



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2019 – 1st Year Examination – Semester 2

IT2405: Systems Analysis and Design
Multiple Choice Question Paper

3rd November 2019

(TWO HOURS)

Important Instructions :

- The duration of the paper is 2 (two) hours.
- The medium of instruction and questions is English.
- The paper has **50 questions** and **13 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**
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- 1) Which of the following statements is/are correct regarding a Decision Support System (DSS)?
- (a) It either helps to identify decision-making opportunities or provides information to help make decisions.
 - (b) It uses the transaction data to produce information needed by managers to run the business.
 - (c) It enhances communication and collaboration between people, both internal and external to the organization.
 - (d) It captures and reproduces the knowledge of an expert problem solver.
 - (e) DSS may be used for example to project a company's revenue over the upcoming six months based on new assumptions about product sales.
- 2) Which of the following is are correct regarding non-functional requirements?
- (a) They define system attributes such as security, reliability, performance, maintainability.
 - (b) Security, scalability and usability are examples of non-functional requirements.
 - (c) They ensure the usability and effectiveness of the entire system.
 - (d) They are largely expressed in user stories and in features and capabilities.
 - (e) They can have a substantial impact on solution development and testing.
- 3) In addition to having formal systems analysis and design skills, a Systems Analyst must develop or possess other skills, knowledge and traits to complete the job. They include:
- (a) Working knowledge of Information Technologies
 - (b) General knowledge of business processes and terminology
 - (c) Good interpersonal communication skills
 - (d) Character and ethics
 - (e) System Programming experience and expertise
- 4) Which of the following is/are correct with respect to legacy systems?
- (a) Due to inadequate system documentation they are difficult to maintain.
 - (b) The legacy systems can be hard to maintain, improve, and expand because there is a general lack of understanding of the system.
 - (c) They are systems that are very expensive compared with other similar software.
 - (d) They can be obsolete software systems that rely on outdated programming languages.
 - (e) Integration with newer systems may be difficult with legacy systems because new software may use completely different technologies.
- 5) Which of the following is/are true regarding the waterfall approach to software development?
- (a) It groups development activities into a sequence of consecutive phases.
 - (b) It is a sequential process in which progress is seen as flowing steadily downwards like a waterfall through the phases of the software development life cycle.
 - (c) It encourages top-down problem solving.
 - (d) Physical design activities are not carried out in it.
 - (e) It is suited for projects where the requirements can be clearly defined.

- 6) Consider the following statements regarding the iterative development approach.
- It has lost flavour with most modern system developers.
 - User requirements are prioritized and the highest priority requirements are included in early increments.
 - Focuses on an initial, simplified implementation, which then progressively gains more complexity and a broader feature set until the final system is complete.

Which of the above statement(s) is/are correct regarding the Iterative system development approach?

- | | | |
|-------------------------|--------------------------|------------------------|
| (a) (i) only. | (b) (iii) only. | (c) (i) and (ii) only. |
| (d) (i) and (iii) only. | (e) (i), (ii) and (iii). | |

- 7) Which of the following is/are correct about stakeholders of an Information System?

- | |
|---|
| (a) Hotel receptionist is an example of a system user in a hotel reservation system. |
| (b) System Designer is a specialist who studies the problems and needs of an organization to determine how people, data processes and information technology can best accomplish improvements for the business. |
| (c) Unlike system owners, system users are less concerned with cost and benefits of the system. |
| (d) Systems Analyst is a technical specialist who constructs Information Systems and components based on the design specifications generated by the System Designers. |
| (e) Programmers construct the system according to the System Designers' specifications. |

- 8) Which of the following is/are tasks of the scope definition phase?

- | |
|--|
| (a) Identify problems and opportunities |
| (b) Develop schedule and budget |
| (c) Identify and express system requirements |
| (d) Assess project worthiness |
| (e) Negotiate scope |

- 9) Which of the following is/are true regarding a logical Data Flow Diagram (DFD)?

- | |
|---|
| (a) It identifies only the system inputs. |
| (b) It is a way of representing a flow of data of an information system. |
| (c) It has no control flow, no decision rules and no loops. |
| (d) A rounded rectangle is always drawn to represent a process in a DFD. |
| (e) Main functionalities can be determined by looking at a DFD of the system. |

- 10) Consider the following statements.

- If data flows are data in motion, think of data stores as data at rest.
- Several processes in a DFD might be executing or working simultaneously.
- Member and Book are possible data stores in library systems.

Which of the above statements is/are correct?

