

Department of Mathematics
Guru Nanak Dev University, Amritsar-143005
Quiz Test in Algebra I: M.Sc. (Hons.) Mathematics, Semester I
(2012)

Dated:—, 2012

Max. Marks 10

MTL402

Max. time allowed: 30 Minutes

Note: Read the instructions carefully:

✿ Attempt all 10 questions by ticking ✓ *only* one of the four choices (a), (b), (c), and (d) for each question below.

✿ Response to any question marked for more than one choice will not be counted for any score.

1. One of the following is *not* a composition series for the cyclic group $\mathbb{Z}/12\mathbb{Z} (\cong \mathbb{Z}_{12})$:
(a) $1 \trianglelefteq \langle \bar{6} \rangle \trianglelefteq \langle \bar{2} \rangle \trianglelefteq \mathbb{Z}/12\mathbb{Z}$ (b) $1 \trianglelefteq \langle \bar{8} \rangle \trianglelefteq \langle \bar{2} \rangle \trianglelefteq \mathbb{Z}/12\mathbb{Z}$
(c) $1 \trianglelefteq \langle \bar{3} \rangle \trianglelefteq \langle \bar{2} \rangle \trianglelefteq \mathbb{Z}/12\mathbb{Z}$ (d) $1 \trianglelefteq \langle \bar{4} \rangle \trianglelefteq \langle \bar{2} \rangle \trianglelefteq \mathbb{Z}/12\mathbb{Z}$
2. Up to isomorphism the total number of distinct non-abelian groups of order 66 is
(a) 2 (b) 3 (c) 4 (d) 5
3. Total number of group homomorphisms from $\mathbb{Z}_{28} \rightarrow \mathbb{Z}_{133}$
(a) 28 (b) 7 (c) 133 (d) 19.
4. Order of the group $\text{Aut}(\mathbb{Z}/n\mathbb{Z})$ is
(a) $2\varphi(n)$ (b) $\varphi(n)/2$ (c) $n\varphi(n)/2$ (d) $\varphi(n)$
5. Total number of conjugates of the permutation $\sigma = (12)(34)(567)(89)$ in S_9 is
(a) $\frac{9!}{144}$ (b) $\frac{9!}{54}$ (c) $\frac{9!}{48}$ (d) $\frac{9!}{96}$.
6. Order of the group $\text{Aut}(Z_{10} \times Z_{21})$ is
(a) 210 (b) 24 (c) 48 (d) 96.
7. Upto isomorphism, the total number of distinct groups of order 6 is
(a) 1 (b) 2 (c) 3 (d) 4
8. Let H be a subgroup of symmetric group S_{20} containing the transposition (12) such that $|H| > 2$.
Then
(a) H is simple (b) H is non abelian (c) $H = \langle (12) \rangle$ (d) H is not simple
9. Let G be a group of order 80. Then G is
(a) simple (b) not simple (c) always solvable (d) never solvable
10. Upto isomorphism, the total number of distinct groups of order 2345 is
(a) 1 (b) 2 (c) 3 (d) more than 100

1.*c*
2.*b*
3.*b*
4.*d*
5.*a*
6.*c*
7.*b*
8.*d*
9.*b*
10.*a*