



TAMIL NADU OPEN UNIVERSITY

Chennai - 15
School of Science

ASSIGNMENT

Programme Code No : 131
Programme Name : B.Sc., Mathematics
Course Code & Name : BMS-21, Groups and Rings
Batch : AY 2018-19 – II Year
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 25 (Average of Total No. of Assignments)

Assignment – I

Max : 25 Marks

Answer any one of the question not exceeding 1000 words

1. Write a note on Symmetric group.
2. Define product of two subgroups, illustrate and state a necessary and sufficient condition for product of two subgroups to be a subgroup.
3. a) Define Centre of a group, illustrate and prove that the centre of a group G is a subgroup of G .
b) Write a note on Normalizer in group.

Assignment – II

Max : 25 Marks

Answer any one of the question not exceeding 1000 words

1. Find the number of generators of the group $(\mathbb{Z}_{12}, \oplus)$, proving all necessary results.
2. State and prove Lagrange's theorem, proving necessary results.
3. Define Index of a subgroup of a group, illustrate and prove that If H and K are two subgroups of G of finite index in G then $H \cap K$ is a subgroup of finite index in G .

Assignment – III

Max : 25 Marks

Answer any one of the question not exceeding 1000 words

1. State and prove Cayley's Theorem.
2. State and prove the fundamental theorem of homomorphism on groups.
3. a) Define a field, give example and prove that any finite integral domain is a field.
b) Prove that a finite commutative ring R without zero-divisors is a field.

Assignment – IV

Max : 25 Marks

Answer any one of the question not exceeding 1000 words

1. State and prove the fundamental theorem of homomorphism on rings.
2. Show that any integral domain D can be embedded in a field F and every element of F can be expressed as a quotient of two element of D .
3. Prove that any Euclidean domain R is a unique factorization domain.



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ASSIGNMENT

Programme Code No : 131
Programme Name : B.Sc., Mathematics
Course Code & Name : BMS-22, Statistics and Mechanics
Batch : AY 2018-19 – II Year
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 25 (Average of Total No. of Assignments)

Assignment – I

Max : 25 Marks

Answer any one of the question not exceeding 1000 words

1. Calculate the first four moments about mean and also find the skewness and kurtosis for the distribution below.

X	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24
F	2	1	2	6	16	27	16	7	3	1	1

2. Fit a straight line to data below

Year	1984	1985	1986	1987	1988	1989
Production	7	9	12	15	18	23

- 3 Fit a parabola for the data given below.

x	1	2	3	4
f	9	24	47	78

Assignment – II

Part – B (2 x 30 = 60 Marks)

Answer any one of the question not exceeding 1000 words

1. Find the coefficient of rank correlation for the following data which shows the heights a sample of 12 fathers and their sons.

Height of Father	65	63	67	64	68	62	70	66	68	67	69	71
Height of son	68	66	68	65	69	66	68	65	71	67	68	70

2. Write properties of Moment Generating Function.
3. Fit a normal distribution to be the following data

x	0	1	2	3	4	5
f	10	14	19	8	5	4

Assignment – III

Answer any one of the question not exceeding 1000 words

1. Show that the path of the projectile is a parabola. Also derive the greatest height attained by a projectile and time taken to reach the maximum height.
2. Discuss direct impact of two smooth spheres.
3. Write a note on simple harmonic motion.



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ASSIGNMENT

Programme Code No : 131
Programme Name : B.Sc., Mathematics
Course Code & Name : BMS-23, Classical Algebra and Numerical Methods
Batch : AY 2018-19 – II Year
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 25 (Average of Total No. of Assignments)

Assignment – I

Answer any one of the question not exceeding 1000 words

1. Sum the series $\sum_{n=0}^{\infty} \frac{(n+1)^2}{n!} x^n$
2. Find the condition that the roots of the equation $ax^3 + 3bx^2 + 3cx + d = 0$ may be in Geometric Progression and hence solve the equation $27x^3 + 42x^2 - 28x - 8 = 0$.
3. Show that the sum of the ninth powers of the roots of the equation $x^3 + 3x + 9 = 0$ is zero.

Assignment – II

Answer any one of the question not exceeding 1000 words

1. If α, β, γ are the roots of the equation $x^3 - 7x + 7 = 0$, find $\frac{1}{\alpha^4} + \frac{1}{\beta^4} + \frac{1}{\gamma^4}$.
2. Solve the equation $x^5 + 4x^4 + x^3 + x^2 + 4x + 1 = 0$.
3. Solve the equation $x^4 - 4x^3 + 4x^2 + x - 2 = 0$ by finding the rational roots.

Assignment – III

Answer any one of the question not exceeding 1000 words

1. Applying Lagrange's formula, find a cubic polynomial which approximates the following data and hence find $y(1)$.

X	-2	-1	2	3
Y(x)	-12	-8	3	5

2. Evaluate $\int_1^2 \frac{1}{x} dx$ by Simpson's rule with 4 strips and 8 strips respectively.

3. Given the differential equation $\frac{dy}{dx} = \frac{x^2}{y^2+1}$ with $y(0) = 0$. Obtain $y(0.25)$, $y(0.5)$ and $y(1.0)$

correct to four decimal places by Picard's method of Successive approximations.