- | | | |
|-------------------------|-------------------------|------------------------|
| (a) (i) Only. | (b) (iii) Only. | (c) (i) and (ii) Only. |
| (d) (i) and (iii) Only. | (e) (i), (ii) and (iii) | |

- 11) Match the statements in Column X with the most appropriate statement from Column Y.

	Column X		Column Y
(i)	Functional requirement	A	is a requirement that specifies criteria that can be used to judge the operation of a system
(ii)	Non-functional requirement	B	is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements.
(iii)	System Design	C	is the process of studying a procedure or business in order to identify its goals and purposes.
(iv)	System Analysis	D	Illustrates data structures, business processes, data flows and user interfaces.
		E	define specific behavior or functions.

- (a) (i) - E, (ii) - A, (iii) - D, (iv) - B
 (b) (i) - D, (ii) - E, (iii) - B, (iv) - C
 (c) (i) - E, (ii) - A, (iii) - B, (iv) - C
 (d) (i) - C, (ii) - A, (iii) - E, (iv) - B
 (e) (i) - D, (ii) - A, (iii) - B, (iv) - D

- 12) Which of the following is/are correct regarding feasibility study and analysis?

- (a) It is used to determine the viability of an idea, such as ensuring a project is legally and technically feasible as well as economically justifiable.
 (b) Feasibility of a system should be measured during the systems analysis phase.
 (c) Economic feasibility is a measure of the practicality of a technical solution and the availability of technical resources and expertise.
 (d) Schedule feasibility is a measure of how reasonable the project timetable is.
 (e) It tells us whether a project is worth the investment.

- 13) Some questions related to data flow diagrams (DFDs) with possible answers are given below.

- (i) Q. Are there a standard set of symbols used for drawing DFDs?
 A. Yes.
 (ii) Q. How many symbols are used in DFDs?
 A. It depends on the methodology followed.
 (iii) Q. What is an external Entity?
 A. An external entity sends or receives data from the system and it can represent a person, a machine, an organization etc. external to the system being modeled.

Which of the above pairs is/are correct?

- (a) Only (i) (b) Only (iii) (c) Only (i) and (ii) (d) Only (i) and (iii) (e) (i), (ii) and (iii)

- 14) Match the non-functional requirements mentioned in Column X with the most appropriate definition from Column Y.

	Column X		Column Y	
(i)	Adaptability	A	Is part of the broader term “user experience” and refers to the ease of access and/or use of a product or website.	
(ii)	Efficiency	B	It is the property that the requirements should truly fulfill the purpose of the system.	
(iii)	Operability	C	It is the ability to keep a piece of equipment, a system or a whole industrial installation in a safe and reliable functioning condition, according to pre-defined operational requirements.	
(iv)	Usability	D	It is the ability to do things well, successfully, and without waste.	
(v)	Scalability	E	Is the property of a system to handle a growing amount of work by adding resources to the system.	
		F	An ability or willingness to change in order to suit different conditions: it is a necessary quality in an ever-changing work environment.	

- (a) (i) - D, (ii) - F, (iii) - B, (iv) - A, (v) - C
 (b) (i) - A, (ii) - B, (iii) - E, (iv) - C, (v) - F
 (c) (i) - D, (ii) - A, (iii) - B, (iv) - C, (v) - E
 (d) (i) - A, (ii) - D, (iii) - C, (iv) - B, (v) - E
 (e) (i) - F, (ii) - D, (iii) - C, (iv) - A, (v) - E

- 15) Some questions related to data flow diagrams (DFDs) with possible answers are given below.

(i) Q. What is an Elementary Process?

A. It is a process which cannot be decomposed further.

(ii) Q. What is the symbol used to represent a Process?

A. It is a rounded rectangle.

(iii) Q. Is it illegal to have a data store directly connected to an external entity in a DFD?

A. Yes. A Process is needed to update (or use) a data store.

Which of the above pairs is/are correct?

- (a) Only (i)
 (b) Only (i) and (ii)
 (c) Only (ii) and (iii)
 (d) Only (i) and (iii)
 (e) (i), (ii) and (iii)

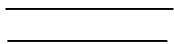
16) Which of the following is/are correct regarding modelling?

- (a) Models can be built for existing systems as a way to better understand them.
- (b) An external agent defines a person, an organization unit, another system , or another organization, that lies outside the scope of the project but that interacts with the system being studied.
- (c) Systems Analysts use physical system models to show business requirements and logical system models to show technical designs.
- (d) Physical model is a non-technical pictorial representation that shows what a system is or does.
- (e) Models can be built for proposed systems as a way to document business requirements.

17) Which of the following is/are considered as information gathering techniques?

- (a) Joint application development
- (b) Observations of the work environment
- (c) Object orient analysis
- (d) Interviews
- (e) Questionnaires

18) Consider the following Symbol used in a DFD.



