Higher National Diploma in Information Technology

First Year, Second Semester Examination – 2016

HNDIT1212 – System Analysis and Design- Answers

Instructions for Candidates:	No. of questions: 06
Answer any 4 questions	No. of pages :
All Questions carry equal marks	Time : Three hours (02 hours)

Question 01

(i) Define term "Stakeholders" in information system and give four examples. (02 Marks)

- **stakeholders**

  Is any person who has an interest in an information system and its outputs.

- Examples.

  1. Systems User
  2. Systems Owner
  3. Systems Builder
  4. Systems Designer
  5. Systems Analyst

(1/2 x 4 Marks)

(ii) State three duties of system analyst. (03 Marks)

a. Identify the problem
b. Analyze and understand the problem
c. Identify the solution requirements
d. Identify alternative solutions
e. Design and implement the best solution
f. Evaluate the result

(iii)State four characteristic of 'Legacy System'. (04 Marks)

a. potentially **problematic**
b. often run on obsolete hardware
c. spare parts for such computers become increasingly difficult to obtain
d. hard to maintain, improve and expand
e. The designers of the system may have **left** the organization, leaving no one left to explain how it works.

(iv) Briefly explain "System Development Life Cycle" and state two advantages of them.
(06 Marks)

- It is a **logical process** by which systems analysts, s/w engineers, programmers & end users build information systems.
    - **ease the process** of building a system
    - **build high quality systems** that meets customer expectations, within time and cost estimates
    - **work effectively and efficiently** in the current and planned information technology infrastructure
    - **avoid failures** like unclear objectives, cost overruns
    - **maintain and enhance cost** effectively

(v) Information System can be classified according to the management levels in an organizations. Briefly explain two types of operational level information systems.

Transaction processing system (02 Marks)

Office automation system

Collaboration system

Transaction processing system (02 x2 Marks)

- Information Systems that capture and process data about business transactions.
- Used mainly by operational level employees

Office automation system

- It supports the **wide range** of business office activities.
    - Work group computing
    - Work group scheduling
    - E-mail
    - Electronic document

Communication and collaboration system

An IS that enables **more effective communications** between,

- Workers
- Partners
- Customers
- Suppliers

- **Enhance** their ability to **collaborate**

(vi) State four characteristic of 'Legacy System'. (04 Marks)

a. potentially **problematic**
b. often run on obsolete hardware
c. spare parts for such computers become increasingly difficult to obtain
d. hard to maintain, improve and expand
e. The designers of the system may have **left** the organization, leaving no one left to explain how it works.

(i) List Main phases in system development life cycles. (1/2 x 3 Marks)

a. *Problem Definition* (systems Investigation)
b. *Systems Analysis*
c. *Systems Design*
d. *Systems Implementation*
e. *Systems Testing*
f. *Systems Maintenance*

(ii) Briefly explain, what is "Term of Reference"? (03 Marks)

Project goals, project bounds & project limits are called project's **Terms of Reference (TOR)**.

(iii) State Three requirements discovery methods. (03 Marks)

a. Sampling of existing documents
b. Research and site visits
c. Observations of the work environment
d. Questionnaires
e. Interviews
f. Joint requirements planning
g. Brainstorming

(iv)Elaborate Evolutionary Prototyping model over the Waterfall Development model

Evolutionary Prototyping model	Waterfall Development model
1. Customers can "see" the system requirements as they are being gathered 2. Developers learn from customers 3. A more accurate end product 4. Unexpected requirements accommodated 5. Allows for flexible design and development 6. Interaction with the prototype stimulates awareness of additional needed functionality	1. Customer cannot see the system until finished. 2. It has a rigid design 3. Inflexible 4. It has a top-down procedure 5. One phase must be completed before the next phase starts 6. No phase can be repeated 7. Time consuming

(08 Marks)

(v) Carefully read the following case study and select suitable software development life cycle model and justify your answer. (08 Marks)

"MyTrip railway reservation system is powerful system because this railway carries about 0.6million passenger reserved accommodation every day. The computerized passenger reservation systems facilitate the booking and cancellation of tickets. These tickets can be booked or cancelled for journeys and one is major thing is that railway railway employees are facility to free of cost journey. Customer can book using counter or online. Counters are found on the railway stations and online booking can make through internet using their credit cards."

Spiral model because,

The spiral model combines the idea of iterative development with the system systematic, controlled aspects of like waterfall model.

Very high emphasis on risk analysis.

It allow for increment release of the product or increment refinement through each iteration around the spiral.

Changing requirements can be accommodated

Allows for extensive use of prototype.

Requirements can be captured more accurately.

Development can be divided into smaller part and more risky part can be developed earlier which help better risk management.

When costs ther is a budget constraint and risk evaluation is important.

Long term project commitment because of potential changes to economic priorities as the requirement change with time.

Customer is not sure of their requirement which is usally the case.

