



PRIFYSGOL CYMRU

## Y Drindod Dewi Sant

UNIVERSITY OF WALES

**Trinity Saint David**

## Examination Answer Book

24 Pages

### Instructions to candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right and seal to hide your name.
3. The answers must be **legibly** written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

|   |                              |                     |
|---|------------------------------|---------------------|
| 1 | Student Number               | P144281             |
| 2 | Title of Examination Paper   | Systems Engineering |
| 3 | Module Code                  | M6X                 |
| 4 | Date and Time of Examination | 30/6/17             |
| 5 | Examination Venue            | MT102               |
| 6 | Seat Number                  |                     |

|   |                                  |  |
|---|----------------------------------|--|
| 7 | Number of Answer Books handed in |  |
|---|----------------------------------|--|

| List the numbers of the questions you have attempted | Office Use |
|------------------------------------------------------|------------|
| 1(a)                                                 | 15         |
| 1(b)                                                 | 15         |
| 1(c)                                                 | 24 =       |
| 2(a)                                                 | 9 / 40     |
| 2(b)                                                 | 2 / 30     |
| 2(c)                                                 | 20 / 30    |
|                                                      |            |
|                                                      | 85 / 200   |
|                                                      | 42.5 / 100 |
|                                                      |            |
|                                                      |            |
|                                                      |            |
|                                                      |            |
| Total                                                | 42.5%      |

Please complete this section and SEAL before the examination starts.

(Block Capitals) Forename(s)

Surname:

# ATKINS

1a) The Systems engineering lifecycle is the process that should be followed from a products initial conception, through the design phase and support phase, all the way to disposal. Or from Birth to Grave of a project. There are many formats that this life cycle can take such as 'V' diagrams, CADMID process and DEMATIC process to name but three. They all have the same key principle that a system is a system of systems and that each part operates efficiently with its neighbours.

b) Shift left is the method of injecting money into the early stages of a project i.e. design phase rather than the later stages to fix undetected problems.

It is useful in Service design. I'm going to use the example of delivering a trial for a customer. The more time, effort and resources spent at the beginning of the project making sure you know exactly what the customer wants (data capture etc) the smoother the trial will run and the less likely it'll be to have nasty surprises on the day of trial where it appears that we're not doing what was asked of us.

Similarly Recon is never wasted, Spending time and money to carry out a Recce of an unknown range can highlight problems before they become problems. Nothing worse than getting to an unknown range with the wrong kit because no one done a recce.

1c) The main technique in Systems engineering to manage disposal costs is to design the product in such a way that there shall be as little to dispose of as possible, and what there is left to dispose can be disposed of cheaply.

For example, using wooden target frames for small arms firings rather than metal ones reduces disposal costs a lot should the target be rendered useless by bullet holes (I shall improve my aim one day). A wooden frame can be burnt on-site to dispose of it whereas a firm must come and collect a metal one, incurring charges.

Another example that saves money during clean-up is a device fitted to the gun that separates link and brass into separate bags as the gun fires. Therefore reducing the amount of time staff have to spend manually sifting through piles of cases separating the links. Ergo less money spent on wages.

Not exactly to the intent,  
but decent examples of the  
reality of disposal management

24  
40

54  
100

2a)

1. Define the process.
2. M
3. Make the process flow.
4. Pull from the customer.
5. Work towards Perfection.

Defining the process is critical as it is what everyone shall be working to.

Pulling from the customer means that customer demands drive the process, it's what the customer wants, the customer gets. Not the customer get what we think he wants.

Working towards perfection is always a good thing, as you shall continually improve.

~~2a)~~ Making the process flow is about making one stage flow seamlessly to the next without any waiting or unnecessary movement.

2b) An Activity that adds Value must meet three Criteria. ~~The~~ The customer must be willing to pay for said activity. The activity must change the product and the activity must work first time.

2c) There are 8 main wastes

Over production - Making too much, spent money making it but not making it back because you're not selling anything. 3

Over processing - Time/effort/money wasted on processes that do not add value or on processes that could be combined. 3

Motion - Time wasted moving components unnecessarily for example double handling. 3

Transport - Similar to motion, transporting stuff too far, have your supplier closer to you to save costs. 3

Waiting - Spending money on ~~per~~ idle people whilst they wait for the previous stage in the process to finish. ie ~~sp~~ paying them to do nothing, they are not adding value whilst waiting. 3

Inventory - Stockpiling too much rather than being just in time. Excess inventory often hides other wastes. 3

Talent - Underutilising people's skills, so they aren't adding as much value as they potentially could. 2