20 Marks)**

- I. The third and Fifth terms of a geometric series are 5.4 and 1.944 respectively and all the terms in the series are positive.
- (a) Find the common ratio (03 Marks)
- (b) Find the first term (03 Marks)
- II. The first three terms of an arithmetic progression are $2x$, $x+4$ and $2x-7$ respectively. Find the value of x . (06 Marks)
- III. In an arithmetic progression the sum of the first ten terms is 400 and the sum of next ten terms is 1000. Find the common difference and the first term. (08 Marks)

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Professional Practice - GS1102

- There are EIGHT (08) questions in this paper.
- This paper contains three (03) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.12.15

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

- (a) Write four (04) ways using to communicate with each other. (04 Marks)
- (b) List down four (04) visual aids that could be used in an oral presentation. (04 Marks)
- (c) Discuss three (03) barriers to effective listening. (06 Marks)
- (d) Briefly explain two (02) reasons that make it necessary for managers to communicate with their juniors in an organization. (06 Marks)

Question 02

(20 Marks)

- (a) Why do we use PowerPoint presentations? Mention four (04) reasons. (04 Marks)
- (b) List down four (04) things which you should not do during an oral presentation. (04 Marks)
- (c) Briefly explain four (04) important factors which presenter need to consider when preparing for a presentation. (12 Marks)

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Question 03**(20 Marks)**

- (a) List four (04) behaviors/ characteristics expected from a computing/IT professional. (04 Marks)
- (b) Briefly explain the role of a professional body. (04 Marks)
- (c) Briefly explain four (04) sections of BCS code of conduct. (12 Marks)

Question 04**(20 Marks)**

- (a) What is CPD? Explain briefly. (08 Marks)
- (b) Why do you think it is important to manage your time as an undergraduate student? Discuss at least four (04) reasons. (12 Marks)

Question 05**(20 Marks)**

- (a) List six (06) characteristics of an effective group. (06 Marks)
- (b) Briefly explain the two types of groups (formal groups and informal groups) with suitable examples. (06 Marks)
- (c) Briefly explain any four (04) stages of group development. (08 Marks)

Question 06**(20 Marks)**

- (a) Write the two (02) forms of academic misconduct? (02 Marks)
- (b) Briefly explain the term "plagiarism" with examples. (08 Marks)
- (c) Why is it important to maintain professional etiquette to develop leadership and improve quality of service provided by an organization? (10 Marks)

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Question 07

(20 Marks)

(a) What is cross-cultural communication? Why is it important? (10 Marks)

(b) Briefly explain five (05) ways to improve cross-cultural communication.

(10 Marks)

Question 08

Write short notes on below topics

(05 Marks * 4)

(a) Non-verbal communication

(b) Copywrite

(c) Low-context Culture

(d) Cubical etiquette

-----END OF THE QUESTION PAPER-----

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Year I Semester I
SEMESTER END EXAMINATION
Professional Practice - GS1102

- There are EIGHT (08) questions in this paper.
- This paper contains three (03) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.04.19

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

- (a) Write four (04) different types of non-verbal communication methods. (04 Marks)
- (b) Discuss how communication is important for good relationship and effective management. (08 Marks)
- (c) Briefly explain the barriers to communication and how to overcome them in a successful way. (08 Marks)

Question 02

(20 Marks)

- (a) What is a "report"? (02 Marks)
- (b) Briefly explain the basic structure of a formal report. (08 Marks)
- (c) Draft a notice with an agenda for a meeting of sports club at your university to discuss on upcoming sports festival. (10 Marks)

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Question 03

(20 Marks)

- (a) List four (04) common characteristics of a profession. (04 Marks)
- (b) Briefly explain the four (04) sections of BCS codes of conduct. (08 Marks)
- (c) Discuss how collective bodies controlling entry into a profession. (08 Marks)

Question 04

(20 Marks)

- (a) What is "Time management"? (04 Marks)
- (b) List down six (06) important time management factors. (06 Marks)
- (c) Briefly explain how time management is important for an IT firm. (10 Marks)

Question 05

(20 Marks)

- (a) List five (05) advantages of group work. (05 Marks)
- (b) Briefly explain Tuckman's stages (05 stages) of group development. (15 Marks)

Question 06

(20 Marks)

- (a) What do you mean by a multi-cultural environment? (04 Marks)
- (b) Write two (02) differences between low-context and high-context cultures. (04 Marks)

