Multiple choice questions - Number theory and discrete mathematics

Year: University Year 1 · 10

Question 1 $\gcd(48, 18) =$

- **A.** 3
- **B.** 6
- **C.** 9
- **D.** 12

Question 2 $7 \cdot 3 \bmod 10?$

- **A.** 1
- **B.** 2
- **C.** 3
- **D.** 21

Question 3 $2^{10} \bmod 11 =$

- **A.** 0
- **B.** 1
- **C.** 2
- **D.** 10

Question 4 Number of ways to choose 2 from 6

- **A.** 12
- **B.** 15
- **C.** 30
- **D.** 36

Question 5 $\varphi(7) =$

- **A.** 3
- **B.** 6
- **C.** 7
- **D.** 1

Question 6 A tree on 8 vertices has how many edges?

- **A.** 6
- **B.** 7
- **C.** 8

- ◯ **D.** 9

Question 7 Handshaking lemma: sum of degrees equals

- ◯ **A.** number of edges
- ◯ **B.** twice the number of edges
- ◯ **C.** number of vertices
- ◯ **D.** half the edges

Question 8 Arrangements of the letters of BOOK

- ◯ **A.** 24
- ◯ **B.** 12
- ◯ **C.** 6
- ◯ **D.** 4

Question 9 The inverse of 3 modulo 7 is

- ◯ **A.** 2
- ◯ **B.** 4
- ◯ **C.** 5
- ◯ **D.** 6

Question 10 K_4 has an Euler circuit?

- ◯ **A.** yes
- ◯ **B.** no
- ◯ **C.** only if directed
- ◯ **D.** only if weighted

Answer grid - Number theory and discrete mathematics

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Question	Answer	Explanation
1	**B**	$48 = 2 \cdot 18 + 12$, $18 = 12 + 6$, $12 = 2 \cdot 6$.
2	**A**	$21 \equiv 1$.
3	**B**	Fermat: $2^{10} \equiv 1$.
4	**B**	$\binom{6}{2}$.
5	**B**	For prime p, $p - 1$.
6	**B**	$n - 1$.
7	**B**	Each edge has two ends.
8	**B**	$\frac{4!}{2!}$.
9	**C**	$3 \cdot 5 = 15 \equiv 1$.
10	**B**	All degrees are 3 (odd).