SHIVAJI COLLEGE, UNIVERSITY OF DELHI

FACULTY NAME - SUNITA

Department of Mathematics

Internal Test (Academic Year 2023-24)

Name of Course : B.Sc.APS

Semester : IV

Name of the paper: Abstract Algebra

Max. marks : 15

Duration: 1 hour

Date of Test:29 -02-2024

Note: Each question contains equal marks .

Q.1. Show that $\{1,2,3\}$ under multiplication modulo 4 is not a group and $\{1,2,3,4\}$ under multiplication modulo 5 is a group.

Q.2. Let G be an abelian group with identity e then $H = \{x \in G : |x| \ is \ finite\}$ is a subgroup of G.

Q.3. Define Centre of a group $Z(G)$ and Centralizer of an element a $C(a)$ in group with example.

SHIVAJI COLLEGE, UNIVERSITY OF DELHI

Department of Mathematics

FAC→ SUNITA.

Internal Test-2 (Academic Year 2023-24)

Name of Course : B.Sc. PS

Semester : IV

Name of the paper: Abstract Algebra

Max. marks : 15

Duration: 1 hour

Date of Test: [redacted]

Q.1. For $|a| = 1000$ find $\langle a^{185} \rangle$, $\langle a^{400} \rangle$, $\langle a^{62} \rangle$ and $|a^{185}|$, $|a^{400}|$, $|a^{65}|$.
(3 marks)

Q.2. Let $H = \{0, \pm 3, \pm 6, \pm 9 \ldots\}$. Find the left cosets of H in Z .
(3 marks)

Q.3. Determine whether the following permutations are even or odd ?
(2 marks)

(i) $(12)(134)(152)$

(ii) $(1243)(3521)$

Q.4. What is the order of following permutations?
(2 marks)

a. $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 1 & 5 & 4 & 6 & 3 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 7 & 6 & 1 & 2 & 3 & 4 & 5 \end{bmatrix}$

Q.5. State and prove Lagrange's Theorem . Is converse of Lagrange's theorem is true ?
(5 marks)

Faculty Name- Ms. SUNITA

SHIVAJI COLLEGE, UNIVERSITY OF DELHI

Department of Mathematics

Internal Test (Academic Year 2023-24)

Name of Course : B.Sc. PS

Semester : IV

Name of the paper: Abstract Algebra

Max. marks : 15

Duration: 1 hour

Date of Test:12-04-2024

Note: Each question contains equal marks .

Q.1. Show that $\{1,2,3\}$ under multiplication modulo 4 is not a group and $\{1,2,3,4\}$ under multiplication modulo 5 is a group. (4 marks)

Q.2. Let $G = \left\{\begin{pmatrix} a & a \\ a & a \end{pmatrix} : a \in R, a \neq 0\right\}$. Show that G is an abelian group. (4 marks)

Q.3. Determine whether the following permutations are even or odd ? (2 marks)

(i) $(12)(134)(152)$

(ii) $(1243)(3521)$

Q.4. What is the order of following permutations? (2 marks)

a. $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 1 & 5 & 4 & 6 & 3 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 7 & 6 & 1 & 2 & 6 & 4 & 5 \end{bmatrix}$

Q.5. Suppose that $\langle a \rangle, \langle b \rangle$ *and* $\langle c \rangle$ are the cyclic group of order 6,8 and 20 repectively. Find all generators of $\langle a \rangle, \langle b \rangle$ *and* $\langle c \rangle$. (3 marks)

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Department of Mathematics

FACULTY NAME - SUNITA

Internal Test (Academic Year 2023-24)

Name of Course : VAC **Semester** : II

Name of the paper: Vedic Maths-1 **Max. marks** : 12

Duration: 1 hour **Date of Test**: 04-03-2024

Q.1. Attempt all from of the following: (8 marks)

(i) Multiply 853 by 267.

(ii) square root of 8836

(iii) 984^3

(iv) 1005 x 1008

Q.2. Keshav Painted $1\frac{1}{2}$ square meters of a wall on Monday, $4\frac{4}{5}$ square meters of the wall on Tuesday and remaining $7\frac{7}{10}$ square meters of the wall on Wednesday. What is the total area of the wall ? (4 marks)

Q.3. 89747 apples have to packed in 93 boxes, each having the same number of apples. How many apples will each box contain ? (4 marks)

Q.4. Rahul brought 3 kg apples and 6 kg oranges. If the cost of 1 Kg of apples is 98 Rs. And 1 kg or oranges is Rs. 54. How much Rahul paid to the shopkeeper?

SHIVAJI COLLEGE, UNIVERSITY OF DELHI

Faculty Name - Ms. SUNITA

Department of Mathematics

Internal Test (Academic Year 2023-24)

Name of Course : VAC

Semester : II

Name of the paper: Vedic Maths-1

Max. marks : 12

Duration: 1 hour

Date of Test: 04-04-2024

Q.1. What is Vedic Mathematics and why is Vedic Mathematics essential ?

Q.2. Attempt any four of the following:

(i) $53,267 + 67,998 + 45,856 = ?$

(ii) $27167878 - 766877 = ?$

(iii) $3\left(\frac{3}{4}\right) - 1\left(\frac{1}{8}\right) = ?$

(iv) $\frac{7}{36} + \frac{11}{60} = ?$

(v) $10\left(\frac{2}{3}\right) - 1\left(\frac{4}{5}\right) = ?$

Q.3. Attempt any two of the following:

(i) Multiply 122 by 98.

(ii) Multiply 2174 by 1111

(iii) Multiply 6543 by 9999