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- (c) List four (04) importance of effective multi-cultural communication. (04 Marks)
- (d) Briefly explain four (04) factors caused for cross cultural conflictions at workplace. (08 Marks)

Question 07 (20 Marks)

- (a) List five (05) Etiquette rules in a business meeting. (05 Marks)
- (b) Briefly explain five (05) positive impressions that you need to cultivate on you as a professional. (15 Marks)

Question 08 (20 Marks)

Write short notes on below topics

(05 Marks * 4)

- (a) Secondary research
- (b) Plagiarism
- (c) Professional Etiquette
- (d) Para verbal communication

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Introduction to Computer Programming - IT1101

- There are EIGHT (08) questions in this paper.
- This paper contains SEVEN (07) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.12.22

Time: 03 Hour

Question 01 (Compulsory)

(20 Marks)

"A function is a group of statements that together perform a task."

- (a) Briefly describe the difference between 'Pass by value' and 'Pass by reference'.
(06 Marks)
- (b) What is the difference between a 'Global variable' and a 'Local variable'?
(06 Marks)
- (c) Briefly describe four (04) main parts in a function.
(08 Marks)

Question 02

(20 Marks)

Write the algorithm for the given scenario using

- (a) Descriptive analysis (10 Marks)
- (b) Pseudocode (10 Marks)

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“A student wants to create a system to convert the temperature to the Celsius value when the user inputs the temperature in Fahrenheit. The formula is: Celsius = $(5.0/9) * (\text{Fahrenheit} - 32)$ ”

Question 03**(20 Marks)**

Write the code in C programming language to draw the given pattern.

(a) 00000
 11111
 22222
 33333
 44444

(10 Marks)

(b) *
 **

(10 Marks)**Question 04****(20 Marks)**

(a) What is the purpose of having software testing?

(04 Marks)

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- (b) Briefly describe 'White-box testing' and 'Black-box testing'. (06 Marks)
(c) Write a test plan for given scenario. (10 Marks)

"A simple calculator which allows entering two numbers with an operator." The program should ask you to enter a number first, and then enter the operator and finally the second number. According to the operator, it will calculate the value."

Question 05 (20 Marks)

- (a) Write four (04) main data types used in C programming language. (04 Marks)
(b) What is a storage location? Briefly explain. (06 Marks)
(c) Explain five (05) rules of making a variable. (10 Marks)

Question 06 (20 Marks)

- (a) Write the value when use following bitwise operators. (05 Marks)

A = 1101 1011

B = 0101 0101

1. $A \wedge B$
2. $B \ll 3$
3. $A \mid B$
4. $A \gg 2$
5. $B \& A$

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(b) Write the output if : a = 5, b = 10

(05 Marks)

1. ++a + ++b
2. b-- + ++a
3. ++b - ++b
4. a++ - b++
5. --b + --a

(c) Write the output if:

(10 Marks)

1. n=5
k = n++ + n++;
What is the final value of n and k?
2. x = 7;
y = --x + - -x;
What is the final value of x and y?
3. d = 10;
e = - -d + d++;
What is the final value of d and e?
4. s = 20
d = ++s + - -s
What is the final value of s and d?
5. t = 08
g = ++t - t--
What is the final value of t and g?

Question 07

(20 Marks)

Find the errors in the given code. Re-write the correct code and circle where you have corrected.

(20 Marks)

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```
include<stdio.h>

int main {
    int a,n,A[5],key,j,i,b,Temp

    for(a=0;a<5 a++){
        printf( Enter elements to the array");
        scanf("%d", A[a]);
    }
    for(j=1;j<=4;j++){
        key = A[j];
        i = j-1;

        while(i>=0 & A[i]<=key){
            A[i+1] = A[i];
            i=i-1;
        }
        A[i+1]=key;

