F.Y.B.SC. (COMPUTER SCIENCE) SEM –II (2014 COURSE) :
SUMMER - 2018
SUBJECT : ALGEBRA – II

Day : **Friday** | Time : **03.00 PM TO 05.00 PM**
Date : **20/04/2018** | Max. Marks : 40

S-2018-0839

N.B.:
1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following: **[10]**

a) State and prove Left Cancellation Law and Right Cancellation Law.
b) Show that $\left(Z_7^*, +_7\right)$ is a group.
c) Find order of every element in group $G=\{1, -1, i, -i\}$ under multiplication.

Q.2 Attempt **ANY TWO** of the following: **[10]**

a) Express the permutation $\sigma=\begin{pmatrix}1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9\\ 2 & 3 & 4 & 5 & 1 & 6 & 7 & 9 & 8\end{pmatrix}$ as product of disjoint cycles. Determine whether σ is even or odd and find σ^{-1}.
b) Find the alternating group $A_3 \subseteq S_3$.
c) Show that group $G=\{1, -1, i, -i\}$ w.r.t. multiplication and $\left(Z_4, +_4\right)$ are isomorphic.

Q.3 Attempt **ANY TWO** of the following: **[10]**

a) Prove that every subgroup of a cyclic group is normal.
b) Test whether f is a homomorphism if so, find its Kernel if $f:(Z, +)\rightarrow(R, +)$ be defined by $f(n)=5n, \forall n$.
c) Prepare composition table for $\left(Z_{12}^*, \times_{12}\right)$.

Q.4 Attempt **ANY FIVE** of the following: **[10]**

a) Find ϕ (36) and ϕ (24).
b) State Lagrange's theorem.
c) Given $f=\begin{pmatrix}1 & 2 & 3 & 4\\ 2 & 1 & 4 & 3\end{pmatrix}$, $g=\begin{pmatrix}1 & 2 & 3 & 4\\ 2 & 3 & 4 & 1\end{pmatrix}$
Find: **i)** fog **ii)** $f^{-1}og^{-1}$
d) Define alternating group.
e) Find order of each element in $(Z_3, +_3)$.
f) Define field.
g) Find all solutions of $x^2+2x+4=0$ in Z_6.

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