



FACULTY OF ENGINEERING AND BUILT ENVIRONMENT

Main 2019

DEPARTMENT OF QUALITY AND OPERATIONS MANAGEMENT

<u>PROGRAMME</u>	BTECH: QUALITY
<u>MODULE</u>	QUALITY MANAGEMENT SYSTEMS III
<u>CODE</u>	QMY44-1
<u>DATE</u>	06 June 2019
<u>DURATION</u>	3 HOURS
<u>TIME</u>	12h30 – 15h30 (Y – session)
<u>TOTAL MARKS</u>	100

<u>EXAMINER</u>	DR N SUKDEO
<u>INTERNAL MODERATOR</u>	MR NS MADONSELA
<u>EXTERNAL MODERATOR</u>	PROF K RAMDASS
<u>NUMBER OF PAGES</u>	7 PAGES including cover page

INSTRUCTIONS TO CANDIDATES:

- Please answer all questions.
- Question papers must not be handed in.
- This is a closed book assessment.
- Read the questions carefully and answer only what is asked.
- Number your answers clearly.
- Write neatly and legibly.
- Structure your answers by using appropriate headings and sub-headings.
- Clauses of ISO 9001:2015 attached.
- The general University of Johannesburg policies, procedures and rules pertaining to written exam apply.

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QUESTION ONE

Case study 1

The X Company started as a small workshop 10 years ago, and since then has grown to 200 employees and has managed to export 90% of its products to foreign markets, especially Japan and Sweden. Having such substantial growth created numerous problems in managing the company, and an increase of nonconforming products and customer complaints. Facing a threat of losing its customers abroad and increasing costs of removing nonconformities led them to implementation of ISO 9001.

The growing demand from its foreign customers led to an increase of production and hiring new employees every year, but as the CEO once stated, he sees “no benefit in administrative workers; all I need are the people working on the machines and producing furniture.” Bad hiring policies led to a lack of qualified personnel and the middle management in the company, so the company had a simple and ineffective company structure with a lack of human resources in mid management.

Identifying interested parties and their requirements – As previously mentioned, the company mainly exports to Sweden and Japan. The Swedish customer had simple requirements and they were mostly regarding quality of the surfaces and the type of wood used in the production. However, the Japanese customer required chairs and tables for kindergartens, so he had more strict requirements for type of materials used in the production (e.g., rubber is sent from Japan and bolts are demanded to be imported from Denmark). All these requirements, along with local legislations regarding occupational health and safety and disposal of chemicals, are taken into account when determining interested parties and their requirements. For each requirement, a set of controls is implemented throughout the entire production process.

Leadership – In order to address the lack of mid management, the company hired two production managers with previous experience in the furniture industry and with ISO 9001; they helped with defining the production process along with defining roles and responsibilities within the process. The employees working in the process were relieved, because now they knew exactly what was expected from them.

One of the biggest problems in the company was the complete lack of any kind of documentation and documentation management. Instead of using drawings and the product specifications, they had a sample of each product and took measurements from them in order to produce new products. The company even purchased the cutting-edge CNC machine, but without digital drawings of the products they couldn't use it properly. The engineer who was hired previously understood the need for systematization of the documentation and digitalization of the drawings, but being the only person in the mid management he never found the time to complete it.

Production process – People working in the production were highly skilled, but poorly managed. Without precise procedures and work instructions, they were never sure what they needed to do and often relied on the CEO's wishes rather than job descriptions. Creating a documented procedure for production helped to define all activities in the process and get the process under control. Handling of customer property was one of the biggest weaknesses, especially in the case of the Japanese customer. The rubber and the bolts required to be used in the products were often misplaced and the wrong parts were incorporated into the product, which led to a lot of nonconformities and complaints. This issue was also addressed with the production procedure.