    for(b=0;b<5;b++){
        printf("%d \n",A[b]);
    }
}
```

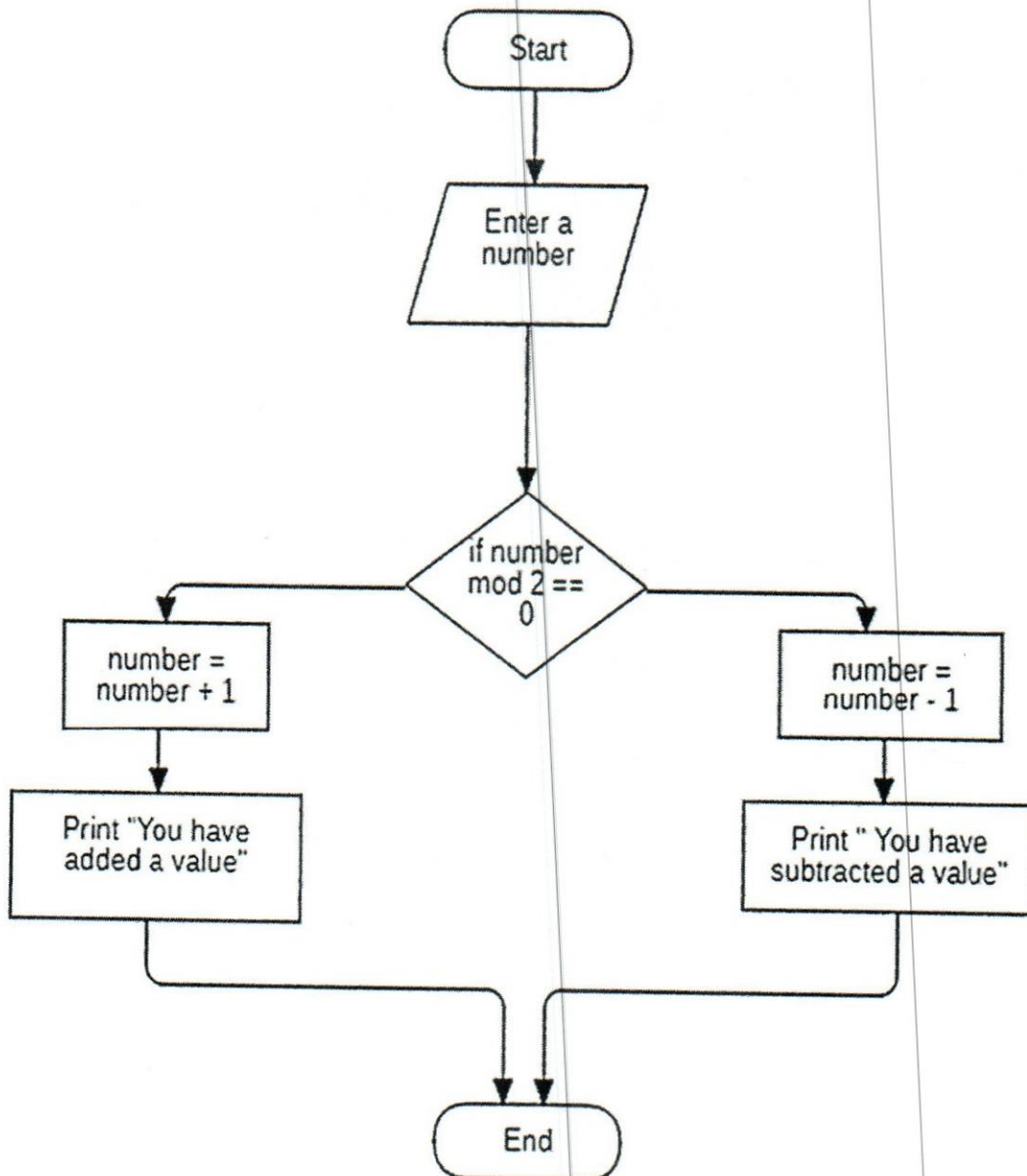

Question 08

(20 Marks)

Convert the following algorithms to the code in C programming language. Use keyboard inputs.

(a)

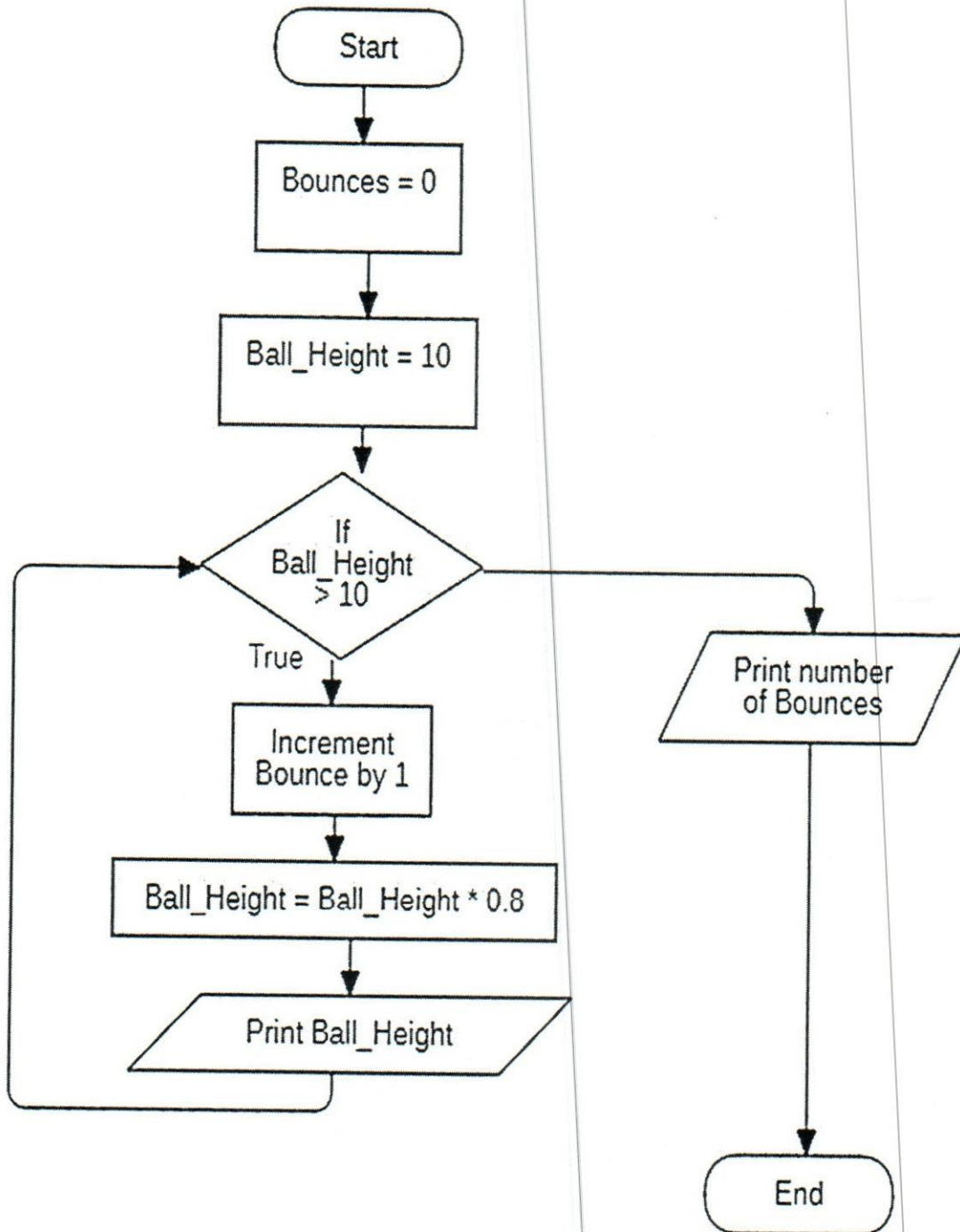
(10 Marks)



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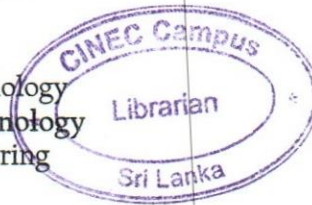
(b)

(10 Marks)



-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Introduction to Computer Programming - IT1101

- There are EIGHT (08) questions in this paper.
- This paper contains FIVE (05) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.04.20

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

Programming is the preparation of a sequence of instructions for a given problem that details exactly how a computer must proceed to solve a problem. A program is defined as a complete set of instructions. To write a program we can use a programming language

- (a) What is an algorithm? Briefly explain your answer. (03 Marks)
- (b) Write two (02) low-level programming languages. (02 Marks)
- (c) Which generations belong to high-level language? Briefly explain your answer with suitable examples. (15 Marks)



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Question 02**(20 Marks)**

