QP CODE	2018001002

Reg.No | | | | | | | | | | |

DMI-ST. EUGENE UNIVERSITY

ZAMBIA

DEGREE EXAMINATION – JUNE 2023

Semester: I **800MA102** **MATHEMATICS - I**

Time: 3:00 Hours **Max. Marks: 100**

Answer any FIVE Questions(5 x 20 = 100 Marks)

1. a) Describe the various types of sets . **(10 Marks)**

   b) If Set A= {1,2,3,4,} B={2,4,6,8}and C={,3,4,5,6}are subsets of the universal set ∪={1,2,3,4,5,6,7,8,9,10}list the elements of the set (i) A'∪(B∩ C) (ii) AND A ∩B∩ C **(5 Marks)**

   c) If A={3,5,7,9,11},B={7,9,11,13}and C={11,13,15} Find (i) (A∩ B) ∩ ($B \cup C$)

   (ii) A∪ $B \cup C$ **(5 Marks)**

2. a) Prove the identity $\frac{tanx+\sec x}{secx\left(1+\frac{tanx}{secx}\right)}=1$ **(10 Marks)**

   b) Solve the equation $3\tan^3 x = \tan x$ for $0 \leq x < 2\pi$. **(5 Marks)**

   c) Convert $40°20'$ into radian measure. **(5 Marks)**

3. a) Find the derivative of the following function:$f(x) = \sin x \cos x$ **(10 Marks)**

   b) Find the derivative of $f(x) = \frac{1}{x}$. **(5 Marks)**

   c) Find the limit $\lim_{x\to 1}\left[\frac{x-2}{x^2-x}-\frac{1}{x^3-3x+2x}\right]$ **(5 Marks)**

4. a) Find the distance between the points P$(1,-3,4)$ and Q $(-4,1,2)$. **(10 Marks)**

   b) Find the distance between parallel lines

   (i) $15x+8y-34=0$ and $15x+8y+31=0$

   (ii) $l(x+y)+p=0$ and $l(x+y)-r=0$ **(10 Marks)**

5. a) Two coins are tossed once. find the sample space. **(5 Marks)**

b) Find the mean deviation about the median for the following data

3,9,5,3,12,10,18,4,7,19,21 **(5 Marks)**

c) Find the mean and variance of : **(10 Marks)**

x:	6	10	14	18	24	28	30
f:	2	4	7	12	8	4	3

6. a) The weight (in kg) of 13 students in a class are 42.5, 47.5, 48.6, 50.5, 49, 46.2, 49.8, 45.8, 43.2, 48, 44.7, 46.9, 42.4. Find the range and coefficient of range. **(10 Marks)**

   b) One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting a diamond card? **(5 Marks)**

   c) Define a sample space and range **(5 Marks)**

7. a) line through the points,$(-2,6)$ and(4,8)is perpendicular to the line through the points (8,12) and (x,24)find the value of x. **(10 Marks)**

   b) Find the ratio in which the YZ-plane divides the line segment formed by joining the points (–2, 4, 7) and (3, –5, 8). **(10 Marks)**