Seat No: _____ Enrollment No: _____

# PARUL UNIVERSITY

## FACULTY OF ENGINEERING & TECHNOLOGY

**Diploma Engineering, Sample Paper -2**

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

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

**Subject Name: (Mathematics I)** **Paper-2** **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.

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| **Q.1** | **Answer any Nine out of twelve. (2 Marks Each)** | **(18)** |
| | **1. Solve:** $\frac{x^2}{(x+5)(x^2+7)} = \frac{?}{(x^2+7)} + \frac{?}{(x+5)}$ | |
| | **2. Solve:** $\log_6 2 + \log_6 3 =$ | |
| | **3. Solve:** $1024^{\log_2 5} =$ | |
| | **4. Convert radian to degree form:** $(i)\frac{4\pi}{5} =$ $(ii)\ 7\pi =$ | |
| | **5. Solve: (i)** $\text{cosec}(3\pi - \theta) =$ $(ii)\ \cos(270° + \alpha) =$ | |
| | **6. If** $Z = -4 + \sqrt{2}i$ **then find the value of** $Z + \overline{Z}$ **and** $Z - \overline{Z}$. | |
| | **7. If** $Z = 3 - 2i$ **then find value of** $\lvert Z \rvert$. | |
| | **8. Find invers:** $Z = 2 - 3i$ | |
| | **9. If** $f(x) = \sin(x)$ **then find** $f(\frac{3\pi}{2} - x)$ | |
| | **10. If** $f(x) = e^x$ **then find** $f(0)$ | |
| | **11. Find limit:** $\lim_{n\to 0}(1+n)^{1/n}$ | |
| | **12. Solve:** $e^{logx}$ | |
| **Q.2** | **A) Solve:** $\frac{1}{(x+1)(x-3)}$ | **(03)** |
| | **OR** | |
| | **A) If** $tan\theta = -\frac{3}{4}$ **and** $\frac{3\pi}{2} \le \theta \le 2\pi$**, then find the other T-ratio.** | **(03)** |
| | **B) Solve:** $\frac{x^2}{(x-1)^2(x+2)}$ | **(03)** |
| | **OR** | |
| | **B) Prove that** $2\log\left(\frac{6}{7}\right) + \frac{1}{2}\log\left(\frac{81}{61}\right) - \log\left(\frac{27}{196}\right) = \log 12$ | **(03)** |
| | **C) If** $z_1 = -5 + 4i$ **and** $z_2 = 6 - 2i$ **then find** $\lvert z_1 + z_2 \rvert$. | **(04)** |
| | **OR** | |
| | **C) If** $log(x+3) + log(x-3) = log(27)$ **then find the value of 'x'.** | **(04)** |
| | **D) Solve:** $z = \frac{1-i}{2+i}$. | **(04)** |
| | **OR** | |
| | **D) Draw the graph** $y = \sin x$ **then** $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$. | **(04)** |
| **Q.3** | **A) Prove that:** $\frac{1}{\log_{bc} p} + \frac{1}{\log_{ca} p} + \frac{1}{\log_{ab} p} = 2\log_p abc$. | **(03)** |
| | **OR** | |
| | **A) If** $f(x) = logx$ **then find**<br>**(i)** $f(xy) = f(x) + f(y)$. | **(03)** |

| | | |
|---|---|---|
| | **(ii)** $f\left(\frac{x}{y}\right) = f(x) - f(y)$. | |
| | **B) Solve:** $\lim_{x \to 0} \frac{3^{4x}-1}{x}$ | **(03)** |
| | **OR** | |
| | **B) If** $f(x) = sinx$ **then find** $f(x) + f(\pi + x) = 0$ | **(03)** |
| | **C) If** $y = e^x - x^e + e^e - logx$ **then find** $\frac{dy}{dx}$ **.** | **(04)** |
| | **OR** | |
| | **C) Solve:** $\frac{cos\ 5\theta + i\ sin\ 5\theta}{cos2\ \theta - i\ sin2\ \theta}$ **.** | **(04)** |
| | **D) If** $z_1 = 2 - i$ **and** $z_2 = -2 + 1i$ **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:** $\frac{1}{\log_2 30} + \frac{1}{\log_3 30} + \frac{1}{\log_5 30} = 1$ | **(03)** |
| | **B) If** $y = e^x * logx$ | **(03)** |
| | **C) If** $f(x) = \log(\frac{x-1}{x})$ **then prove that,** $f(x) + f(-x) = f(x^2)$ **.** | **(04)** |
| | **D) Solve:** $z = 2 - 3i$ **then find** $\lvert z + \bar{z} \rvert$ **and** $z \cdot \bar{z}$ | **(04)** |