(a) Write the algorithm for the given scenario using

1. Pseudocode (10 Marks)
2. Flow charts (10 Marks)

Create a calculator to enter two numbers (operands) and an operator from user and according to the operator do the calculation and get the answer. Then display the output (answer) on the screen.

Hint: If user input + as the operator, then output is the sum of two operands.

Question 03**(20 Marks)**

(a) Briefly explain, "What an array is".

(02 Marks)

(b) Briefly explain the following terms.

1. Continue statement
2. Break statement

(04 Marks)

(c) Briefly describe the difference between global variable and local variable.

(06 Marks)

(d) 1. What is the purpose of using functions?

(02 Marks)

2. What are the two (02) ways use for parameter passing?

(02 Marks)

3. List down the four (04) main parts include in a function.

(04 Marks)

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Question 04**(20 Marks)**

Write the code in C programming language to draw the given pattern.

(a) 54321
 5432
 543
 54
 5

(10 Marks)

(b) * * * *
 * * * *
 * * * *

(10 Marks)**Question 05****(20 Marks)**

(a) What is "Unary Minus"? Briefly describe the answer.

(05 Marks)

(b) Write the value when using following bitwise operators.

(05 Marks)

A = 0001 0011

B = 0101 1110

1. $A \wedge B$
2. $B \ll 2$
3. $A \mid B$
4. $A \& B$
5. $A \ll 3$



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(c) Write the output if : $a = 10$, $b = 20$

(10 Marks)

1. $a++ + b++$
2. $b-- + ++a$
3. $++b - ++b$
4. $a++ - a++$
5. $--b + --a$

Question 06

(20 Marks)

(a) What is 'software testing'? Briefly describe.

(02 Marks)

(b) Write the difference between 'validation' and 'verification'.

(04 Marks)

(c) Briefly describe 'White-box testing' and 'Black-box testing'.

(04 Marks)

(d) Devise a test plan with three (03) test cases for the given scenario. (10 Marks)

A simple program which will calculate the bill for customers who buy up to ten (10) different fruits, each costing between Rs.10.00 and Rs.100.00.

Question 07

(20 Marks)

(a) Write four (04) data types use in C programming language.

(04 Marks)

(b) Write six (06) reserved words in C programming language.

(06 Marks)

(c) Write five (05) rules for making a variable in C.

(10 Marks)

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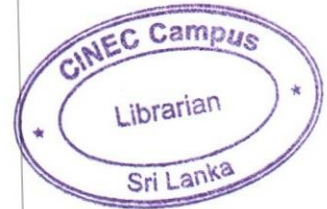
Question 08**(20 Marks)**

Find the errors in the given code. Re-write the correct code and circle where you have corrected.

