FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

June Examination

DEPARTMENT	QUALITY & OPERATIONS
MODULE	OPERATIONS MANAGEMENT IV
CODE	BPJ 44A4
DATE	09th JUNE 2016
DURATION	3 HOURS
TIME	08:30 - 11:30
TOTAL MARKS	100

EXAMINER	MR J. AGWA-EJON AND MR. B. JAVANI
EXTERNAL MODERATOR	MR J. MASHALA
NUMBER OF PAGES	07 PAGES

INSTRUCTIONS TO CANDIDATES:

- Question papers must be handed in.
- This is an open 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.
- The general University of Johannesburg policies, procedures and rules pertaining to written assessments apply to this assessment.

PREPARATION AND REQUIREMENTS:

Student Requirements:	Stationery, **Graph Paper**, Examination Book, **Z-distribution Table (see Appendix)**
Equipment Requirements (minimum):	Financial Calculator / Scientific Calculator

...Cont...

SECTION A – OPERATIONS TECHNOLOGY STRATEGY (50 MARKS)
SECTION B – PROJECT MANAGEMENT (50 MARKS)

SECTION A (50 Marks)

Operations & Technology Management Strategy

Note to Students:
Read the following scenario carefully and answer the questions at the end of the case study. Make use of practical examples to illustrate your knowledge and understanding of problem solving.

Introduction
There were numerous major quality breakthroughs over many years. However, it is only when management realise that business and operational processes, and not only people are key to capability and optimal performance. Organisations therefore need to understand operational and individual business processes as well as their strategic impact they have on the entire supply network.

Recent research has shown that key to successful process decisions requires that specific criteria's should be taken into consideration. Some of these are (*i*) the best fit for the situation – logical operational chain, (*ii*) optimisation of one process at the expense of another – utilises organisation's resources, (*iii*) processes as building blocks that create a total business value chain which include the cumulative phases of business processes affecting output, customer satisfaction and competitive priorities + advantage – defined objective, (*iv*) that there is no distinction between any processes in the value chain either performed by internal or by outside suppliers – include all stakeholders, and (*v*) that managers pay attention to interfacing all processes ensuring cross-functional coordination (operational) – achievement of measurable results.

UMZUMBE CORPORATION
Background
Lately there has been an unexpectedly large increase in the demand for services and products in the UMZUMBE CORPORATION (UC). Due to the increase in demand the UC is presently struggling to satisfy the demand for their products and services. In addition to this they have seen an opportunity to provide their services and products to be exported to central African and South American markets.

Presently, UC is in the process of increasing their output and as part of this process are re-evaluating their supply chain. In order to achieve this departments have hired temporary employees and are working the maximum possible overtime.

At a recent strategic meeting the following facts were revealed:

1. The marketing director of UC, Mr Tshabalala, states that there is a delay in deliveries to customers. However, the factory manager, Mr Naidoo, says that the marketing department gave him un-realistic sales order due dates and that sales target are crazy. Mr Naidoo also pointed out that delays are due to the re-prioritisation of works orders and projects.

2. At the same meeting, the financial director, Mrs Harding, expressed a concern about the high wage bill - especially the high overtime cost and number of casuals employed. She stated that the total expenses were much higher than the budget allowed and that the budget had been calculated on previous years' actual expenses which have been averaged out at a flat rate per month. She as well as Mr Naidoo mentioned that UC does not have the necessary capability to take care of the unexpected increase of demand for their products and projects.

3. A major concern is that the quality manager, Mrs Moeketsi, says that she is sick and tired that the marketing and financial director are always complaining about customer satisfaction, bad quality and high overhead cost. She stated that they know nothing about quality and operational processes.

As the result of the above statement Mrs Moeketsi send a memorandum to the CEO expressing his concern that over the past 8 months no quality improvements have been made and that everybody does just do what they want too to get the jobs done – chasing targets and bonuses.

The following common concerns were identified after thorough operational and business process analysis. These are:

i. Lack of identification and measurement of competitive priorities,
ii. Misunderstanding and attitude towards quality,
iii. Inadequate tools to determine the status of operational and quality within the organisation,
iv. Inadequate problem identification and handling,
v. No clear defined supply chain strategy in place,
vi. Lack of application of good project principles.

The CEO of the organisation decided to develop "New Operations and Technology Management Strategy".

Questions:

1. You are the newly appointed Chief Operations Officer of UC. Analyse the above scenarios and propose possible strategic operational actions that you will take to "improve" the present situation. Justify your answer(s) by means of practical examples. (30 Marks)

2. In fulfillment of this objective, compile a framework that will ensure future continuous improvement measures and operational capability in order to maintain competitiveness, and operational performance. (20 Marks)

Total **(50 Marks)**

SECTION B (50 Marks)

PROJECT MANAGEMENT

QUESTION 1 (25)

The activities that are necessary to build Construction machines are listed in the following table:

Activity	Duration	Immediate Predecessors
A	10	-
B	14	-
C	12	A
D	18	B,C
E	08	B,C
F	04	A
G	15	E
H	12	D,F
I	20	G,H

1.1 Construct a network for the production of one machine. (06)
1.2 Identify the critical path using the letters in the networks. (02)
1.3 Calculate the total project duration. (02)
1.4 Determine the ES, EF, LS, LF, and Slack value for each activity in the project. (15)

QUESTION 2 [25]

The activities involve in building a small drinking place in Soweto in weeks (W) and the associated costs in Rands (R) are listed below;

Activity	Normal Time (W)	Crush Time (W)	Normal Cost (R)	Crush Cost (R)	Immediate Predecessors
A	3	1	1 000	1 600	-
B	2	1	2 000	2 700	-
C	3	3	500	500	-
D	7	3	1 300	3 600	A
E	6	1	850	1 000	B

F	2	1	4 000	5 200	C
G	4	2	1 500	2 000	D, E
H	8	5	4 400	8 000	D, E
I	6	4	2 000	3 600	F, G

2.1 Construct the network and determine the project completion time in weeks. (08)

2.2 What will be the total cost of crushing this project to ten (10) weeks in the most economical way? (27)

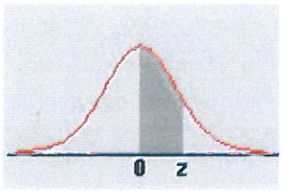
Total **(50 Marks)**

TOTAL 100 MARKS

APPENDIX

Z-DISTRIBUTION CURVE

Area between 0 and z



	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015

1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990