Monitoring, measuring, analysis, and evaluation – When asked what was measured and when, the answer was usually “when needed.” There were no strict and precise instructions on what

should be monitored and measured, and when, and the employees were relying mostly on their experience. After examination of the product drawings, the engineer defined values of the pressure in the press and the pressure and time applied for gluing different parts of products. All this information was also added to the production procedure and work instructions. At the end of the production process, they had a simple quality check where one employee looked at the products to identify flaws and mistakes, but very often he didn't know where to look and what requirements the product needed to meet. So, a checklist for inspection was created for every type of product, which was particularly important to meet the requirements of the Japanese customer.

Handling nonconformities and customer complaints – Nonconformities identified were never analysed and instead of removing the cause, they simply created a new product. The worst was with customer complaints, because the products were shipped far away and they couldn't be repaired, only replaced, so every complaint meant a huge loss to the company. Implementing a process for managing nonconformities and corrective actions was very beneficial to the company, because they later discovered the flaws of the gluing process and managed to prevent further nonconformities.

The company mentioned here was struggling with its problems for a long time and although it looked successful from the outside, it was on the brink of collapse. Great human resource deficiencies with a lack of process control could turn this nice story into tragedy. However, the top management realized that these things needed to change, and they embraced ISO 9001 as a tool for overcoming their challenges. Most of the companies that implement ISO 9001 lack this little detail, awareness of the top management. Without it, no profound change and no improvements can be made in the company regardless of its success and current state.

Questions

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|-----|--|-------------|
| 1.1 | Suggest the key benefits associated with “leadership”. | [4] |
| 1.2 | Discuss the possible actions that should be considered when dealing with “leadership”. | [6] |
| 1.3 | To prevent this problem from occurring in the future, explain the prerequisites of implementing a quality management system. | [6] |
| 1.4 | Create an understanding by explaining the seven quality management principles which form the basis of ISO 9001:2015. | [7] |
| 1.5 | In your opinion how can X Company improve on their business? | [3] |
| | | [26] |

QUESTION TWO

Case study 2

Questions

- | | | |
|-----|---|-----|
| 2.1 | The aim of the project is to assist Housing Providers with working through how to determine if any of their stock is at risk of overheating as the climate changes, and what strategic steps and internal processes they intend to put in place to manage the risk. | |
| | Develop a risk management framework. | [6] |

- 2.2 Argue the benefits of risk management. [5]
- 2.3 Appraise the principles of risk management. [11]
- [22]**

QUESTION THREE

Case study 3

DB Construction is a key player within the construction industry with a particular focus on civil engineering, substructure works, highway works and ground works. DB works with a diverse range of public and private sector clients and fulfils the role of principle contractor for local authorities. As a subcontractor the company has worked continuously on the Essex Highways Maintenance and Improvements Framework. DB values certification to demonstrate transparency of its operations and accountability for all works undertaken by the organisation. Currently registered to ISO 9001 and ISO 14001, work is also underway towards gaining certification to BS OHSAS 18001 Occupational Health and Safety Management.

“In order to maintain our average yearly growth rate of 34%, we are committed to increasing our work with existing clients and strategically chosen new clients,” says Jack Bowie, QSHE Director. “We understood that becoming ISO certified in several key areas of our business was not so much a choice rather a necessity. Today certification is a primary requirement for competing in some Pre-Qualification Questionnaires and Invitation to Tenders. It enables an organisation to demonstrate its commitment to quality and environmental management. This is particularly important for local authority projects.”

- 3.1.1 Assist DB Construction and discuss the benefits of an Environmental Management system. [5]
- 3.2 Demonstrate how OHSAS 18001:2007 could be applied in terms of safety during construction. [2]
- 3.3 Upon certification, explain to DB Construction why management systems should be integrated. [11]
- 3.4 Elaborate on the benefits of an integrated management system. [10]
- [28]**

QUESTION FOUR

Theory Application

- 4.1 Consider Figure 1 and deduce the **six** potential actions to be taken with the process approach. [6]

