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MNO2604
MAY/JUNE 2017
WORK STUDY

STUDENT NUMBER									

IDENTITY NUMBER											

FOR USE BY EXAMINATION INVIGILATOR

Question No	Marks					
	Examiners					
	1	2	3	4	5	6
1						
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Total						

Number of paper

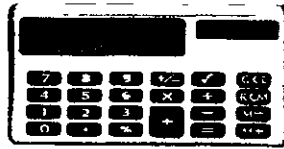
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**MNO2604**

May/June 2017

WORK STUDY

Duration 2 Hours

70 Marks

EXAMINERS

FIRST

DR B SOOKDEO

SECOND

MR BL MBONYANE

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 one (21) 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 ten multiple-choice questions. 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 two 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 THIS QUESTIONS IN THIS SECTION

10 marks

SECTION BQUESTIONS 2, 3 and 4 SELECT **ANY TWO** (2) OF THE THREE (3) QUESTIONS

60 marks

70 marks
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

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

QUESTION 1

1 1 The importance of work study in organisations cannot be over-emphasised Which one of the following clearly outlines why work study is important in an organisation? Work study

- 1 helps to prevent continuous retrenchments in organisations
- 2 allows management to determine the rates of remuneration of its employees
- 3 assists management to achieve their organisational objectives efficiently
- 4 ensures that employees work harder in order to meet set targets and due dates

Answer:

1 2 The ILO defines work study as

- 1 an effective investigation
- 2 a successful investigation
- 3 an operational investigation
- 4 a systematic investigation

Answer

1 3 In order to attain its objectives, work study concentrates on which three of the following aspects?

- a The most valuable use of employees and processes in order to meet set targets
- b The most efficient and effective application of plant and equipment
- c The most efficient and effective application of human resources
- d The evaluation of material usage

- 1 a, b, c
- 2 a, b, d
- 3 a, c, d
- 4 b, c, d

Answer:

1 4 Which one of the following steps of the work study procedure refers to "the results attained by the improved method compared with the quality of work involved and calculate a standard time for it"?

- 1 Define
- 2 Examine
- 3 Evaluate
- 4 Install

Answer:

[TURN OVER]

1 5 The structure of work study indicates that method study can be utilised to improve methods of production. It also uses its systematic procedure in order to achieve which three of the following?

- a Reduction of fatigue
- b A better working environment
- c Improved design of equipment
- d Improved factory and workplace layout

- 1 a, b, c
- 2 a, b, d
- 3 b, c, d
- 4 a, c, d

Answer

1 6 During a method study investigation, a problem must be identified and selected. Method study uses _____ to search, analyse and come to an understanding of the factors which caused the problems.

- 1 critical thinking
- 2 decision making
- 3 process optimisation
- 4 mind mapping

Answer.

1 7 A flow process chart is a process chart setting out the sequence of the flow of a product or a procedure by recording all events under review using the appropriate process chart symbols. Which of the following are the three types of flow process charts which can be distinguished?

- a Procedure type
- b Man (worker) type
- c Material type
- d Equipment type

- 1 a, b, c
- 2 a, b, d
- 3 a, c, d
- 4 b, c, d

Answer

[TURN OVER]

- 18 Work measurement is really a term used to describe a family of techniques, any one of which can be used to measure work, rather than a single technique by itself. Which of the following are the principal techniques of work measurement?
- a Time study
 - b Work sampling
 - c Analytical estimating
 - d Pre-determined time standards
- 1 a,
2 a, b
3 a, b, c
4 a, b, c, d

Answer

- 19 Use the information below to calculate the standard time for element 1 and state which one of the following is the correct answer

Element number	1
Selected basic time	3 017
Rest allowance %	11%
Contingency allowance	6%

- 1 3 549 standard minutes
- 2 3 550 standard minutes
- 3 3 551 standard minutes
- 4 3 552 standard minutes

Answer.

- 1 10 Given the following information, calculate the "Actual time" and state which one of the following is the correct answer

Observed time	Rating	Frequency	Rest allowance
8 763	75	1/2	10

- 1 3 612 standard minutes
- 2 3 613 standard minutes
- 3 3 614 standard minutes
- 4 3 615 standard minutes

Answer.

