



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2016 – 1st Year Examination – Semester 2

IT2405: Systems Analysis and Design
Multiple Choice Question Paper

23rd October 2016

(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 **14 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 will 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.**

- 1) Which of the following are types of information systems that capture the expertise of workers and then simulate that expertise to the benefit of non-experts?

- (a) Transaction processing system
- (b) Executive information system
- (c) Expert system
- (d) Communication and Collaboration System
- (e) Office Automation System

- 2) What is the best way of filling the blanks in the following incomplete sentence?
..... is a specialist who analyses a complex process or operation in order to improve its efficiency, especially by applying a computer system.

- (a) A system user
- (b) A system owner
- (c) A systems analyst
- (d) A project manager
- (e) A system designer

- 3) Which of the following is/are correct regarding the stakeholders of an information system?

- (a) Database Programmers are specialists in database technologies who design and coordinate changes to corporate databases.
- (b) Web architect is a specialist who designs complex Web sites for organizations and private business to business Web sites.
- (c) System programmers are specialists who convert business requirements, statements of problems and procedures into computer languages.
- (d) Application programmers are specialists in database languages and technologies who design and coordinate changes to corporate databases.
- (e) A webmaster is someone who creates and manages the content and organization of a website, manages the computer server and technical programming aspects of a website or does both.

- 4) Consider the following skills.
- (i) Working knowledge of information technologies
 - (ii) General problem solving skills
 - (iii) General knowledge of business processes and terminologies

Which of the above skills is/are needed by systems analysts?

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

- 5) Each of the blanks labeled A – E of the paragraph given below has to be filled with the most appropriate word selected from the phrases labeled (i) – (vi).

- (i). Information system
- (ii). Waterfall development approach
- (iii). System development life cycle
- (iv). Iterative development approach
- (v). Systems Analysis and Design
- (vi). Incremental development

TheA..... is a term used in systems engineering, information systems and software engineering to describe a process for planning, creating, testing and deploying a/anB.....
.....C..... is an approach toD..... that completes each phase, one after the other, and only once. It has lost favour with most modern system developers.E..... is a way of breaking down the software development of a large application into smaller chunks and complete the entire information system in successive iterations.

Which of the following gives the most appropriate label for A,B,C,D and E?

- | |
|---|
| <ul style="list-style-type: none">(a) A – (ii), B – (i), C – (iii), D – (vi), E – (iv)(b) A – (iii), B – (ii), C – (i), D – (iv), E – (v)(c) A – (v), B – (ii), C – (iv), D – (i), E – (vi)(d) A – (iii), B – (i), C – (ii), D – (v), E – (vi)(e) A – (iii), B – (i), C – (ii), D – (v), E – (iv) |
|---|

- 6) Which of the following is/are true regarding the Scope Definition phase of the Software Development Life Cycle?

- | |
|--|
| <ul style="list-style-type: none">(a) It is also called preliminary investigation phase.(b) During this phase, it establishes the project plan in terms of scale, development strategy, schedule, resource requirements and budget.(c) Candidate solutions are identified during this stage.(d) A physical model showing a technical pictorial representation needs to be drawn during this phase.(e) It answers the question “Is this project worth looking at?”. |
|--|

- 7) Consider the following tasks in connection with software development.

- (i) Develop baseline schedule and budget
- (ii) Develop key based data model
- (iii) Identify candidate solutions

Which of the above is a/are typical task(s) of the Scope Definition phase the Software Development Life Cycle?

- | |
|--|
| <ul style="list-style-type: none">(a) Only (i)(b) Only (ii)(c) Only (i) and (ii)(d) Only (ii) and (iii)(e) All |
|--|

8) Consider the following statements.

- (i) The purpose of a context diagram is to analyse how the system interacts with the world around it and to specify in general terms the system inputs and outputs.
- (ii) The goal of the problem analysis phase is to study and understand the problem domain well enough to thoroughly analyse its problems, opportunities and constraints.
- (iii) Identify and analyse candidate solutions.

Which of the above is/are correct regarding problem analysis?

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

9) Consider the following requirements.