Which of the following component in a DFD is represented by the above symbol in Gane and Sarson Methodology?

- | | | |
|-------------|-----------------------|---------------------|
| (a) Entity | (b) Data stores | (c) External Entity |
| (d) Process | (e) No such component | |

19) Given below are some statements associated with process modelling. Identify the correct statement(s) from among them.

- (a) Processes on a data flow diagram cannot operate in parallel.
- (b) Looping and branching can be shown in a data flow diagram.
- (c) Single data flow diagrams might include processes that happens hourly, daily, weekly, yearly, and on demand.
- (d) An external agent is a another business or information system that is separate from your system but with which the system must interface.
- (e) It is a technique used to organize and document systems processes.

20) Which of the following is/are true about Physical DFDs?

- (a) They show the work or actions that must be performed no matter how you implement the system.
- (b) They are initially used to describe business requirements.
- (c) Each logical process in logical DFD will be implemented as one or more physical processes in a Physical DFD that may include work performed by people.
- (d) They do not show how the system is technically implemented.
- (e) The potential users may find it difficult to understand.

21) Identify the possible Entities in a Hotel System from among the following.

- | | | |
|-----------------|-------------|----------|
| (a) Reservation | (b) Hotel | (c) Room |
| (d) Payment | (e) Cashier | |

22) Which of the following benefits are tangible benefits?

- | |
|---------------------------------|
| (a) Decrease response time |
| (b) Reduce expenses |
| (c) Improve employee morale |
| (d) Better service to community |
| (e) Improve customer goodwill |

23) Which of the following statements is/are correct regarding system design?

- | |
|---|
| (a) Systems Design focuses on the technical concerns of the system. |
| (b) Structured design seeks to factor a program into the top-down hierarchy of modules that have high cohesion and loose coupling. |
| (c) Physical Data Flow Diagram (DFD) is a process data model used to communicate the technical implementation characteristics of an information system. |
| (d) Object Oriented design encourages separation of concerns about data and processes. |
| (e) During prototyping the scope and complexity of the system can quickly expand beyond original plan, and can easily get out of control |

24) Structured design seeks to factor a program into the top-down hierarchy of modules which have the following properties/property:

- | |
|----------------------|
| (a) Loosely cohesive |
| (b) Highly cohesive |
| (c) Loosely coupled |
| (d) Tightly coupled |
| (e) Inherited |

25) Consider the following statements.

- (i) Import of data from or the export of data to another information system across a network
- (ii) Flow of data between two modules within the same program
- (iii) A database command

Which of the above data can be represented using a physical data flow?

- | |
|-------------------------|
| (a) Only (i) |
| (b) Only (ii) |
| (c) Only (i) and (ii) |
| (d) Only (ii) and (iii) |
| (e) (i), (ii) and (iii) |

26) Match column X with column Y.

Column X			Column Y
(i)	Structured English	A	encourages and requires active end-user participation.
(ii)	UML	B	is a process model used to document the scope for a system.
(iii)	Prototyping	C	partitions the system into logical subsystems and/or functions.
(iv)	Functional decomposition diagram	D	is widely accepted as a standard for object modeling.
(v)	Context data flow diagram	E	is a language and syntax based on the relative strength of structured programming and natural English, for specifying the underlying logic of elementary processes in process models.

- (a) (i) - D, (ii) - E, (iii) - B, (iv) - A, (v) - C
 (b) (i) - A, (ii) - B, (iii) - E, (iv) - C, (v) - D
 (c) (i) - D, (ii) - A, (iii) - B, (iv) - C, (v) - E
 (d) (i) - A, (ii) - D, (iii) - C, (iv) - B, (v) - E
 (e) (i) - E, (ii) - D, (iii) - A, (iv) - C, (v) - B

27) Consider the following relationships.

- i. Payment and Corporate Billing
- ii. Car and Truck
- iii. Book and Copy
- iv. Aircraft and Engine
- v. Doctor and Surgeon
- vi. Current Account and Privileged Account

Which of the above would form superclass-subclass pairs?

- (a) Only (i), (ii), (iv) and (vi)
 (b) Only (ii),(iii),(iv) and (v)
 (c) Only (i),(ii),(iii), (iv), (vi)
 (d) Only (i),(ii),(v)
 (e) Only (ii),(iii),(iv)

28) has the following characteristics:

- It is a binary association.
- It is a whole/part relationship.
- A part could be included in at most one whole at a time, and
- If a whole is deleted, all its parts are deleted with it.

- (a) Polymorphism (b) Inheritance (c) Aggregation
 (d) Composition (e) Association

29)

Consider the following statements in relation to Data modelling.

