M. P. SHAH ARTS & SCIENCE COLLEGE, SURENDRANAGAR.

Assignment-1 B. Sc. Semester-V (2019-20)

Mathematics Paper- 05(A)

Date of Submission: 13/08/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) If (X, d) is a metric space than prove that $\left(X, \frac{d}{1+d}\right)$ is also a metric space.

2) State and prove Housedroff's principle.

3) Prove that a neighborhood of any point of metric space is an open set in metric space.

4) Is $\frac{4}{5}$ in cantor set? Justify your answer.

5) Prove that derived set of any any subset of metric space is closed.

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Assignment-2 B. Sc. Semester-V (2019-20)

Mathematics Paper- 05(A)

Date of Submission: 27/08/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) Let f be a bounded function defined on $[a, b]$. P and P^* are two partition of $[a, b]$ such that P^* is a refinement partition of P, then $L(p, f) \leq L(P^*, f) \leq U(P^*, f) \leq U(p, f)$.

2) State and prove Darboux's theorem.

3) State and prove necessary and sufficient condition for a bounded function f defined on $[a, b]$ to be R-integrable.

4) Prove that bounded monotonic function defined on $[a, b]$ is R-integrable.

5) Find $\int_0^1 x^2$ using definition of Riemann integrable.

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Assignment-3 B. Sc. Semester-V (2019-20)

Mathematics Paper- 05(A)

Date of Submission: 06/09/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) Show that G is a commutative group if $(ab)^i = a^i b^i, \forall\, a, b \in G$, **for any three conjugative integers.**

2) Let G be a commutative group. Let $a, b \in G$ **such that** $O(a) = m$ **and** $O(b) = n$, **then** $O(ab) = mn$ **if** $(m, n) = 1$.

3) Prove that intersection of two subgroups of a group is again a subgroup.

4) Prove that the set A_n **of all even permutations of** S_n $(n \geq 2)$ **is a subgroup of** S_n **of order** $\frac{n!}{2}$ **.**

5) Prove that a normalizer of a group G is a subgroup of G.

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Assignment-4 B. Sc. Semester-V (2019-20)

Mathematics Paper- 05(A)

Date of Submission: 14/09/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) Prove that a subgroup of index 2 in a group is a normal subgroup.

2) State and prove Cayley's theorem for group.

3) Prove that a subgroup H of a group G is a normal subgroup if and only if

$$(H_a)(H_b) = H(ab), \forall a, b \in G.$$

4) A subgroup H of a group G is a normal subgroup if and only if $aha^{-1} \in H, \forall a \in G, \forall h \in H$.

5) Let H be a normal subgroup of a group G. Then the set ${}^{G}/_{H}$ of all right cosets of H in G form a group with respect to the product of cosets of H in G.