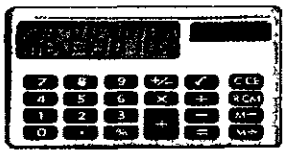
UNIVERSITY EXAMINATIONS



UNIVERSITEITSEKSAMENS

UNISA university of south africa

MNO2604

May/June 2016

WORK STUDY

Duration 2 Hours

70 Marks

EXAMINERS

FIRST MR B SOOKDEO
SECOND MR MJ MOTHA

Use of a non-programmable pocket calculator is permissible.

Closed book examination.

This examination question paper remains the property of the University of South Africa and may not be removed from the examination venue

This examination paper consists of twenty (20) pages

Make sure the following information appears on the cover of your answer book

- your student number
- your identification number
- date of examination and examination venue

This examination paper consists of two sections
Section A consists of question 1 which contains 10 multiple-choice questions x 1 marks each Please answer this question in the block provided in your answer book

Section B consists of three questions, namely questions 2, 3 and 4 Each of these questions is worth 30 marks **You have to select any <u>two</u> questions** and answer them for 60 marks out of 70 Sections A and B together thus count 70 marks

SECTION A:
QUESTION 1 ANSWER ALL QUESTIONS IN THIS SECTION 10 marks

SECTION B:
QUESTIONS 2, 3 and 4. SELECT **<u>ANY TWO</u>** (2) OF THE THREE (3) QUESTIONS <u>60 marks</u>
<u>70 marks</u>

RECOMMENDATION: PLEASE CAREFULLY CONSIDER THE ABOVE MARK ALLOCATION AND TOTAL TIME LIMITATION (TWO HOURS) BEFORE DECIDING ON WHICH SECTION TO ANSWER FIRST.

[TURN OVER]

SECTION A

QUESTION 1

THIS QUESTION MUST BE ANSWERED BY ALL STUDENTS. ANSWER EACH OF THESE QUESTIONS IN THE BLOCK PROVIDED. ANSWER ALL TEN QUESTIONS.

1 1	Management needs work study because it uses _____ _____ and studies at the workplace in order to obtain the facts required
	1 variety reduction
	2 comparative estimation
	3 continuous observation
	4 detailed measures
	Answer:
1 2	The critical examination of all the recorded information refers to which one of the following steps of the work study procedure?
	1. Step 1
	2 Step 2
	3 Step 3
	4 Step 4
	Answer:
1 3	Method study develops more efficient methods of working to ensure the _____ _____ of human and other resources
	1 optimal utilisation
	2 detailed analysis
	3 efficient effort
	4 satisfactory usage
	Answer:
1 4	A systematic investigation can be defined as a_____ _____ to a problem with the purpose of solving the problem in the most advantageous way possible
	1 measurable gauge
	2 systematic approach
	3 reliable technique
	4 systematic procedure
	Answer:
1 5	Which one of the following process charts uses only an operation and inspection symbol?
	1 Flow process chart
	2. Outline process chart
	3 Travel chart
	4 Multiple activity chart
	Answer:

1 6	Work measurement is concerned with the identification of _____ _____ with the aim of eventually eliminating it
	1 effective time
	2 average times
	3 *ineffective time*
	4 inefficient methods
	Answer:
1 7	Work measurement serves as an accurate aid to effective _____ and _____ utilisation
	1 training and staff
	2 planning and work
	3 plant and machine
	4. labour and equipment
	Answer:
1 8	Use the information provided to calculate the "Actual time" and state which one of the following is the correct answer?

Observed time	= 13 86 minutes	Observed rating	= 105
Frequency	= 1/2	Rest allowance	= 11%

	1 6 077 standard minutes
	2 7 198 standard minutes
	3. 8 077 standard minutes
	4 9 186 standard minutes
	Answer:
1 9	Complete the calculation below and state which one of the following is the correct answer?

	1	2	3	4	5	Total
x	2	3	4	5	6	$\sum x = 20$
x^2	4	9	16	25	36	$\sum x^2 = 90$

$$N = \left(\frac{40\sqrt{n' \sum x^2 - (\sum x)^2}}{\sum x} \right)^2$$

$$= \left(\frac{40\sqrt{5\,(90) - (20)^2}}{20} \right)^2$$

	1 100 more cycles
	2 125 more cycles
	3 150 more cycles
	4 200 more cycles
	Answer:

1 10	Use the information given below to calculate the "Error margin" and state which one of the following is the correct answer? Clock time = 60 minutes All observed times = 56 55 minutes TEBS = 1 06 and TEAS = 1 35		
	1 1 63		
	2 1 73		
	3 1 83		
	4 1 93		
	Answer:		
	Section A: 10 questions x 1 marks each = 10 marks **Total marks for Question 1:**		**[10]**

SECTION B

QUESTIONS 2, 3 AND 4:
SELECT AND ANSWER ANY TWO (2) OF THE THREE (3) QUESTIONS BELOW.
EACH QUESTION COUNTS 30 MARKS.