- (i) Data modeling is often the first step in database design and object-oriented programming as the designers first create a conceptual model of how data items relate to each other.
- (ii) There are three basic elements in ER-Diagrams (ERD):
 - Entities are the "things" for which we want to store information.
 - Attributes are the data we want to collect for an entity.
 - Relationships describe the relations between the entities.
- (iii) ERD is a type of structural diagram for use in database design.

Which of the following statement(s) is/are correct?

- | | | |
|--------------------------|--------------------------|-------------------------|
| (a) (i) only. | (b) (i) and (ii) only. | (c) (i) and (iii) only. |
| (d) (ii) and (iii) only. | (e) (i) , (ii) and (iii) | |

Consider the following list of terms in answering the questions from 30-33.

- i. Cardinality**
- ii. Degree**
- iii. Primary key**
- iv. Many to many**
- v. Recursive**

Fill in the blanks with the most appropriate term from the above list.

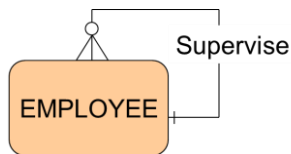
- 30) is a column or a group of columns in a table that uniquely identifies the rows in that table.

- | | | | | |
|-------|--------|---------|--------|-------|
| (a) i | (b) ii | (c) iii | (d) iv | (e) v |
|-------|--------|---------|--------|-------|

- 31) defines the minimum and maximum number of occurrences of one entity that may be related to a single occurrences of the other entity.

- | | | | | |
|-------|--------|---------|--------|-------|
| (a) i | (b) ii | (c) iii | (d) iv | (e) v |
|-------|--------|---------|--------|-------|

32) Part of an ER diagram is shown below.



Theof the above diagram is One.

- (a) i (b) ii (c) iii (d) iv (e) v

33) The diagram given in Q32 has a Relationship

- (a) i (b) ii (c) iii (d) iv (e) v

34) Which of the following is/are advantage(s) of fact finding through ‘observation of the work environment’?

- (a) Relatively cheap method compared with Interviews.
- (b) Allows the Systems Analyst to do work Measurements.
- (c) It does not require more employee release time.
- (d) Data gathering may be highly reliable.
- (e) Work being observed may involve the level of difficulty or volume normally experienced.

35) Which of the following is/are correct regarding the requirements gathering technique ‘Use of Questionnaires’?

- (a) Questionnaires allow the analysts to collect information and opinions from a larger audience.
- (b) Mostly suited for closed questions.
- (c) One disadvantage is that it does not guarantee an individual will answer or expand on all the questions.
- (d) Always the most expensive requirement discovery method.
- (e) Allow individuals to maintain anonymity.

36) Building a small working model of the users’ requirements or a proposed design for an information system is known as prototyping. Which of the following statement(s) is / are true regarding this technique?

- (a) Helps to validate requirements with fewer errors
- (b) Through prototyping one can gain a better appreciation of how the final system will look and feel.
- (c) Main role is to improve the requirement definition by involving potential system users.
- (d) Allows analysts to create mock forms and tables to simulate the system.
- (e) It creates a culture where only the analyst and designer play leading roles.

37) What is meant by Technical feasibility in a the feasibility study?

- (a) Availability of technology for the defined solution.
- (b) A measure of the practicality of a technical solution.
- (c) A measure of how reasonable a project time table is.
- (d) Defines the feasibility that is concerned with specifying equipment and software that will successfully satisfy the user requirement.
- (e) A measure of the cost-effectiveness of a project

- 38) Consider the following statements related to the Feasibility Study.
- (i) Feasibility of a project cannot be changed during system development.
 - (ii) The Economic feasibility analysis takes into account the organization's current state, as well as existing resource capabilities and the availability/sustainability of new technological offerings.
 - (iii) A feasibility study is an analysis that takes all of a project's relevant factors into account including economic, technical, legal, and scheduling considerations to ascertain the likelihood of completing the project successfully.
- Which of the above statements(s) is/are correct?
- | |
|---|
| <ul style="list-style-type: none"> (a) Only (i) (b) Only (i) and (ii) (c) Only (iii) (d) Only (ii) and (iii) (e) (i), (ii) and (iii) |
|---|
- 39) There can be a requirement to implement some logical processes in a DFD as one or more physical processes. Which of the following reasons can be valid reasons for the above requirement?
- (i) To split the process into a portion to be implemented with one technology and a portion to be implemented with a different technology.
 - (ii) To show multiple but different implementations of the same logical process.
 - (iii) To add processes that are necessary to handle exceptions or to implement security requirements.
- | |
|---|
| <ul style="list-style-type: none"> (a) Only (i) (b) Only (i) and (ii) (c) Only (i) and (iii) (d) Only (ii) and (iii) (e) (i), (ii) and (iii) |
|---|
- 40) Which of the following is/are correct regarding the use of Interviews as a fact-finding technique?
- | |
|--|
| <ul style="list-style-type: none"> (a) There is no immediate opportunity to clarify a vague or incomplete answer. (b) There is no opportunity to motivate the interviewee to respond freely and openly. (c) It is a relatively inexpensive method compared to others (d) It is a time-consuming method compared to others (e) Success of the interviews is highly dependent on the Systems Analyst's human relation skills. |
|--|

