



UNIVERSITY
OF
JOHANNESBURG

FACULTY OF ENGINEERING AND BUILD ENVIRONMENT

**DEPARTMENT OF QUALITY AND OPERATIONS MANAGEMENT
MAIN EXAMINATION**

PROGRAMME : **NATIONAL DIPLOMA: OPERATIONS MANAGEMENT**

SUBJECT : **OPERATIONS MANAGEMENT 3**

CODE : **BPJ33A3**

DATE : **30th MAY 2016**

TIME : **8h30**

DURATION : **3 HOURS**

WEIGHT : **50:50**

TOTAL MARKS : **100**

NUMBER OF PAGES : **4 (including cover page)**

EXAMINERS : **DR. P. KHOLOPANE & MISS M. SILASE**

MODERATOR : **PROF. T. TENGEN**

INSTRUCTIONS:

ANSWER **ALL** QUESTIONS IN PROVIDED ANSWER BOOKS AND ENSURE THAT YOUR STUDENT NUMBER APPEARS ON ALL THE WORK THAT YOU HAND IN. **THIS IS A CLOSED BOOK ASSESSMENT**

REQUIREMENTS : ANSWER SCRIPTS; SCANNER SHEET; CALCULATOR.

- QUESTION 1** [8]
Analyze the four elements into which Preventive maintenance procedures is divided.
- QUESTION 2** [10]
Explain 5 reasons why we need to carry out maintenance.
- QUESTION 3** [8]
Explain the important tactics of maintenance and reliability
- QUESTION 4** [12]
Maintenance engineering has integrated steps covering the following facts given below. Explain each one of these steps.
4.1. Job screening(including risk and priority)
4.2. Scoping(what to do)
4.3. Planning(how to do it)
4.4. Scheduling(when to do it)
4.5. Execution(doen it)
4.6. Close-out
- QUESTION 5** [5]
In your own words, explain in detail what risk management is.
- QUESTION 6** [6]
Define Prevention and Mitigation in terms of risks in your own words and explain why is it so important
- QUESTION 7** [5]
Give 5 reasons why work order number is so important
- QUESTION 8** [5]
Discriminate between ERP and CMMS
- QUESTION 9** [7]
Name seven functions of CMMS
- QUESTION 10** [6]
Identify and explain three ways of obtaining failure rate data.

QUESTION 11**[3]**

A product has three components X, Y, and Z integrated in series. X has reliability of 0.991; Y has reliability of 0.993. If Z has reliability of 0.991, what is the reliability of the entire product? Can Z be redesigned to be reliable enough for the entire product to have reliability of 0.99? Explain.

QUESTION 12**[8]**

Given the following, 15 circuit breakers subjected to 80 hours of testing each. Halfway through the testing, 3 circuit breakers failed. What was the following?

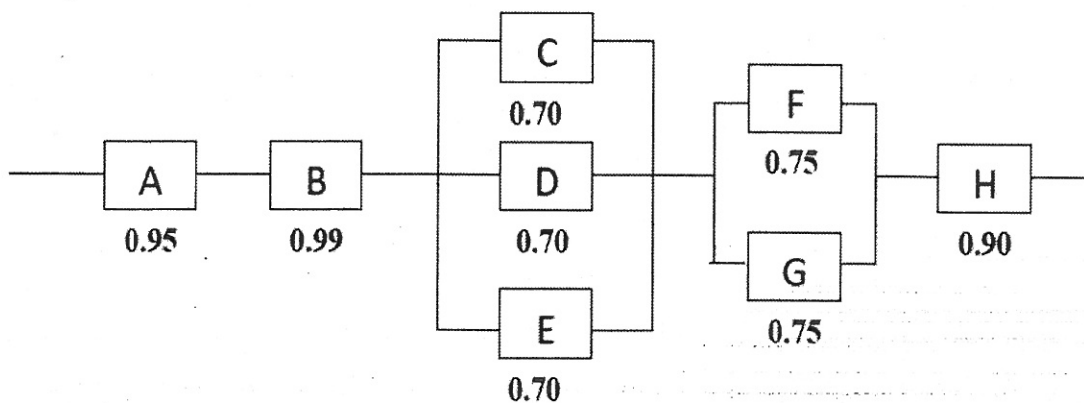
- Percentage of failures
- Number of failures per unit-hour
- Number of failures per unit-year
- If 20 motors receive circuit breakers installations, how many motors can we expect to fail during the following year?

QUESTION 13**[2]**

What is the Mean Time Between Failures for Question 12 problem?

QUESTION 14**[15]**

A system consists of 8 identical components connected in series and parallel as shown below. What is the reliability of a system having both series and parallel parts? (Note: Give your answer to 4 decimal places)



Formulae

Percentage failures [FR%] = Number of failures / Number of units tested x 100

Number of failures per unit hour [FR (N)]

FR (N) = number of failures/ Total time – Non operating time

Number of failures per unit year = FR (N) x 24hrs x 365 days

Series $R_s = R_1 \times R_2 \times R_3$

Parallel = $[1 - (1 - R_C) (1 - R_E)]$

END OF ASSESSMENT

[100 MARKS]

GOOD LUCK