```
#include <stdio.h>
int main {
    int year;
    printf("Enter a year: ");
    scanf("%d", year);
    // leap year if perfectly visible by 400
    if (year % 400 == 0) {
        printf("%d is a leap year.", year)
    }
    // not a leap year if visible by 100
    // but not divisible by 400
    else if (year % 100 == 0 {
        printf("%d is not a leap year." year);
    }
    // leap year if not divisible by 100
    // but divisible by 4
    else if (year % 4 == 0) {
        printf("d is a leap year.", year);
    }
    // all other years are not leap year
    else {
        printf("% is not a leap year.", year);
    }
    return 0;
}
```

-----END OF THE QUESTION PAPER-----

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Year I Semester I

SEMESTER END EXAMINATION

Mathematics for Computing I - MA1101

- There are EIGHT (08) questions in this paper.
- This paper contains SIX (06) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- Calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2021.12.13

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

a) Solve the following equations:

(04 Marks)

I. $\log_x(x^4 - 3x + 3) = 4$

II. $3^{(x^2-1)} = 27$

b) The transfer function, $G(s)$, of a system is given by

(08 Marks)

$$G(s) = \frac{\frac{1}{(2s+1)}}{\frac{7}{(s^2+5s+2)}}$$

Simplify $\frac{G(s)}{1+G(s)N(s)}$ where $N(s) = 10s$.

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c) Determine the partial fraction

(08 Marks)

$$\frac{125+4x-9x^2}{(x-1)(x+3)(x+4)}$$

Question 02

(20 Marks)

a) Use the binomial theorem to express $(1+x)^6$ as a sum of powers of x .

(04 Marks)

b) Use your result to obtain an approximation to $(11/10)^6$ which is correct to three decimal places.

(08 Marks)

c) Let $f(x) = \frac{x^3+3}{2-x^3}$ (provided $2-x^3 \neq 0$). Show that the inverse function, $f^{-1}(x)$, is given by

$$f^{-1}(x) = \left(\frac{2x-3}{1+x} \right)^{1/3}$$

(08 Marks)

Question 03

(20 Marks)

a) A factory gets permission to dispose, at the start of every day, 600 kg of waste into a stream of water. The running stream removes 40% of the any waste present, by the end of the day. Determine a simplified expression for the amount of waste present in the stream at the end of the n^{th} day.

(10 Marks)

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b) Evaluate the following expression

(10 Marks)

$$\sum_{n=0}^{\infty} \sum_{m=0}^{\infty} \left[\frac{1}{3^{m+n}} \right]$$

Question 04

(20 Marks)

- a) Find the sum of all positive integers, from 5 to 1555 inclusive, that are divisible by 5. (04 Marks)
- b) An arithmetic sequence has a its 5th term equal to 22 and its 15th term equal to 62. Find its 100th term. (06 Marks)
- c) Find the sum S defined by (10 Marks)

I. $S = \sum_{n=1}^{20} (0.2n) + \sum_{j=21}^{40} 0.4j$

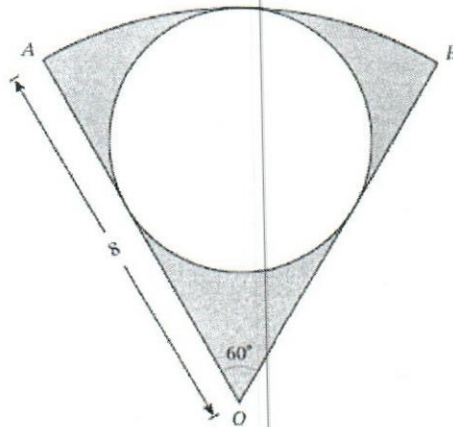
II. $S = \sum_{n=1}^{20} \left(3n - \frac{1}{2} \right)$

Question 05

(20 Marks)

A landscape gardener decides that he wants to design a lawn split into a series of sectors with circular patios laid into the grass, as shown in the given figure. The circular lawn will be split into six equal sectors, each with a radius of eight meters. The lines *A* and *OB* are both tangents to the circle, and the arc *AB* touches the circle at a single point.

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- I. Work out the area of sector B . Give your answer in terms of π .
(04 Marks)
- II. The gardener needs to calculate the radius of the circular patio. Using trigonometric ratios, calculate the radius of the patio. Give your answer as a fraction.
(10 Marks)