Section A: 10 questions x 1 mark = 10 marks

[TURN OVER]

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 Draw a diagram to show the structure of work study and provide a brief outline of the definition of work study (8)

A large empty rectangular box for drawing a diagram and writing a definition. The box is divided into two main sections: a large upper section for drawing and a lower section with horizontal lines for writing.

[TURN OVER]

2 2 Write short notes on your understanding of the financial implications of work study (4)

2 3 Similar to work study, method study also consists of a scope Describe the scope of method study (4)

[TURN OVER]

2.4 Method study: Single-column process chart

The following procedure concerns the processing of a home loan application. The process includes a home loan consultant and a credit clerk.

The home loan consultant receives the application form from the applicant. Checks the application to ensure that all sections are completed (4.3 minutes). He/she places the application form in the out tray to be forwarded to the processing department (0.25 minutes).

The credit clerk receives the application the following day. Contacts the credit bureau to verify the applicant's credibility (6.90 minutes). Checks the applicant's banking details and historical data (8.80 minutes). Thereafter, he/she contacts the employer to verify that the applicant is employed (3.00 minutes). Writes a recommendation on the application form (2.50 minutes). Takes the application form to the home loan consultant, (15 metres). He/she returns to his/her desk.

The home loan consultant receives the application from the credit clerk. Checks the recommendation of credit clerk (1.50 minutes). Contacts the applicant to inform him/her of the outcome (3.75 minutes).

Required:

Using the above information, compile a single-column process chart (operator type) of the present method of procedure. Use the attached single-column process chart on the next page. (14)

SINGLE COLUMN PROCESS CHART

DIVISION			TAKEN BY		
SHEET	OF		CHART COMMENCES AT		
PRESENT METHOD		PROPOSED METHOD		CHART ENDS AT	

DESCRIPTION OF TASK

STEP NO	DETAILS OF OPERATION	OPERATIONS					DISTANCE	TIME	REMARKS
		O P E R	I N S P E C T	D E L A Y	T R A N S	S T O R A G E			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
		○	□	D	⇨	▽			
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		○	□	D	⇨	▽			
		○	□	D	⇨	▽			

OPSOMMING SUMMARY		▽ STORAGE OPBERGING	○ OPERATION OPERASIE	⇨ TRANSPORT VERVOER	D DELAYS VERTRAGINGS	□ INSPECTION INSPEKSIE
	GETAL NO	TYD TIME	GETAL NO	TYD TIME	GETAL NO	TYD TIME

[TURN OVER]
[30]

QUESTION 3

3 1 The work measurement definition raises four important issues, namely, a fair time, a qualified worker and a defined rate of working Explain each of these issues within the context of work measurement (6)

3 1 1 A fair time	{2}
3 1 2 A qualified worker	{2}
3 1 3 A defined rate of working	{2}

3 2 One of the application possibilities of work measurement is that work measurement serves as an important aid when planning and controlling labour complements Explain what is meant by this and how "time standards" can assist in this regard? (4)

[TURN OVER]

33 Differentiate between direct and indirect work measurement techniques. Substantiate your answer with examples of two direct and two indirect work measurement techniques (6)

34 **Work measurement: Time study**
 The following information is the results of a time study that was conducted at your work place. The task consists of ten elements. You are required to calculate the basic time, the selected basic time, the actual time and the standard time for this job. Please answer this question in Table 1 below. A contingency allowance of 6% is applicable (14)

Element number	Observed time	Rating	Frequency	Rest allowance %
1	2 76	65	1/1	9
2	2 96	60	1/1	8
3	2 87	65	1/1	10
4	2 84	65	1/1	11
5	2 12	85	1/1	9
6	2 52	75	1/1	11
7	1 43	110	1/1	12
8	1 09	105	2/1	10
9	1 88	100	1/1	9
10	2 31	90	1/2	8

[TURN OVER]

Table 1 Time study analysis

Element number	Observed time	Rating	Basic time	Frequency	Selected basic time	Rest allowance %	Actual time per element
Total actual time							
Contingency allowance							
Standard time							

[30]

QUESTION 4

4 1 Method study uses diagrams to indicate movements or the inter-relationships of movements more clearly than process charts can do. With this in mind, name three method study diagrams which indicate movement and provide a brief description of each (3)

