Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Diploma Engineering, Winter 2021-22 Examination

Semester:1 **Date: (dd/mm/yyyy)**

Subject Code: **Time: (2hr: 30min)**

Subject Name: (Mathematics I) **sample Paper-3** **Total Marks: 60**

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is considered to be Authentic.

Q.1	**Answer any Nine out of twelve. (2 Marks Each)**	**(18)**
	1. Solve: $\frac{x}{(x-2)(x^2+2)} = \frac{?}{(x^2+2)} + \frac{?}{(x-2)}$	
	2. Solve: $\log_e 5 - \log_e 4 =$	
	3. Solve: $10^{\log_{10} 10} =$	
	4. Convert radian to degree form: $(i)\frac{3\pi}{10} =$ **Convert degree to radian form:** $(i)135\dot{} =$	
	5. Solve: (i) $\sin\left(\frac{3\pi}{2}+\theta\right) =$ $(ii)\ \sec(360-\alpha) =$	
	6. If $Z = 2 + i$ **then find the value of** $Z + \overline{Z}$ **and** $Z - \overline{Z}$.	
	7. If $Z = -1 + 4i$ **then find value of** $\lvert Z\rvert$.	
	8. Find invers: $Z = 1 - i$	
	9. If $f(x) = \log(x)$ **then find** $f(625)$	
	10. If $f(x) = cos(x)$ **then find** $f(0)$	
	11. Find limit: $\lim_{x\to a}\frac{x^n-a^n}{x-a} =$	
	12. Solve: $y = sin(x^2)$ **then find** $\frac{dy}{dx}$	
Q.2	**A) Solve:** $\frac{7x-25}{(x-4)(x-3)}$	**(03)**
	OR	
	A) If $sin\theta = \frac{3}{5}$ **then find the other T-ratio.**	**(03)**
	B) Solve: $\frac{x^2-3x+1}{(x-2)^2(x+1)}$	**(03)**
	OR	
	B) Prove that $\log\left(\frac{9}{14}\right) - \log\left(\frac{15}{16}\right) + \log\left(\frac{35}{24}\right) = 0$	**(03)**
	C) If $z_1 = 3 - 2i$ **and** $z_2 = 2 + 5i$ **then find** $\lvert z_1 - z_2\rvert$.	**(04)**
	OR	
	C) If $\log_x 4 + \log_x 16 + \log_x 8 = 9$ **then find the value of 'x'.**	**(04)**
	D) Solve: $z = \frac{2+3i}{3+2i}$	**(04)**
	OR	
	D) Draw the graph $y = \sin x$ **then** $0 \le \theta \le \pi$.	**(04)**
Q.3	**A) Prove that:** $\frac{1}{\log_{24} 12} + \frac{1}{\log_8 12} + \frac{1}{\log_9 12} = 3$.	**(03)**
	OR	

	A) If $f(x) = \frac{1-x}{1+x}$ then find **(i) $f(x) + f\left(\frac{1}{x}\right) = 0$.** **(ii) $f(x) - f\left(\frac{1}{x}\right) = 2f(x)$.**	**(03)**
	B) Solve: $\lim_{x\to 0} \frac{a^x - b^x}{x}$	**(03)**
	OR	
	B) If $f(x) = \log(\frac{x-1}{x})$ then prove that, $f(x) + f(-x) = f(x^2)$	**(03)**
	C) If $y = 3x^2 + 2x + 5$, then find $\frac{dy}{dx}$.	**(04)**
	OR	
	C) Solve: $\frac{cos\ 3\theta - i\ sin\ 3\theta}{cos2\ \theta - i\ sin2\ \theta}$.	**(04)**
	D) If $z_1 = 3 - 2i$ and $z_2 = 2 + 5i$ then find $\lvert z_1 * z_2 \rvert$	**(04)**
	OR	
	D) Solve: $\lim_{x\to 1} \frac{x^2 - 8x + 7}{7x^2 - 6x - 1}$.	**(04)**
Q.4	**A) Prove that: $\log(\sqrt{x^2+1} + x) + \log(\sqrt{x^2+1} - x) = 0$**	**(03)**
	B) If $y = x^3 cosx$, then find $\frac{dy}{dx}$	**(03)**
	C) If $f(x) = a^x$ then prove that, (i) $f(x+y) = f(x) \cdot f(y)$. $(ii) f(x-y) = \frac{f(x)}{f(y)}$.	**(04)**
	D) Solve: $z = 3 - i$ then find $\lvert z + \bar{z} \rvert$ and $z \cdot \bar{z}$	**(04)**