

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	P146277
2	Title of Examination Paper	Systems Engineering
3	Module Code	MBX00947
4	Date and Time of Examination	30/06/17
5	Examination Venue	
6	Seat Number	

7	Number of Answer Books handed in	
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Please complete this section and SEAL before the examination starts.

(First Name) Forename(s)

Surname

Ferguson

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5

2

2

2

2

2

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14

2	1
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Question 2

- a) Lean Systems engineering is used to ensure the product or process is tailored to the customer's needs whilst also ensuring that the process does not have any wastes to maximise the profits. Lean also ensures that continual improvement is conducted within the process to allow the maximisation of profits 5

DMMPW

1. Define the Value 2
2. Map the value stream 2
3. Make the process flow 2
4. Pull from the customer 2
5. Work towards Perfection 2

1 - Ensure the customer requirements add value to the project, and gain an understanding of the requirements 1

2 - Map where value can be added and ensure to map where value might be lost 1

3 - Ensure the process is well planned and ensure that the production continually works from end to end. 1

4 - ensure all of the customer's requirements are sourced to prevent any excess waste in the system but also ensure the customer gets exactly what is required.

2

5 - Ensure the process is continually reviewed to ensure perfection and improvement is always the goal.

2

(22)

b) Value adding activities are deemed to activities which add value to customer by either changing the scope of the project for improvements and a value that can be added first time without adding a time delay. Value adding activities must also be communicated with the customer as they must be willing to pay.

5

Non-Value adding activities are deemed not to change the fit, function or ...

2

Fit - the change must fit within the original design

1

Function - the ~~change~~ change must not effect the primary function of the product but may provide other improvements (e.g. Air Conditioning in cars)

2

(10)

c) ~~muda is the~~

c) muda defines possible problems within a process or project that may lead it to failure in budget, time scales, customer satisfaction.

The main 3 wastes are:

- Defect - defect in the process may be that there is a common flaw in the design of a project and you may require to change this design which will cost time and money.

2.

- over-Production - Over-Production can impact a project as it may effect profit at the end of the process due to us making more products than the customer is willing to buy therefore leaving us with left over stock that won't sell.

3

- over Processing - Over Processing can impact a project by over complicating an easy process which will add a time delay to an already time constrained project

2

• Motion - Motion can effect a Project due to valuable time being wasted on ~~collecting~~ waiting for another part of the Production line to pass on the work this then creates time delays due to failure in optimization

3

• Transportation - Transportation effects a Project by Increasing price and waiting time through not sourcing materials close to the manufacturing plant which caused time delay on delivery and cost for mileage of the delivery

2

• Waiting - Waiting can time constrain a Project as the manufacturing line may be slower in one section than another causing sections of the line to have lots of work and another having nothing to do

3

• Inventory - this can add cost a Project if you do not order only the stock you require as excess stock builds up the price of the Project as it won't be required.

3

Talent - talent can effect the time of a project due to skills not being utilised in the right areas.

2

20

Question 3

a) The benefits that can be achieved from using an FMEA are:

- Allows you to identify possible failure modes before they happen *

- Allows for an in depth review of a process to assess for possible improvement areas

- Allows the project to increase profitability as the prevention of failure modes ensures cost isn't being added by defects occurring.

-

- * Allows you to save on money as you aren't paying to rebuild broken products

3

3

4

2

(12)

b) An FMEA can be used to ~~use~~ assess the failure modes within a component, sub system, main system or a process.

The FMEA is assessed using a spreadsheet based template with outlined columns all leading the possibility of the failure occurring and then applying mitigations to prevent this occurring.

4

First column would be the process, this outlines what the process is.

3

Second column would outline what possible defects could arise from this process.

2

Third column would indicate severity should this defect occur within the process.

3

Fourth column outlines the possible outcome should this failure occur and what/who might be harmed.

3

Fifth column would indicate the likelihood of this defect/failure occurring.

3

Sixth Column will indicate the Likelihood $\times$ Severity, which therefore is the overall risk the failure poses to the project without any mitigations in place.

Seventh column will be where mitigations are put in place to reduce the overall risk of the failure to the project.

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