

ADMISSION NUMBER											

School of University Polytechnic

Diploma in Civil Engineering
Mid Term Examination - Nov 2023

Duration : 90 Minutes
Max Marks : 50

Sem I - N1DF101T - Applied Mathematics-I

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Find $\sec \theta$ if $\theta = 60^\circ$. K2 (2)
- 2) Which term of A.P. 4, 9, 14, Is 124. K1 (3)
- 3) If $b = a + a^2 + a^3 + \dots + \dots + \dots + \infty, a < 1$, Show that $a = \frac{b}{1+b}$. K2 (4)
- 4) If $x = 1 + a + a^2 + a^3 + \dots + \dots + \dots + \infty$ and $y = 1 + b + b^2 + b^3 + \dots + \dots + \dots + \infty$ where $|a| < 1, |b| < 1$. Then prove that $xy = 1 + ab + a^2b^2 + a^3b^3 + \dots + \dots + \dots + \infty = \frac{xy}{x+y-1}$. K2 (6)
- 5) Apply binomial expansion, Find the coefficient of x^6y^3 in $(x+y)^9$. K3 (6)
- 6) Identify four numbers in A.P. such that their sum is 20 and sum of their squares is 120. K3 (9)
- 7) Simplify $\cos\left(\frac{3\pi}{2} + x\right) \cos(2\pi - x) \left\{ \cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi - x) \right\}$ K4 (8)
- 8) The product of three numbers in A.P. is 224, and the largest number is 7 times of smallest number. Discover the numbers. K4 (12)

OR

Discover the term independent of x in the expansion of $\left(x^2 - \frac{1}{x^3}\right)^{10}$. K4 (12)