Questions (41) to (46) are related to the following feasibility tests.

- (i) Operational Feasibility**
- (ii) Cultural Feasibility**
- (iii) Technical Feasibility**
- (iv) Schedule Feasibility**
- (v) Economic Feasibility**
- (vi) Legal Feasibility**

Select the most appropriate feasibility test from the above list to fill in the blanks in questions from 41-46.

- 41) deals with how the end users feel about the proposed system.

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|----------|----------|-----------|
| (a) (i) | (b) (ii) | (c) (iii) |
| (d) (iv) | (e) (v) | |

42) means whether a business or a project is feasible cost wise and logistically.

- | | | |
|---------|----------|-----------|
| (a) (i) | (b) (ii) | (c) (iii) |
| (d) (v) | (e) (vi) | |

43) addresses the following question.
“ Do we posses the necessary technical expertise and technology?”

- | | | |
|----------|----------|-----------|
| (a) (i) | (b) (ii) | (c) (iii) |
| (d) (iv) | (e) (vi) | |

44) asks if given what is known about the problem and the cost of the solution, the problem is still worth solving.

- | | | |
|----------|----------|-----------|
| (a) (i) | (b) (ii) | (c) (iii) |
| (d) (iv) | (e) (v) | |

45) a measure of how reasonable a project time table is.

- | | | |
|----------|----------|-----------|
| (a) (i) | (b) (ii) | (c) (iii) |
| (d) (iv) | (e) (vi) | |

46)a measure of how well a solution can be implemented within existing legal and contractual obligations.

- | | | |
|---------|----------|----------|
| (a) (i) | (b) (ii) | (c) (iv) |
| (d) (v) | (e) (vi) | |

47) Each of the blanks labelled (I) – (III) of the paragraph given below has to be filled with the most appropriate word selected from the phrases labelled (A) – (F).

Project management is the process of -----(I)-----, planning, -----(II)-----, organizing, directing, and controlling the development of an acceptable system at a -----(III)-----cost within a specified time frame.

- A. Analyzing
- B. Scoping
- C. Implementing
- D. Staffing
- E. Minimum
- F. Maximum

Which of the following gives the correct mapping?

- | |
|----------------------------|
| (a) (I)-B ,(II)-C, (III)-F |
| (b) (I)-D,(II)-A, (III)-E |
| (c) (I)-D ,(II)-B, (III)-E |
| (d) (I)-B ,(II)-A, (III)-E |
| (e) (I)-B ,(II)-D, (III)-F |

48) Given below are some statements associated with Object Modelling. Identify the correct statement(s) from among them.

- (a) Generalization is the process of extracting shared characteristics from two or more classes, and combining them into a generalized superclass.
- (b) UML is widely accepted as a standard for object modeling.
- (c) Polymorphism is the concept that different objects can respond to the same message in different ways.
- (d) Encapsulation is used in various contexts and describes situations in which something occurs in several different forms.
- (e) Composition is a subset of association meaning they are specific cases of association.

49) Consider the following statements.

- (i) CASE tools are set of software application programs, which are used to automate Software Development Life Cycle activities.
- (ii) “Visual Paradigm” is an example of a Real CASE tool.
- (iii) Reverse Engineering is a CASE tool capability that can automatically generate initial system models from software or database code.

Which of the above statements is/are correct about CASE tools?

- (a) Only (i)
- (b) Only (ii)
- (c) Only (i) and (ii)
- (d) Only (i) and (iii)
- (e) (i), (ii) and (iii)

50) Consider the following statements related to project management.

- (i) Project Management is the activity of documenting , managing and continually improving the process of systems development.
- (ii) Project Management is necessary to ensure that the project meets deadlines.
- (iii) Project Managers use PERT charts to show project tasks and the relationship between these tasks.

Which of the above is/are project management problems and consequences?

- (a) Only (i)
- (b) Only (ii)
- (c) Only (i) and (ii)
- (d) Only (i) and (iii)
- (e) (i), (ii) and (iii)