- (i) Requirements about resources required, response time, transaction rates, throughput, benchmark specifications or anything else having to do with performance.
- (ii) Requirements about the accuracy and precision of the data.
- (iii) The effort required to move the software to a different target platform.
- (iv) Every order shall be allocated a unique identifier.

Which of the above is/are non-functional requirements?

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

10) Fill in the blank space.

..... phase in the system development life cycle defines business requirements for the new system.

- | | | |
|--------------------------|------------------------|-------------------|
| (a) Requirement analysis | (b) Project initiation | (c) System design |
| (d) System development | (e) Scope definition | |

11) The following statements are connected with the Requirements Analysis Phase of a new system. Which of them is/are correct?

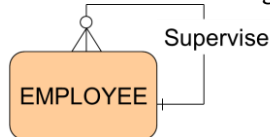
- (a) This phase answers the question “What do the users need and want from a new system?”
- (b) Databases are created during this phase.
- (c) Updating and refining the project plan would not be a part of this phase.
- (d) The purpose of this phase is to determine the worthiness of the project and create a plan to complete it.
- (e) This phase defines the business requirements for a new system.

- 12) Some questions related to Data Modeling with possible answers are given below.
- (i) Q. What is Data Modeling?
A. It is a technique for organizing and documenting a system's processes.
 - (ii) Q. Define an *Relationships* in Data Modeling?
A. It is a natural business association that exists between one or more entities.
 - (iii) Q. Is the following statement correct?
“In a Hotel Reservation system, *Room*, *Customer* and *Payment* are entities.”
A. Yes

Which of the above answers is/are correct?

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

- 13) Consider the following diagram and statements.



- (i) The degree of the above relationship is 2.
- (ii) It is an example for a recursive relationship.
- (iii) *Supervise* is the relationship name.

Which of the above statements is/are correct?

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

- 14) Consider the following statements related to Process modelling.
- (i) Process models are always implementation independent.
 - (ii) Physical process models show what the system is or does.
 - (iii) Physical models reflect technology choices and the limitations of those technology choices.

Which of the above statements is/are correct?

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

- 15) Fill in the blank space.
Ideally, essential should describe ‘things’ about which the business wants to store data.

- (a) primitive process
- (b) external agent
- (c) data store
- (d) data flow
- (e) process

- 16) Some questions related to data flow diagrams (DFDs) with possible answers are given below.
- (i) Q. What is a *Primitive Process*?
A. It is a *Process* that can be decomposed.
 - (ii) Q. What is the symbol used to represent a Process in any methodology?
A. It is a rounded rectangle.
 - (iii) Q. Is the following statement correct?
“Data stores may not be directly linked by data-flows; information is transformed from one stored state to another via a process.”
A. Yes.

Which of the above answers is/are correct?

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

- 17) Which of the following is/are correct regarding Process and Data modelling?

- (a) Data modeling is often the first step in database design as the designers first create a conceptual model of how data items relate to each other.
- (b) A Context Data flow diagram is used to define system boundaries.
- (c) Further analysis of Data flow diagrams creates Context Data flow diagrams.
- (d) Data flows in a DFD represent an input of data to a process or the output of data from a process.
- (e) Data can flow directly from a data store to an external agent.

- 18) Some questions related to entity modeling with possible answers are given below.

- (i) Q. What is the number of entities that participate in a relationship called?
A. Degree
- (ii) Q. What is the candidate key that will most commonly be used to uniquely identify a single entity instance called?
A. A Concatenate key
- (iii) Q. Is the following statement correct?
“Relationships may also exist between different instances of the same entity.”
A. No

Which of the above answers is/are correct?

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

The blanks in the Questions 19-24 have to be filled by selecting the most appropriate words/phrases from the list labelled (i) – (vii). Note that one word/phrase may be used in more than one instance.

- (i) Cardinality
- (ii) Entity
- (iii) Subtype
- (iv) Inheritance
- (v) Primary Key
- (vi) Supertype
- (vii) Generalization

What is the most appropriate way to fill in the given blanks?