Question 03 **[Total Marks 25]**

(i) Briefly explain "feasibility studies". (03 Marks)

(ii) State three examples for legal feasibility study areas in software development. (06 Marks)

- copyright law (licensed agreements should not be violated)
- non-disclosure clauses
- code ownership (if developed with outside assistance)
- labour laws
- foreign trade, and labour regulations
- Financial & Accounting standards

(iii)Giving examples, explain tangible item cost and intangible item cost.

(06 Marks)

- Tangible items are those to which direct values can be attached
  - **Equipment costs for the new system**
  - **Personnel cost**
  - **Material costs**
  - **Conversion cost**
  - **Other costs**(consultant's cost)
- Intangible items, are those whose values cannot be exactly determined
  - How much is saved by completing a project earlier or providing new information to decision makers?

(iv) Rainbow Company Ltd. expect to buy new machine for their productions. Two company give their proposal with machine capacity and their plan (Machine A and Machine B). Calculate the payback period of the two machines using the following cash flows and decide which new machine Rainbow Company should accept. Assume the maximum payback period the company establishes is four years. (10 Marks)

Year	Machine A	Machine B
0	Rs. -5000.00	Rs.-2000.00
1	Rs.600.00	Rs. 500.00
2	Rs.1000.00	Rs. 1200.00
3	Rs.1500.00	Rs.1600.00
4	Rs.2000.00	Rs. 2000.00

Machine A

year	inflow	outflow	net flow	cumulative cash flow
0		-5000	-5000	-5000
1	600		600	-4400
2	1000		1000	-3400

3	1500		1500	-1900
4	2000		2000	100

Machine B 3.95 (04 Marks)

Year	inflow	outflow	net flow	cumulative cash flow
0		-2000	-2000	-2000
1	500		500	-1500
2	1200		1200	-300
3	1600		1600	1300
4	2000		2000	3300

2.1875 (04 Marks)

Machine B is the best one (02 Marks)

[Total Marks 25]

Question 04

(i) State two things which system designer have to do during the system design phase? (04 Marks)

a) Designers must select the equipment needed to implement the system.

b) Specify new programs or changes to existing programs

c) Specify new database or changes to existing database

d) Designers must also produce detailed procedures that describe how users will use the system,

(ii) Methodology is one of the major component of system development. Explain term "Methodology". (04 Marks)

A very formal and precise system development process that defines a set of

– Activities

– Methods

– Best practices

– Deliverables

– Automated tools

(iii) Read the following case study and answer the questions.

City Hospital expect to establish a new software system to improve their efficiency and effectiveness. System consist following functions.

Administrator can view all the details of the hospital records. System can maintain consultants' information, details of patients who are admitted and also contains details of the patient who are came for check_ups. Lab report generates from the system and bill details are calculate from the system.

a) Draw the Context diagram for the City Hospital Management system.

(07 Marks)

b) Draw the 0 level DFD (Data Flow Diagram) for above system.

(10 Marks)

Question 05 **[Total Marks 25]**

(i) Explain what is test automation? (03 Marks)

Test automation is the use of software to

a. control the execution of tests
b. the comparison of actual outcomes to predicted outcomes
c. the setting up of test preconditions
d. test reporting functions.

(ii)

(iii)Briefly explain 'White box testing' and 'Black box texting'. (04 Marks)

White box testing (clear box testing, glass box testing, transparent box testing, or structural testing) uses an internal perspective of the system to design test cases based on internal structure.

- **Black Box testing** takes an external perspective of the test object to derive test cases. The test designer selects valid and invalid inputs and determines the correct output. There is no knowledge of the test object's internal structure.

(iv)State two kind of maintenance activities. (02 Marks)

- **corrective maintenance**: correcting errors
- **adaptive maintenance**: adapting to changes in the environment (both hardware and software)
- **perfective maintenance**: adapting to changing user requirements
- **preventive maintenance**: increasing the system's maintainability

(v) Source code may be in one of the following categories, Explain each of them.

(08 Marks)

a. Standard off- the –shelf package

The organization purchases and installs a ready-made solution.

i. Advantages:

1. Available immediately
2. Cheaper
3. High quality
4. Can be update
5. Relatively free of bugs
6. Easy to handle

ii. Disadvantages

1. It may be not well suited
2. Competitors may well use the same package.

b. Bespoke package

Programmers write an application to meet the specific needs of the organization.

This can be a time-consuming and expensive process

It is involves all the tasks included in the software development and testing cycle

c. Amended standard package

A standard package is purchased, but some customization is undertaken so that the software meets the organizations requirements.

This may require access to the source code.

Development time should be much quicker.

User can get good knowledge about the software

d. standard package plus additions

The purchased standard package is not amended itself, but additional software that integrates with the standard package is developed. This also may require access to the source code.

(vi) Briefly explain, file conversion method "Direct change over "with their advantages and disadvantages. (08 Marks)

a. **Direct changeover**-the old system is completely replaced by the new system in one move

Advantages	Disadvantages
Quick	Risky
Minimal cost	Could disrupt operations
Minimizes workload	If fails, will be costly