QUESTION 2

2 1 Work study is widely used to tackle areas of ineffectiveness in organisations With this in mind, write a short description of your understanding of the concept of work study and explain how it can add value to an organisation (6)

2 2 Explain why work study is considered a "tool" of management and briefly explain the nature of work study (6)

2 3 One of the objectives of method study aims at developing better ways of doing things and reducing costs in the organisation It also contributes to improving efficiency by eliminating unnecessary work and delays, and preventing other forms of waste With this in mind, identify the ways in which the objectives of method study can be achieved (6)

2.4 **Outline process chart:**

The following procedure concerns a requisition for petty cash by the planning manager of a steel manufacturing company

> The planning manager writes out the requisition and checks if all the details are correct The requisition is then inserted into the "pick up" basket It waits in basket to be picked up *(2 50 minutes)* The requisition is taken to the accounting department *(50 metres and 2 95 minutes)* Here, the account number and signature are verified
>
> The treasurer approves the amount The requisition is then taken to the cashier *(20 metres)* Here, the cashier counts the amount required *(3 00 minutes)* and hands the requisition to the bookkeeper *(15 metres).* The bookkeeper records the amount in the records journal (*1 00 minute*) The petty cash is inserted into an envelope
>
> The petty cash is returned to the planning department The planning manager checks the amount against the requisition The manager then signs the receipt as acceptance of the petty cash The amount is then stored in the safety box

Required:

Read the information provided and compile an outline process chart of the present method Use the attached outline process chart on the next page (12)

OUTLINE PROCESS CHART

DEPARTMENT			STUDY NO	DATE
DIVISION			TAKEN BY	
SHEET NO. OF			CHART COMMENCES AT	
PRESENT METHOD		PROPOSED METHOD:	CHART ENDS AT	
DESCRIPTION OF TASK				

WORKER / MATERIAL / EQUIPMENT

STEP NO.	DESCRIPTION	SYMBOL	TIME	REMARKS

SUMMARY:	○ OPERATION	□ INSPECTION		TOTAL STEPS
	NO TIME	NO TIME		

Total marks for Question 2:		[30]

[TURN OVER]

QUESTION 3

3 1 Work measurement is the second technique of work study which is used to measure the duration of tasks In view of this statement, explain how a work measurement investigation will add value to your organisation (6)

3 2 Kanawaty (1995) states that work measurement is really a term used to describe a family of techniques, any one of which can be sued to measure work, rather than a single technique by itself Make use of a diagram to illustrate the principal techniques for carrying out work measurement (6)

3 3 Time study is a direct work measurement technique which is widely used to determine standard times In view of this statement, outline the one very important characteristic of time study and the five pre-requisites for the use of time study (6)

3 4 The following table shows the observed times and ratings of the assembly and leak testing of car radiators at Ready Radiators A contingency allowance of 6% is applicable

Observation number		Assembly				Leak testing		
		Observed time	Rating	Rest allowance		Observed time	Rating	Rest allowance
1		1 45	80	15		3 10	90	14
2		2 30	90	12		5 20	105	12
3		6 40	85	13		4 35	80	15
4		3 80	75	14		2 10	95	14
5		4 40	110	14		4 60	75	14

You are required to calculate the standard time for the assembly and the leak testing of the car radiators, separately Make use of the tables on the next page to answer this question
Note: You must show all steps of your calculations

Standard time for the assembly {6}

Element	Observed time	Observed rating	Basic time	Rest *allowance*	Actual time
				Total actual time:	
				Contingency allowance	
				Standard time:	

Standard time for the leak testing {6}

Element	Observed time	Observed rating	Basic time	Rest allowance	Actual time
				Total actual time:	
				Contingency allowance	
				Standard time:	