- III. Calculate the total area of grass in one sector. Give your answer, in terms of π , in its simplest form.
(06 Marks)

Question 06

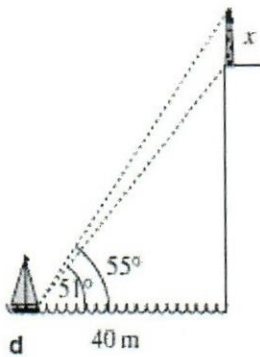
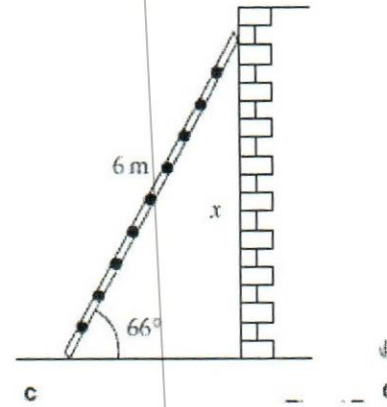
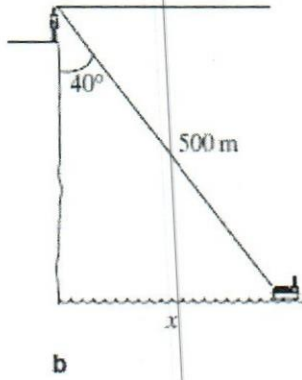
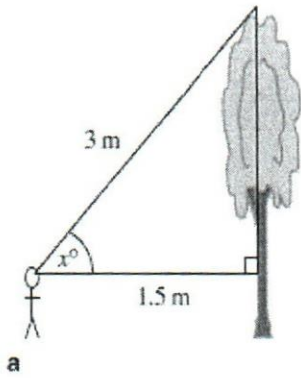
(20 Marks)

(a) Let $Y = 5 \sin\left(2t + \frac{\pi}{3}\right)$ Find;

- I. Period (02 Marks)
- II. Phase shift(horizontal) (02 Marks)
- III. vertical shift (02 Marks)
- IV. Sketch graph (08 Marks)

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(b) Determine the value of x in each of the following cases: (02X 4=08 Marks)



Question 07

(20 Marks)

a) For $A = \begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$, $B = \begin{pmatrix} 6 & -1 \\ 5 & 3 \end{pmatrix}$, $C = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$, evaluate the following:

- I. $A + B$ (02 Marks)
- II. BC (04 Marks)
- III. $3AC - 2BC$ (04 Marks)

b) If $A = \frac{1}{9} \begin{pmatrix} -8 & 1 & 4 \\ 4 & 4 & 7 \\ 1 & -8 & 4 \end{pmatrix}$, prove that $A^{-1} = A'$, A' being the transpose of A . (10 Marks)

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Question 08**(20 Marks)**

- (a) Use Cramer's rule to solve the system

(10 Marks)

$$X - 2Y + Z = 3$$

$$2X + Y - Z = 5$$

$$3X - Y + 2Z = 12$$

- (b) The mesh equations of a circuit are given by:

$$i_1 + 3i_2 + 2i_3 = 13$$

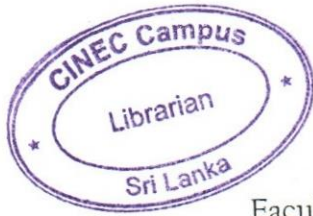
$$4i_1 + 4i_2 - 3i_3 = 3$$

$$5i_1 + i_2 + 2i_3 = 13$$

Using **row-echelon form** or **reduced row-echelon form** determine the values of i_1 , i_2 and i_3 .

(10 Marks)

-----END OF THE QUESTION PAPER-----



Library

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Year 1 Semester 2

SEMESTER END EXAMINATION

Database Management Systems - IT1203

- There are EIGHT (08) questions in this paper.
- This paper contains five (05) pages.
- Excluding the Compulsory question-answer any four (04) questions.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.

Date: 2022.01.06

Time: 03 Hour

Question 01: (Compulsory)

(20 Marks)

- (a) What is a DBMS? (02 Marks)
- (b) List two (02) examples of commercially available DBMS. (02 Marks)
- (c) Name any three (03) specific benefits of the database approach. (03 Marks)
- (d) What is data independence? (04 Marks)
- (e) Briefly explain the two types of data independence. (04 Marks)
- (f) Briefly explain the "integrity rules" (05 Marks)

Question 02

(20 Marks)

- (a) What is normalization? (04 Marks)
- (b) List two (02) purposes of schema normalization. (04 Marks)

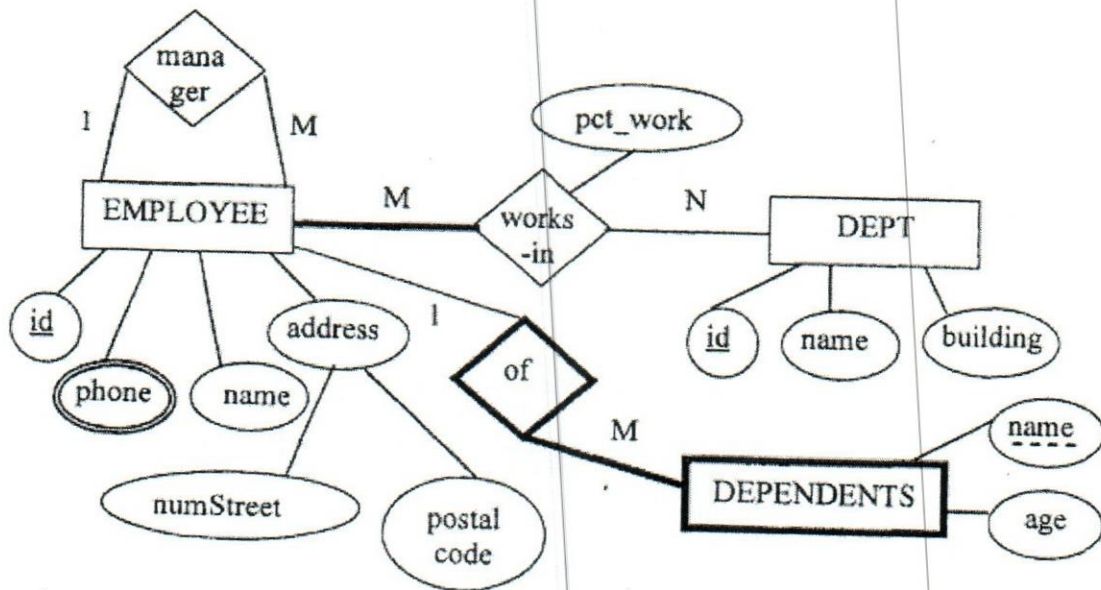
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- (c) Normal forms are used to eliminate or reduce redundancy in database tables.
Explain three (03) normal forms with an example. (12 Marks)

Question 03

(20 Marks)

Convert the following ER diagram to the relational model. You do not need to specify the domains of attributes. State any assumption/s you made.



Question 4

(20 Marks)

Draw the ER diagram to model the following real world situation. Show the entities, attributes, relationships, cardinalities, keys, weak entities etc. wherever applicable.

You are hired by the SMART-CARDS credit-card company to design a database. After conducting an analysis on the requirements, you come to the following conclusions:

The company has two types of card holders. A cardholder can be either a main cardholder or a dependent cardholder.

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- A main cardholder is allowed to have a maximum of 2 dependent cardholders.
- A dependent cardholder must be affiliated with (i.e., sponsored or supported by) one and only one main cardholder.