- 19) refers to the maximum number of times an instance in one entity can be associated with instances in the related entity.

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

- 20) is an approach that seeks to discover and exploit the commonalities between entities.

(a) (i)	(b) (ii)	(c) (iii)
(d) (vi)	(e) (vii)	

- 21) is a person, place or thing about which we want to collect and store data.

(a) (vii)	(b) (ii)	(c) (iv)
(d) (v)	(e) (vi)	

- 22) Through , the concept of generalization in data models permit us to reduce number of attributes through the careful sharing of common attributes.

(a) (vii)	(b) (ii)	(c) (iii)
(d) (iv)	(e) (v)	

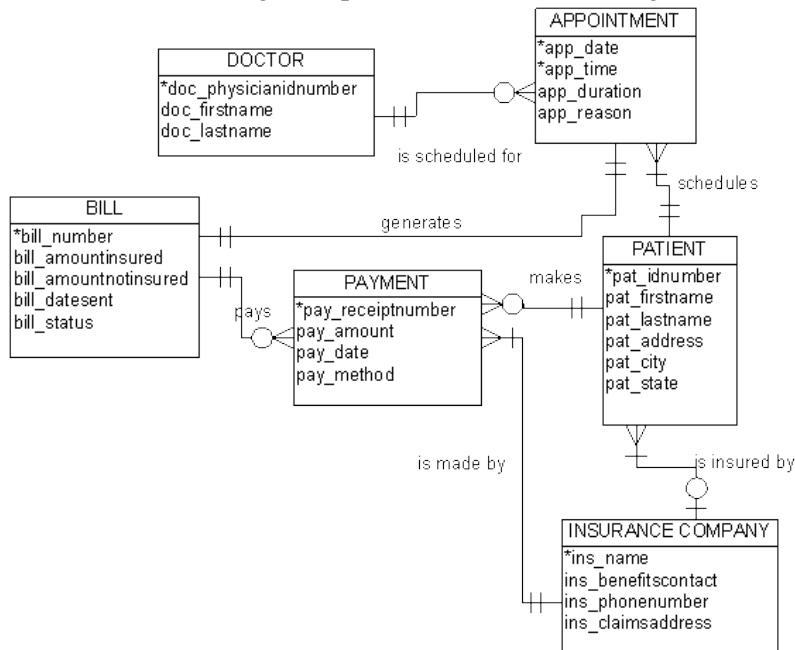
- 23) When designing a Data Model for *People* you can have a entity of *People* and its child entities can be *Vendor*, *Customer* and *Employee*.

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

- 24) *Insurance* entity can act as a and entities like *Health Insurance*, *Life Insurance* can be subtype entities.

(a) (i)	(b) (ii)	(c) (iii)
(d) (vi)	(e) (vii)	

- 25) Consider the following example of an ERD drawn using Martin notation.



Identify the correct statements related to the above diagram.

- (a) A doctor can be scheduled for more than one appointment.
- (b) Each appointment is scheduled with exactly one doctor.
- (c) A patient can schedule one or more appointments.
- (d) One payment is applied to exactly one bill, and one bill can be paid off over time by several payments.
- (e) A bill can be outstanding, having nothing yet paid on it at all.

- 26) Consider the following relationship types drawn using Martin notation.

- (i)
- (ii)
- (iii)

Identify the correct type of relationships?

- (a) (i) – many, (ii) – one or more (iii) one
- (b) (i) – more than one (ii) –more than one (iii) two
- (c) (i) – zero or more (ii) – one or more (iii) one or more
- (d) (i) – zero or more (ii) –more that one (iii) exactly one
- (e) (i) – zero, one or more (ii) – one or more (iii) exactly one

- 27) A Phrase from Column A has to be matched with the most appropriate phrase from Column B.

	Column A		Column B
(i)	Logical Models	A	pictorial representations of reality.
(ii)	Physical Models	B	are abstract models that organizes elements of data and standardizes how they relate to one another and to properties of the real world.
(iii)	Models	C	are techniques used to organized and document a system's processes.
(iv)	Data Models	D	reflect technology choices and the limitations of those technology choices.
(v)	Process models	E	show the system independent of any technical implementation.