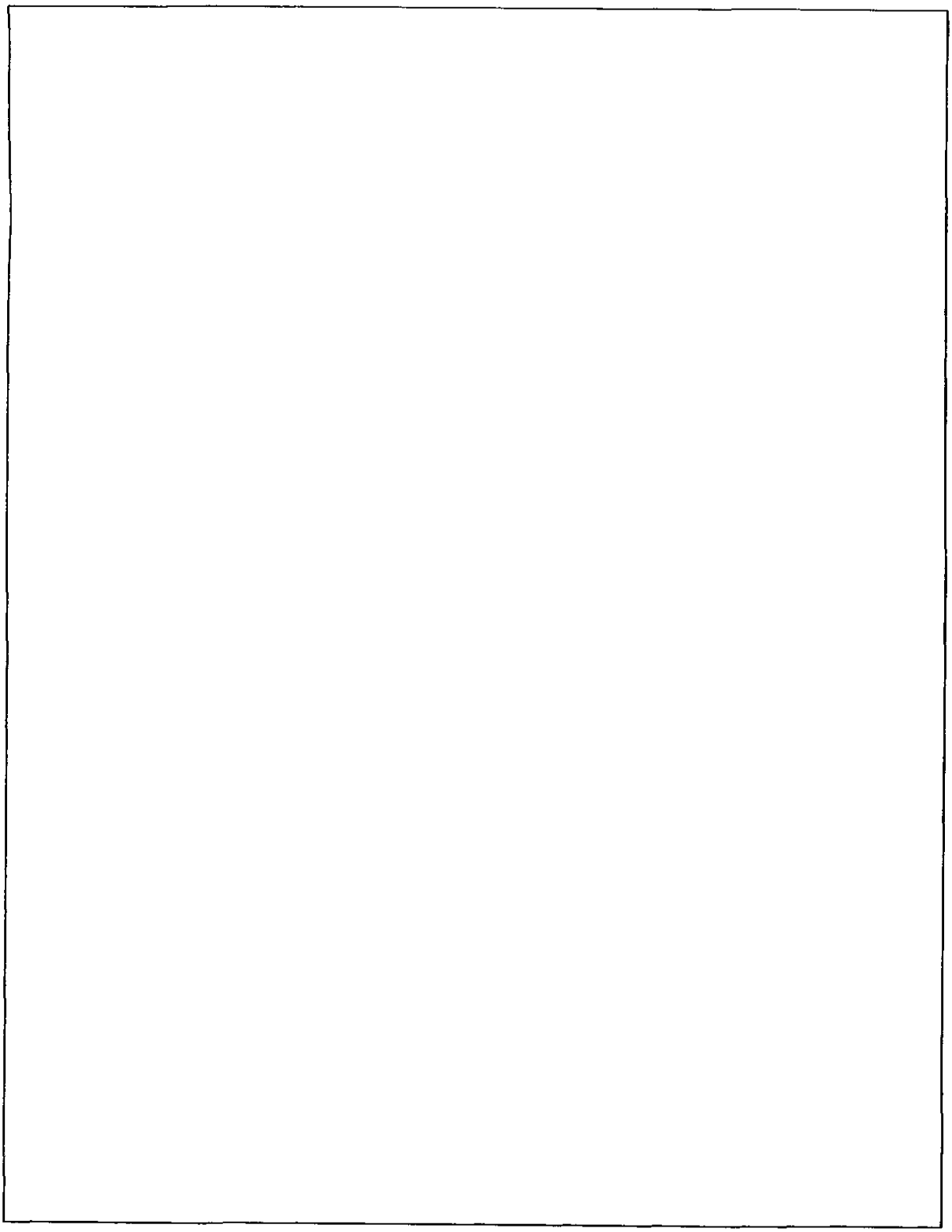
(12)

Total marks for Question 3:		**[30]**

QUESTION 4

4 1 Briefly explain the following aids available to management Clearly indicate how each of these aids contributes to the decision-making process
Organisational development, value analysis, variety reduction, PERT and motion study (5)

4 2 Work content is an important concept in work measurement With this in mind, make use of a diagram to illustrate the work content allocated to product and processes (5)



4 3 An element can be defined as a sub-division of a task that consists of homogeneous movements, the duration of which may be measured by means of a stopwatch In response to this definition, outline and explain the six steps of the procedure for element selection (6)

4 4 **Multiple activity chart:**

The following information concerns an operation in which material is slit using a slitting machine The operatives utilised in this operation consist of an operator and a helper who assists the operator The tasks that have been identified are as follows

Number	DESCRIPTION	Time
	OPERATOR	
1	Run machine	2 20
2	Wait for helper	0 70
3	Label the rolls	0 60
4	Open the winder	0 30
5	Wait for helper	0 80
6	Start machine	0 60
	HELPER	
1	Prepare wrappers and labels	0 90
2	Wait for machine	1 30
3	Wrap rolls	0 90
4	Wait for operator	0 70
5	Remove rolls	0 80
6	Place on skid	0 60
	MACHINE	
1	Slit material	2 20
2	Idle	3 00

Required:

Compile a multiple activity chart (worker/machine) of the present method showing the operator, helper and the machine (10)

Please note that you do not need a chart to compile this multiple activity chart Please compile this chart on the next page

4 5 Study the following scenario with regards to an average worker and answer the question that follows

Assume that a standard time must be determined for five workers A, B, C, D and E, who do the same work These five workers have the same training as well as experience and time study will be used to determine the standard time The output of the workers is as follows

Worker	Output (units per hour)
A	118
B	126
C	111
D	124
E	110

Calculate the average and determine which one of the five workers is most suitable for conducting a work measurement study and explain why it is compulsory to use a suitably qualified worker (4)

Total marks for Question 4:		**[30]**

Section B: any 2 questions x 30 marks = 60 marks

TOTAL NUMBER OF MARKS (SECTIONS A & B) = 70

[TURN OVER]

ADDITIONAL PAGES.
Should you find that the space provided after each question is insufficient, please number the question and continue with your answers on the following pages