Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

Year and Program S.Y .B.Sc | **School of Science** | **Department: Mathematics**

Course Code: MTS 202 | **Course Title: Mathematics -IV** | **Semester : IV**

Day and Date: | **End Semester Examination** | **Time : 2 Hrs.**
Max Marks : 50

Instructions: 1) All Questions are compulsory.

2) Use of non-programmable calculator is allowed.

		Marks	Bloom's Level	CO
Q.1	**Solve the following (any two)**			
a)	If G is a finite group and H be a subgroup of group G then prove that $o(H)$ divides $o(G)$.	8	L3	CO1
b)	If $\{H_i \mid i \in I\}$ be any set of subgroups of a group G then prove that $\bigcap_{i\in I} H_i$ is a subgroup of G.	8	L3	CO1
c)	Prove that the set $G=\{1,-1,i,-i\}$ is a cyclic group under usual multiplication.	8	L3	CO2
Q.2	**Solve the following (any two)**			
a)	Prove that order of a cyclic group is equal to order of its generator.	8	L1	CO2
b)	Prove that any two right cosets of a group are either disjoint or equal.	8	L1	CO3
c)	If H and K be two subgroups of a group G, where H is normal in G then prove that $\frac{HK}{H} \cong \frac{K}{H\cap K}$.	8	L1	CO3
Q.3	**Solve the following (any two)**			
a)	Prove that a non-zero finite integral domain is a field.	9	L2	CO4
b)	Let $f: R \to R'$ be homomorphism then prove that i) Kernel of f is an ideal of R, ii) $Kerf=\{0\}$ if and only if f is one-one.	9	L2	CO5
c)	Let R be a commutative ring with unity. Prove that an ideal M of a ring R is maximal ideal of R if and only if $\frac{R}{M}$ is a field.	9	L2	CO5

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