The correct matching is

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

The blanks in the Questions 28 – 33 have to be filled by selecting the most appropriate words/phrases from the list labelled (i) – (vii). Note that one word/phrase may be used in more than one instance.

- (i) Object Modelling
- (ii) Unified Modelling Language
- (iii) Generalization/Specialization
- (iv) Class Diagram
- (v) Inheritance
- (vi) Polymorphism
- (vii) Encapsulation

What is the most appropriate way to fill in the blanks?

- 28) is the concept wherein methods and/or attributes defined in an object class can be inherited or reused by another object class.

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

- 29) For a given base class *Shape* enables the programmer to define different area methods for any number of derived classes such as circles , triangles, rectangles etc.

(a) (i)	(b) (iv)	(c) (v)
(d) (vi)	(e) (vii)	

- 30) is concealing of implementation details of a data object from the outside world.

(a) (i)	(b) (iii)	(c) (v)
(d) (vi)	(e) (vii)	

31) is a general-purpose, developmental, modeling language in the field of software engineering, that is intended to provide a standard way to visualize the design of a system.

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

32) In object-oriented modeling, a is the primary block for building the whole structure.

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

33) is technique wherein the attributes and behaviours that are common to several types of object classes are grouped into their own class.

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

34) Consider the following statements in relation to using questionnaires as a requirements discovery methods.

- (i) On line questionnaires are relatively expensive means of gathering data from a large number of individuals.
- (ii) There is no immediate opportunity to clarify an incomplete answer to any question.
- (iii) Data gathering through questionnaires may be highly unreliable.

Which of the above statements is/are correct?

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

35) Which of the following is/are correct regarding the usage of interviews for fact gathering?

- | |
|---|
| (a) Video conferencing facility permits the systems analyst to interview clients who are at distant locations. |
| (b) Interviews allow the systems analyst to probe for more feedback from the interviewee. |
| (c) Interviews are relatively inexpensive compared with on-line questionnaires. |
| (d) Interviews permit the systems analyst to reword questions for each individual. |
| (e) A structured interview is an interview where the interviewer has a specific set of questions to ask from the interviewee. |

The blanks in the Questions 36 – 39 have to be filled by selecting the most appropriate words/phrases from the list labelled (i) – (viii).

- (i) Operational Feasibility
- (ii) Candidate Systems Matrix
- (iii) Technical Feasibility
- (iv) Schedule Feasibility
- (v) ROI Analysis
- (vi) Payback Analysis
- (vii) Feasibility Analysis Matrix
- (viii) Feasibility Analysis

What is the most appropriate way of fill in the blanks?

36)

..... is a technique that compares the lifetime profitability of alternative solutions.

- (a) (ii) (b) (v) (c) (vi) (d) (vii) (e) (viii)

37)

..... is a technique for determining if and when an investment will pay for itself.

- (a) (ii) (b) (v) (c) (vi) (d) (vii) (e) (viii)

38)

..... addresses the following issue.

“Is the technology/solution proposed practical?”

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

39)

..... is used to document similarities and differences among candidate systems.

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

40)

Which of the following is/are correct regarding *Feasibility Analysis*?

- (a) *Operational Feasibility* deals more with how well the solution will meet the system requirements, whereas *Political feasibility* deals with how the end users feel about the proposed system.
- (b) *Cultural feasibility* addresses the following issue.
“How will the working environment of end users change? Can or will end users and management adapt to the change?”
- (c) *Operational Feasibility* addresses the following issue.
“What end users or managers resist or not use the system? Can this problem be overcome?”
- (d) The benefits that a system provides can be classified as Tangible and Intangible benefits.
The following are some examples of tangible benefits:
- Decrease response time, Increase sales and Fewer processing errors
- (e) A Return-on-Investment technique compares the life time profitability of alternative solutions.

