DEPARTMENT OF COMPUTER ENGINEERING
FACULTY OF ENGINEERING
UNIVERSITY OF BENIN, BENIN CITY, EDO STATE.
SECOND SEMESTER EXAMINATION (2018/2019 SESSION)

COURSE CODE: *CPE 391 (RELIABILITY AND MAINTENABILITY)* **TIME:** *3HOURS*
INTRUCTION: ANSWER MINIMUM OF FOUR QUESTIONS

1A. There are exactly 25 personal computers in a software laboratory. The condition of use includes; operating time, room-temperature, dust, vibration, acoustics, environment, and geographical location.
Explain the reliability of the 25 personal computers, and state what is considered more important for their maintainability if some hardware and software components failure are analyzed for REPLACEMENT and REPAIRABILITY.

B. Describe the following parameters of reliability metrics

i. Failure rate (λ)
ii. Hazard rate
iii. Mean time between failure (MTTF)
iv. Mean time between maintenance (MTBR)
v. Mean time between repair (MTBR)
vi. Mean time between critical failure (MTBCF)
vii. Mean time between operational mission failure (MTBOMF)

C. Briefly describe four essential elements of a reliability requirement.

2A Briefly describe preventive maintenance for hardware systems and state the draw backs of performing preventive maintenance
What are the difference between preventive maintenance and predictive maintenance?

B. Briefly describe the following preventive maintenance categories

i. Time Based Maintenance (TBM)
ii. Failure Finding Maintenance (FFM)
iii. Risk Based Maintenance (RBM)
iv. Condition Based Maintenance (CBM)
v. Corrective Maintenance(CM)

C. Highlight the objectives of maintenance prevention (MP) and state the stages maintenance prevention (MP) activities are conducted.

3A. Zinox Computer Limited are about to produce 80 mini laptops for a sales promo, briefly describe the term "quality control" in the line of production and operations management of the process.

B. Briefly describe the three main sub-areas in quality control and highlight the steps in quality control process.
i. What are the objectives of quality control
ii. What are the benefits of quality control?

4A. The Head of department (HOD) of computer engineering developed a website for computer Engineering department A Pareto analysis on the causes for error on the website is shown in figure 4.0 below. Using the Pareto principle briefly discuss where efforts should be focused to achieve greatest improvement when effecting maintenance on the website.

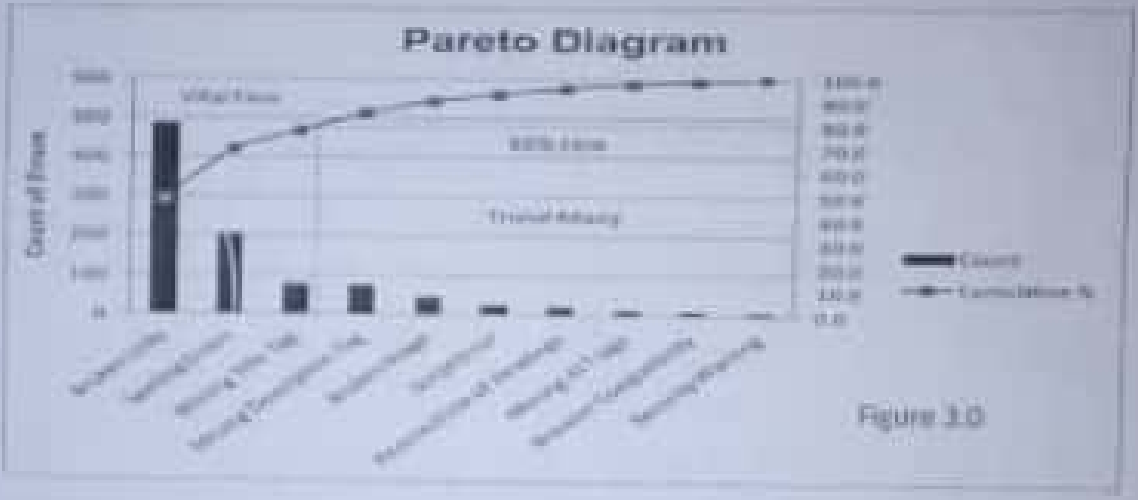

Figure 3.0

B. Briefly discuss the two Causes of Variation in Quality of product in hardware manufacturing process.

C. Briefly discuss any of the following tools for quality control.

i. Cause and effect diagram
ii. Scatter diagrams
iii. Histogram
iv. Graphs or flow charts
v. Control charts

Case Study

Three final year students of computer engineering decide to set up a company [illegible] commercialize their final year project. The company registration and administrative functions were handled solely by Team Member A, while Team Members B and C focused on the product design. Two months down the line, Team Member B reluctantly withdrew from the team due to disenchantment. The frustration was mainly because of frequent system failures

5A What is Capability Maturity Level (CMM)

B List the levels in CMM and succinctly describe them in not more than two sentences

C Using Case Study 1,

i. Profile the team using CMM
ii. Suggest how the team can progress to higher levels using CMM

6 A i. What is software reliability

ii. What is the difference between software reliability and hardware reliability

B State some of the reasons why software fail

C From the perspective of reliability, how is software different from hardware

D Sketch and discuss software reliability curve