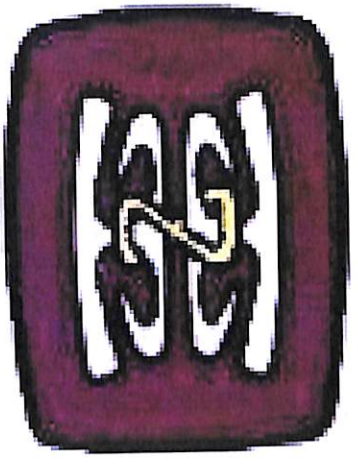
PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINERING

EXAMINATION QUESTION PAPERS



ME 412
CONTROL ENGINEERING

SEMESTER ONE – 2024

BY GK

Question 1:

- Define and discuss Step Function and write down its Laplace Transforms.

10 Marks

- Write down and discuss the Laplace Transform for the Ramp Function

15 Marks

Question 2: Discuss Proportional + Integral +Derivative Control Action.

20 Marks

Question 3: Discuss Unit-Step Response of First Order Systems.

25 Marks

Question 4: Consider the following complex function:

$$F(s)=\frac{s^2+2s+3}{(s+1)^3}$$

Find the inverse Laplace transform of the function $F(s)$. Hints:

$$L^{-1}\left[\frac{1}{s+\alpha}\right]=e^{-\alpha t},\ L^{-1}[0]=0,\ L^{-1}\left[\frac{1}{(s+\alpha)^n}\right]=\frac{1}{(n-1)!}t^{n-1}e^{-\alpha t},\quad n=1,2,3...$$

30 Marks