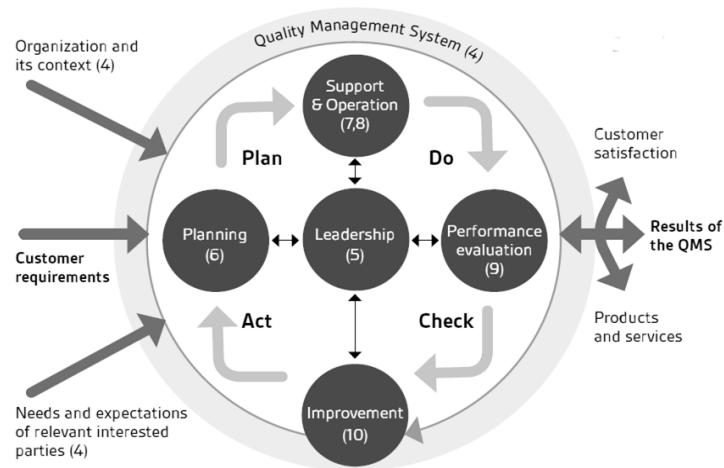
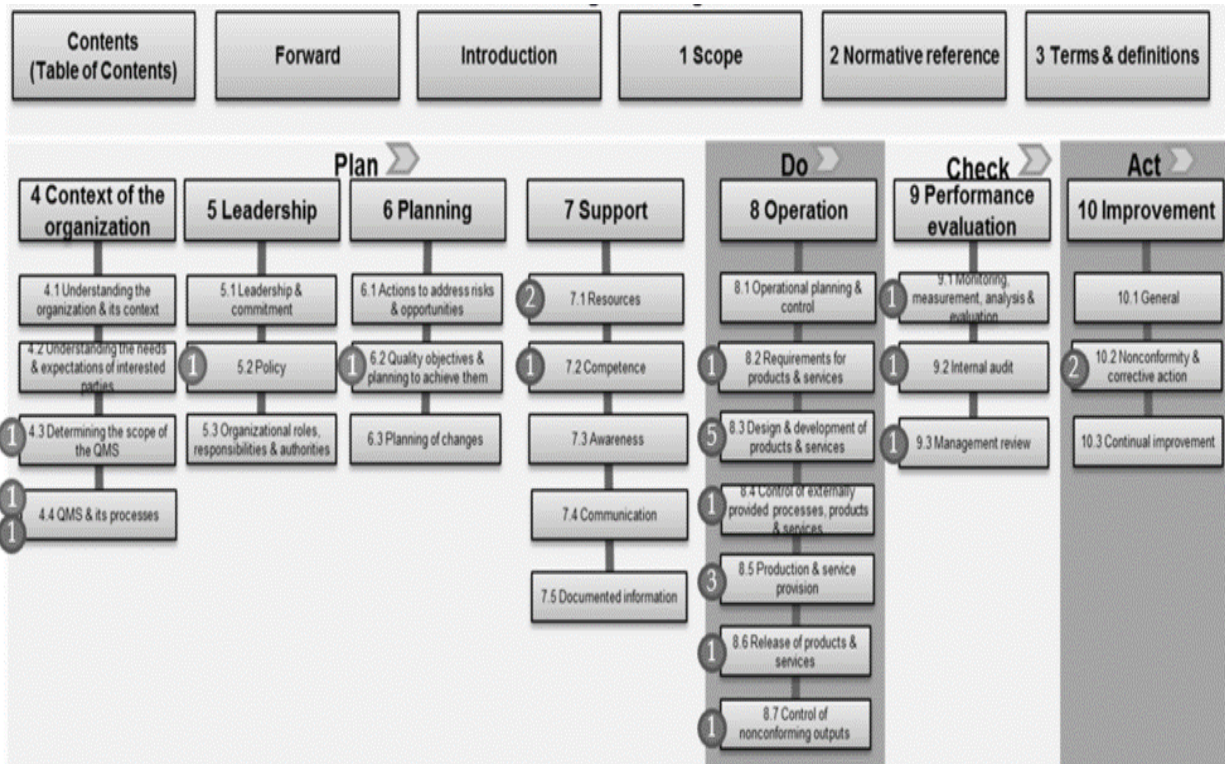