- 41) Which of the following statements is/are true regarding systems design?
- (a) Information systems design is defined as those tasks that focus on the specification of a detailed computer-based solution.
 - (b) Information engineering is a model driven process centered, but data sensitive technique for designing information systems.
 - (c) Prototyping approach is an iterative process involving close working relationship between the designer and the users.
 - (d) RAD is a system design approach that utilizes structured, prototyping and Joint Application Development techniques to quickly develop systems.
 - (e) Joint Application Development is a technique that focuses on data and strategic planning to produce application projects.
- 42) The following statements are related to systems design. Identify the correct statements.
- (a) By having users interact with evolving prototypes, the business functionality from a RAD project can often be much higher than that achieved via a waterfall model.
 - (b) Object-oriented design is the process of planning a system of interacting objects for the purpose of solving a software problem.
 - (c) Modules in a system should be loosely cohesive.
 - (d) Modules in a system should be tightly coupled.
 - (e) Modules in a system should be minimally dependent on one another to minimize the effect that future changes in one module will have on other modules.
- 43) show program modules and their interconnections.
- (a) Entity Relationship Diagrams
 - (b) Coupling
 - (c) Data Flow Diagrams
 - (d) Structure Starts
 - (e) Event Diagrams
- 44) Consider the following statements in relation to systems design.
- (i) The logical data flow diagram is a process model used to communicate the technical implementation characteristics of an information system.
 - (ii) Prototyping encourages and requires active end-user participation which increases end-user morale and support for the project.
 - (iii) OOD is used to refine the object requirements definitions identified earlier during analysis and to define design specific objects.
- Which of the above statement(s) is/are correct?
- | | | |
|-------------------------|-----------------------|----------------|
| (a) Only (i) | (b) Only (i) and (ii) | (c) Only (iii) |
| (d) Only (ii) and (iii) | (e) All | |
- 45) The two overarching goals of object oriented design are
- (a) loose cohesion and tight coupling.
 - (b) high cohesion and tight coupling.
 - (c) high coupling and high cohesion.
 - (d) loose coupling and loose cohesion.
 - (e) low coupling and high cohesion.

- 46) Consider following statements related to Application Architecture.
- (i) The physical data flow diagrams model the technical decisions to be implemented as part of an Information System.
 - (ii) The physical data flow diagrams model the human design decisions to be implemented as part of an Information System.
 - (iii) A physical data flow diagram is used to establish logical processes and data stores across a network.

Which of the above statements is/are correct?

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

- 47) Which of the following statements regarding Data Flow diagrams is/are correct?

- (a) The logical DFD describes the business events that take place and the data required for each event and it provides a solid basis for the physical DFD, which depicts how the data system will work, such as the hardware, software, paper files and people involved.
- (b) Logical DFD provides a solid basis for the physical DFD, which depicts how the data system will work, such as the hardware, software, paper files and people involved.
- (c) Physical Data flow diagrams show different implementations of a physical process as two or more logical processes.
- (d) New processes may be added to Physical Data flow diagrams to show different implementation done with different technology.
- (e) New processes may be added to Physical Data flow diagrams to implement security requirements and audit trails.

- 48) Consider the following statements related to project management software.

- (i) PERT charts and Gantt charts are two popular tools that support project managers.
- (ii) A Gantt chart clearly shows overlapping tasks that can be performed at the same time.
- (iii) The bars in Gantt charts can be shaded to clearly indicate percentage completion and project progress.

Which of the above statements is/are correct?

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

49)

Consider the following statements related to automated tools and technology.

- (i) Project management software are routinely used to help programmers to plan projects , develop schedules, develop budgets, monitor progress and costs, generate reports and effect change.
- (ii) An integrated development environment (IDE) is a software application that provides comprehensive facilities to computer programmers for software development
- (iii) *Eclipse* is an example of an IDE.

Which of the above statements is/are correct?

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

50)

Consider the following statements related to project management.

- (i) Project management is the application of processes, methods, knowledge, skills and experience to achieve the project objectives.
- (ii) Project Manager is the person who is responsible for supervising a systems project from initiation to conclusion.
- (iii) Project Managers use Gantt charts to show the interdependencies between a project's tasks.

Which of the above statements is/are correct?

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