Mid-West University

Examinations Management Office

Surkhet, Nepal

End Semester Examination-2082

Level: B.Ed. /VI Semester

Sub: Abstract Algebra (MATH465)

Roll No: ....

Group 'A' 10 × 1 =10

Tick (✓) the best answers:

1. How many elements are there in symmetric group S_3?

a. 3 b. 6 c. 4 d. 5

2. The inverse of (1 2 3) in multiplication table of S_3 is ....

a. (1 2 3) b. (2 3)

c. (1 3 2) d. (1 2)

3. The order of $-i$ in $\{1, -1, i, -i\}$ is ....

a. 4 b. 6 c. 2 d. 3

4.The generator of $\{1, -1, i, -i\}$ is ....

a. 1 b. -1 c. i d. i and $-i$

5. The order of 3 in Z_{12} is

a. 6 b. 9 c. 3 d. 4

6. Which of the followings is maximal ideal of Z?

a. 6Z b. 4Z c. 2Z d. 8Z

7. An ideal I of a ring R is called principal ideal if it is generated by

a. odd number b. even number

c. prime number d. single element

8. Which of the followings is not a field?

a. $< C, +, >$ b. $< Z, +, >$

c. $< R, +, >$ d. All of the above

9. Which of the followings is the unit of Z_5?

a. 1 b. 2 c. 3 d. All of the above

10. A polynomial $f(x) = a_0 + a_1 x + a_2 x^2 + \ldots\ldots + a_n x^n$ is called primitive polynomial if the $gcd\ (a_0, a_1, \ldots, a_n)$ is ....

a. 1 b. a_1 c. a_0 d. a_n

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Level: B.Ed. / VI Semester FM: 60

Time: 3.00 hrs. PM: 30

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Candidates are required to give their answers in their own words as far as practicable.

Attempt All the Questions.

Group 'B' **6×5 = 30**

1. Define cyclic group and abelian group. Prove that every cyclic group is abelian.

2. Prove that order of an element of a direct product of finite group is LCM of the order of components elements.

3. Define subnormal and normal series with example. Form three subnormal series from D_4.

Or

Let P(x) be an irreducible polynomial in F(x). Then there exists an extension E of F in which P(x) has a root.

4. Define Prime ideal, Maximal ideal, Principle ideal, Co-maximal ideal and Trivial ideals.

5. Define integral domain and prove that every field is an integral domain.

6. In a commutative ring R with identity, every maximal ideal is prime.

Or

Show by examples that Z is an integral domain but not a field.

Group 'C' **2×10 = 20**

7. Define internal and external direct product of groups. Prove that internal direct product of groups is isomorphic to external direct product.

8. Define Principal ideal domain(PID) and Unique factorization domain. Prove that PID is UFD.

Or

Define splitting field. Let K be a splitting field of the polynomial $f(x) \in F(x)$ over a field F. If E is another splitting field of f(x) over F, then there exists an isomorphism $\sigma : E \rightarrow K$ that is identity on F.

THE END