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SUBJECT CODE NO: - BNP-2689
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc (NEP) (P-2024) S.Y Sem III
Examination November / December 2025
Mathematics (Number Theory)

[Time: 1:00 Hours]**[Max. Marks: 30]**

Please check whether you have got the right question paper.

N. B

- 1) Question No.1 is compulsory.
- 2) Attempt any four questions from question No.2 to 7.
- 3) Figure to the right indication full marks.

Part A**Q1 Choose the correct alternative:****10**

- 1) The Diophantine equation $2x+10y=17$ has _____.
 a) Unique solution b) infinite solutions
 c) no solution d) none of these
- 2) If $a=qb+r$ and $\gcd(a,b)=3$, then $\gcd(b,r)=\dots$.
 a) 1 b) 0 c) 2 d) 3
- 3) Which of the following statement is true?
 a) 1 is a prime number b) All primes are odd
 c) The integer 2 is only even prime d) The set of primes is finite
- 4) If n is a prime number, then $I(n)=\dots$.
 a) 2 b) n c) 0 d) 1
- 5) If $n=30$, then $\mu(n)=\dots$.
 a) 30 b) 8 c) 3 d) -1

Part B

- Q2** For positive integers a and b prove that $\gcd(a,b) \mid \text{lcm}(a,b)=ab$. **5**
- Q3** Use the Euclidean algorithm to obtain integers x and y satisfying $\gcd(56,72)=56x+72y$. **5**
- Q4** If $a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$ then prove that:
 $(a+c) \equiv (b+d) \pmod{n}$ and
 $(ac) \equiv (bd) \pmod{n}$ **5**
- Q5** Find the remainder when 2^{50} is divided by 7. **5**
- Q6** If p is a prime and pxa , then prove that $a^{p-1} \equiv 1 \pmod{p}$. **5**
- Q7** Calculate $\phi(36,000)$ **5**