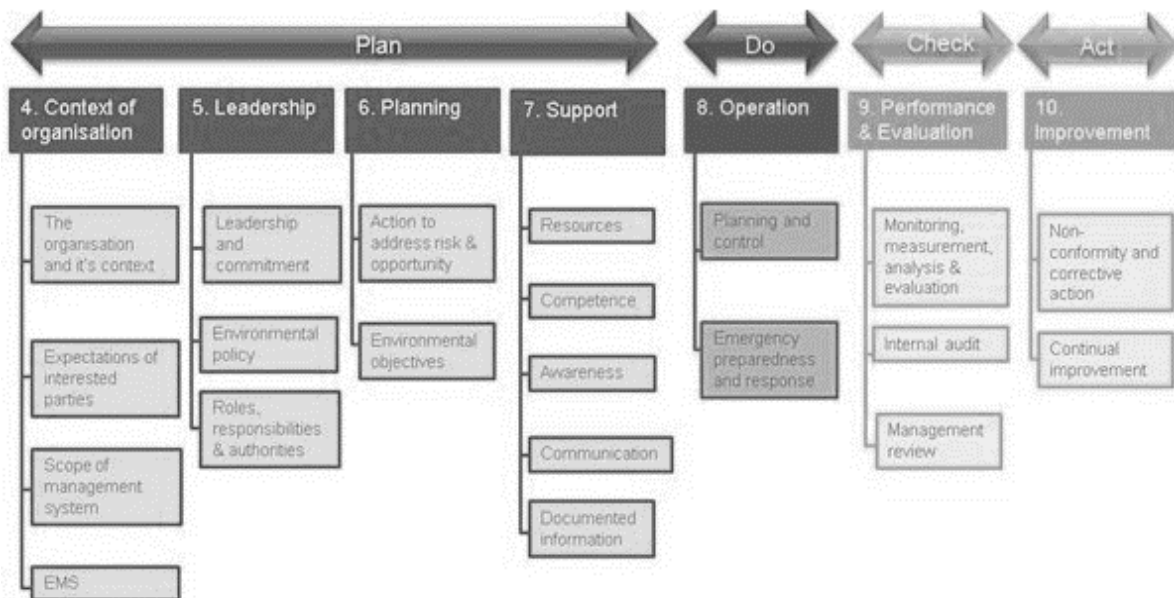
FIGURE 1

- 4.2 Appraise the four elements of the PDCA cycle. [4]
- 4.3 Defend the application of the process approach model in Figure 1. [4]
- 4.4 Identify **any five** major clauses of ISO 9001:2015. Stipulate how these clauses have been implemented in your organisation. [10]
- [24]

Total = 100 marks



Summary of ISO 14001:2015 Clauses



Summary of ISO OHSAS Clauses

PLAN				DO	CHECK	ACT
4. Context of the organization	5. Leadership and worker participation	6. Planning	7. Support	8. Operation	9. Performance evaluation	10. Improvement
4.1 Understanding the organization and its context	5.1 Leadership and commitment	6.1 Actions to address risks and opportunities	7.1 Resources	8.1 Operational planning and control	9.1 Monitoring, measurement, analysis and performance evaluation	10.1 General
4.2 Understanding the needs and expectations of workers and other interested parties	5.2 OH&S Policy	6.2 OH&S objectives and planning to achieve them	7.2 Competence	8.2 Emergency preparedness and response	9.2 Internal audit	10.2 Incident, Nonconformity and corrective action
4.3 Determining the scope of the OH&S management system	5.3 Organizational roles, responsibilities and authorities		7.3 Awareness		9.3 Management review	10.3 Continual improvement
4.4 OH&S management system	5.4 Consultation and participation of workers		7.4 Communication			
			7.5 Documented information			