[TURN OVER]

4 2 Before a work measurement investigation is conducted, it is imperative that the supervisors and the workers be thoroughly acquainted with the purpose of the work measurement investigation. In view of this statement, what would you say are some of the ways that the work study officer can gain the co-operation of the supervisors and workers? (3)

4 3 **Method study** Multiple activity chart

The following procedure concerns the manufacture of wooden handles for paint brushes

Procedure:

- An operator, a cutting machine and a sanding machine are used in the process of manufacturing wooden handles for paintbrushes
- The process involves cutting timber to produce handles of specified dimensions which are then sanded to create a smooth surface, the handles are then transferred to the finishing department where the final shaping and painting operations are carried out

The sequence of events and standard times are as follows

[TURN OVER]

STEP NO.	ELEMENT	STANDARD TIME (in centi-minutes)
1	Operator collects timber from storage area	0 40
2	Loads onto cutting machine	1 60
3	Set length to be cut on machine	0 40
4	Switches cutting machine on	0 20
5	Trim Length (hand feed)	0 80
6	Switches machine off	0 20
7	Turn timber around (90°)	0 30
8	Set width to be cut on machine	0 40
9	Switches machine on	0 20
10	Trim width (hand feed)	0 50
11	Switches machine off	0 20
12	Transfers handle to standing workbench	0 90
13	Picks up sanding machine	0 50
14	Switches machine on	0 10
15	Sands all surfaces of handle	2 00
16	Switches machine off	0 10
17	Place machine aside	0 20
18	Conducts a check for smoothness in a jig	0 80
19	Transfers completed top to temporary storage	0 60

Required:

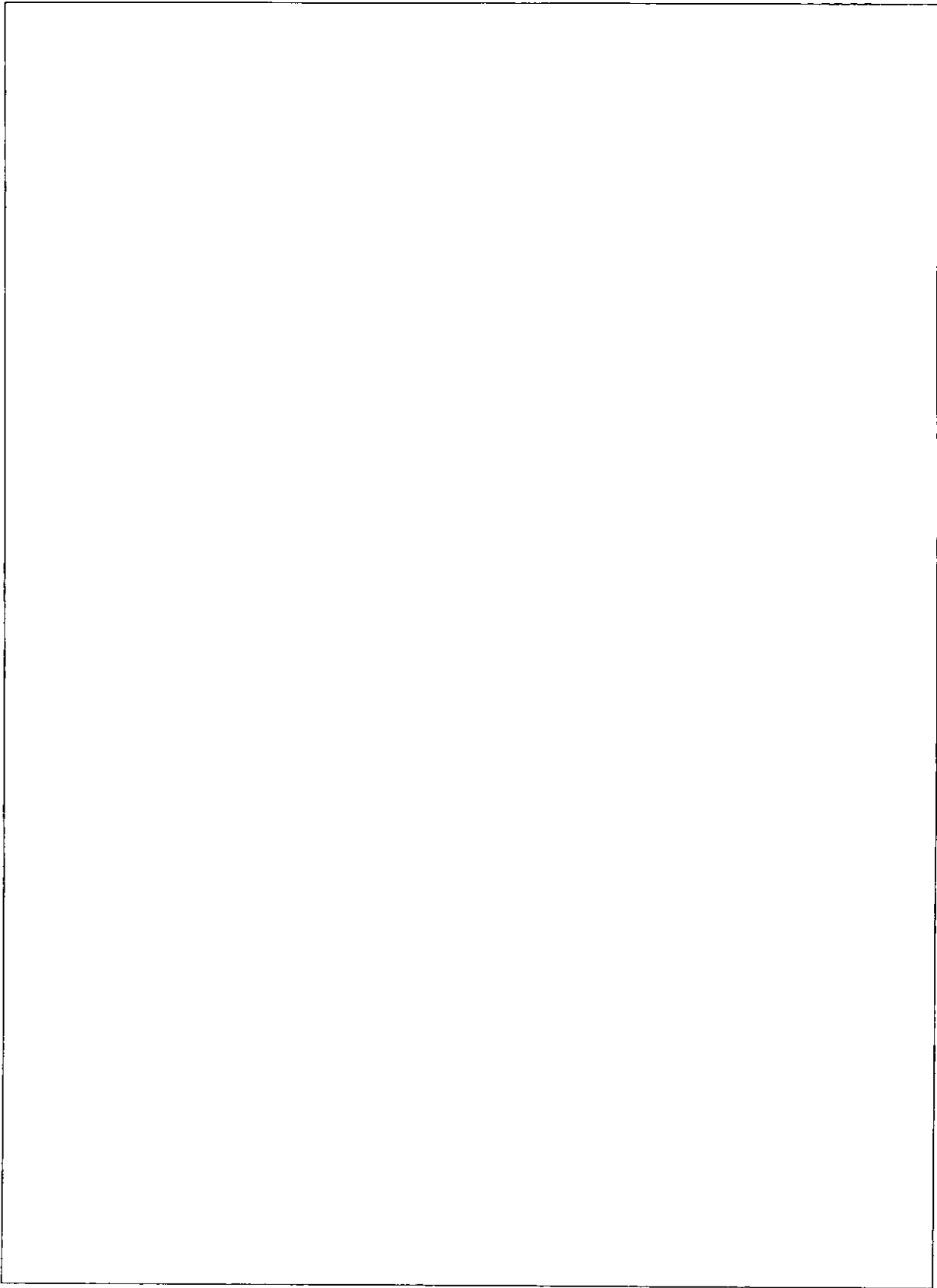
Make use of the above information to compile a Multiple Activity Chart of the operation
Show the relationship between the activities of the operator, the cutting machine and the sanding machine