- A main cardholder has an account, while a dependent cardholder uses the account of the main cardholder that he/she affiliates with.
- An account has only one main cardholder.
- A main cardholder can have only one account with the Credit Card Company.
- Accounts have unique account IDs. Each account records the balance (i.e., unpaid expenses) of the account.
- For main cardholders, the database records their ID#, which is unique, names, addresses, and credit limits (i.e., the maximum amount of money they can charge to their credit cards).
- For dependent cardholders, the database records their names and credit limits.

Question 05
(20 Marks)

Consider the following instance of a relation R:

SalesmanID	OfficeNo	Name	RegNo	Make	Office address
S40	O11	B. Perera	GE 12345	Toyota	Colombo
S50	O34	M. Opatha	HK 22334	Nissan	Nawala
S40	O12	L. Siriena	AK 23431	Mitsubishi	Malabe
S93	O12	K. Silva	CD 55667	Ford	Malabe

The functional dependencies of R, not including trivial ones, are:
 SalesmanID, OfficeNo -> Name, RegNo, Make, Officeaddress
 OfficeNo -> Officeaddress
 RegNo -> Make

Decompose the relation into 3NF. For each step of the decomposition procedure, state what functional dependency it is based on, and give the relational schemas after the step has been carried out. State the relation instance in your 3NF schema corresponding to the above instance of R.

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Question 06
(20 Marks)

The questions given below are based on the following relational schema:

BOOK (ISBN, Author_ID, Author_Name, Title, No_Of_Copies)

STUDENT (Student_ID, Name, Address, Course)

LOAN (Student_ID, ISBN, Due_Date)

ISBN is a unique serial number for books.

- (a) Write an SQL statement to list ISBN, title and author of all the books sorted by ascending order of ISBN. (4 Marks)
- (b) For students who borrowed more than one book, write an SQL statement to list their student IDs and the number of books each of them borrowed, and give the alias of "total_books" for the number of books. (5 Marks)
- (c) One day, the librarian finds a mistake in the view that a copy of the book "Database Management Systems" was borrowed by students with Student_ID "M2081223" but actually it was borrowed by another student with Student_ID "M2081555". Write an SQL query to correct this mistake. (Assume that book titles are unique). (5 Marks)
- (d) Write an SQL statement to list the student IDs of students who have **all** of their borrowed books overdue. (In your SQL query, you can use Due-Date >"2-OCT-2020" to test if a book is overdue). (6 Marks)

Question 07
(20 Marks)

Consider the following schema and specify the queries in Relational Algebra.

Employee (eid, name, salary, address)

Works (eid, deptno)

Dept (deptno, dname, building, mgr)

- (a) Print all department names.

(1 Mark)

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- (b) Print the names of employees working at "Administration" department. (2 Marks)
- (c) Print names of employees working for "Academic" department whose salary is greater than Rs. 25000. (4 Marks)
- (d) Print the names of all managers and their department's name. (4 Marks)
- (e) Print the names of employees who are working at both "Academic" and the "Administration" departments. (4 Marks)
- (f) Print the names of employees who are working at "Engineering" or "Accounts" department. (5 Marks)

Question 8

(20 Marks)

Define each of the following database terms accurately and concisely. Give an example for each.

- (a) Weak entity
- (b) Schema
- (c) Candidate key
- (d) Multi-valued attribute
- (e) Partial key

-----END OF THE QUESTION PAPER-----