<div align="center">**Group 'A'**</div>   [1×5=5]

1. How many 4-digit number can be formed with no digit repeated by using the digits 3, 4, 5, 6, 7, 8 and 0?
    a)   280   b) 560   c) 720   d) 840
2. The greatest positive integer which divide $n(n+1)$ $(n+2)$ $(n+3)$ for all $n \in N$ is
    a)   2   b) 6   c) 20   d) 24
3. Which of the following statement is true?
    a)   A triangle can have two right angles
    b)   A triangle can have two obtuse angles
    c)   A triangle can have two acute angles
    d)   A triangle can have all three angles less then $60°$.
4. If α and β are the roots of $x^2 + x + 1 = 0$ then α^{2040} and β^{2040} is
    a)   -2   b) -1   c) 1   d) 2
5. $\int \sqrt{1 + sinx} \, dx = ?$
    a) $\sqrt{2} \sin(\frac{\pi}{4} - \frac{x}{2}) + C$ b) $\sqrt{2} \sin(\frac{\pi}{4} - \frac{x}{2}) + C$
    c) $-2\sqrt{2} \sin(\frac{\pi}{4} - \frac{x}{2}) + C$ d) None of these

<div align="center">**Group 'B'**</div>

6. a)   Differentiate between permutation and combination.   [2]
    b)   In how many ways can the letters of the word 'PENCIL' can be arranged under the following condition.
         i) How many begin with 'N'.   [1]
         ii) How many begin with 'E' and end with 'I'   [1]
         iii) If there is no restriction.   [1]
7. a)   The numbers 1, 2, 3, ... ∞ are said to be natural number. These numbers are used to form varions series.
         i) Write the formula for the sum of first $(n+1)$ even natural numbers.   [1]
         ii) Write the formula for the sum of square of first $(n-1)$ natural numbers. [2]

b) Define consistent and independent with suitable example. [1]

8. a) Mayor Balen Shah plans to have circular information technology park of radius 2 km in Kathmandu. A separate area in the form of a segment formed by a chord of length 2 km is to be allotted exclusively for a canteen in the park. Find the area of the segment to be allotted for the canteen. [3]

b) In a $\triangle ABC$, a = 2 $\sqrt{2}$, b = 2 $\sqrt{3}$ and c = 75°. Find the other side and the angles. [2]

9. a) Evaluate: $\int \frac{1}{x^2-a^2} dx$ [2]

b) Evaluate: $\int \sqrt{\frac{9+x}{9-x}} dx$ [3]

10. a) Evaluate: $\int \frac{1}{a+b \cos x} dx$ when a < b [3]

b) Find $\int \sqrt{x^2 + 2 + 5} dx$. [2]

11. a) In $\triangle ABC$, prove that

$\sin \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}$ Where 'S' is semi perimeter of $\triangle ABC$. [3]

b) Solve the following equation by using cramer's rule: [2]
2x + 3y = 7 and 3x + 5y = 9

12. a) Define de-moive's theorem [1]

b) Find the quotient $\frac{2 \cos\left(\frac{9\pi}{4}\right) + i \sin\frac{9\pi}{4}}{4\left(\cos\left(\frac{-3\pi}{2}\right) + i \sin\left(\frac{-3\pi}{2}\right)\right)}$ in rectangular form. [3]

c) If z = (Cos θ + i sin θ), Show that $z^n - \frac{1}{z^n} = 2 i \sin n\theta$. [1]

🙠 **Best of Luck** 🙡