Note:

You do not need a chart to compile this multiple activity chart. You must compile it on the pages which follow this question in your answer book.

(10)

[TURN OVER]



[TURN OVER]

4.4 Work measurement Time study

The following observed times were taken from a time study that was conducted in the production department of Ready Radiators. The task consists of five elements, and five observations of each element were made.

The study started at 09:00 and finished at 09:40.

TEBS = 1.86 and TEAS = 1.24.

A contingency allowance of 5% is applicable.

Element	Observed time	Rating
1	1.35	80
2	2.40	65
3	0.66	75
4	1.25	80
5	1.55	80
1	1.40	85
2	2.29	70
3	0.59	70
4	1.19	85
5	1.49	85
1	1.39	85
2	2.33	70
3	0.61	75
4	1.29	75
5	1.58	80
1	1.42	85
2	2.39	70
3	0.69	80
4	1.24	80
5	1.44	85
1	1.31	80
2	2.42	65
3	0.71	80
4	1.33	70
5	1.50	85

The following rest allowances are applicable:

Element 1	13%
Element 2	11%
Element 3	12%
Element 4	13%
Element 5	14%

[TURN OVER]

Calculate the following

4.4.1 The error margin

{3}

[TURN OVER]

4 4 2 The basic time per element Please answer this in Table 2 below

{5}

Table 2: Time study analysis

TIME STUDY ANALYSIS SHEET											
DEPARTMENT				STUDY TAKEN BY							
AFDELING DIVISION				DATE				STUDY NO			
DESCRIPTION OF TASK				TIME FINISHED				TEBS + TEAS			
				TIME STARTED				TIME OF STUDY			
WORKER		ERROR		ELAPSED TIME				RECORDED TIME			
Basic time per element											
		ELEMENT NUMBER									
		NO. 1	NO 2	NO. 3	NO. 4	NO. 5	NO	NO	NO	NO	NO
N U M B E R O F O B S E R V A T I O N S	1.										
	2.										
	3.										
	4.										
	5.										
	TOTALS										
NO OF OBSERVATIONS.											
AVERAGE BASIC TIME:											

[TURN OVER]

4 4 3 The standard time to produce one product

{6}

STANDARD TIME CALCULATION							
Elem No	Element Description	Average Basic Time	Frequency	Selected Basic Time	RA %	Other Allow	Actual Time
S B T – Selected Basic Time				TOTAL ALLOWED TIME.			
R A - Rest Allowances				Contingency allowance			
AT – Allowed Time				STANDARD TIME:			

(14)

[30]

Section B: any 2 questions x 30 marks = 60 marks
TOTAL NUMBER OF MARKS (SECTIONS A & B) = 70

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

[TURN OVER]

Tear

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