MANONMANIAM SUNDARANAR UNIVERSITY

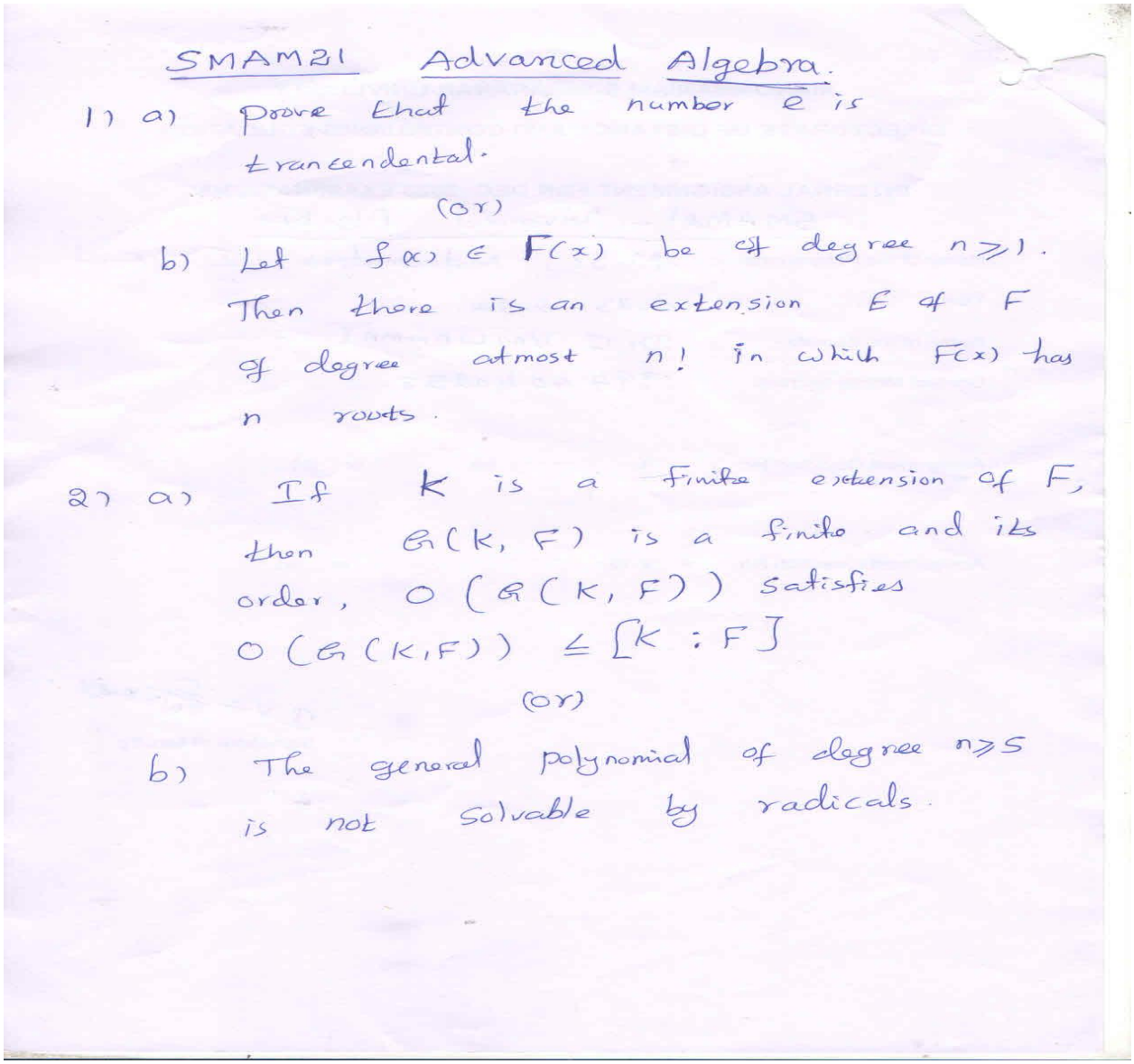
DIRECTORATE OF DISTANCE AND CONTINUING EDUCATION

INTERNAL ASSIGNMENT FOR MAY 2025 EXAMINAITONS

M. Sc Mathematics – Second Semester

Advanced Algebra

Sub-Code: SMAM21



SMAM21 Advanced Algebra.

1) a) Prove that the number e is transcendental.

(or)

b) Let $f(x) \in F(x)$ be of degree $n \geq 1$. Then there is an extension E of F of degree atmost $n!$ in which $F(x)$ has n roots.

2) a) If K is a finite extension of F, then $G(K, F)$ is a finite and its order, $O(G(K, F))$ satisfies $O(G(K,F)) \leq [K : F]$

(or)

b) The general polynomial of degree $n \geq 5$ is not solvable by radicals.

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M. Sc Mathematics – Second Semester

Real Analysis-II

Sub-Code: SMAM22

SMAM 22 Real Analysis - II

1) a) (i) For any Sequence of Set $\{E_i\}$, $m^*\left(\bigcup_{i=1}^{\infty} E_i\right) \leq \sum_{i=1}^{\infty} m^*(E_i)$.

(ii) Show that For any set A and For any $\varepsilon > 0$, there is an open set O containing A such that $m^*(O) \leq m^*(A) + \varepsilon$.

(or)

b) State and prove Fatou's Lemma.

2) a) State and Prove Riemann Lebesgue Lemma.

(or)

b) State and Prove Mean Value Theorem.

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M. Sc Mathematics – Second Semester

Partial Differential Equations

Sub-Code: SMAM23

SMAM23 Partial Differential equatio

1) a) Derivation of Laplace's Equation For Gravitational. Hs

(or)

b) State and Prove Uniqueness Theorem.

2) a) Solve $\nabla^2 u = 0$, $0 < x < 0$, $0 < y < b$

$u(x, 0) = f(x)$, $0 \leq x \leq 0$.

$u(x, b) = 0$

$u_x(0, y) = 0$

$u_x(a, y) = 0$.

(or)

b) Prove that Dirichlet Problem for the Laplace operator.

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M. Sc Mathematics – Second Semester

Mathematical Statistics

Sub code : SMAE21

SMAE21 Mathematical statistics

1) a) Let the random variable X and Y have the joint p.d.f $f(x,y) = \begin{cases} x+y, & 0<x<1, 0<y<1 \\ 0, & \text{elsewhere} \end{cases}$

Find the correlation co-efficient of X and Y.

(or)

b) Compute the measures of skewness and Kurtosis of a Gamma Distribution.

2) a) Find the variance of Chi-Square distribution

(or)

b) State and prove the Box and Muller Transformation.

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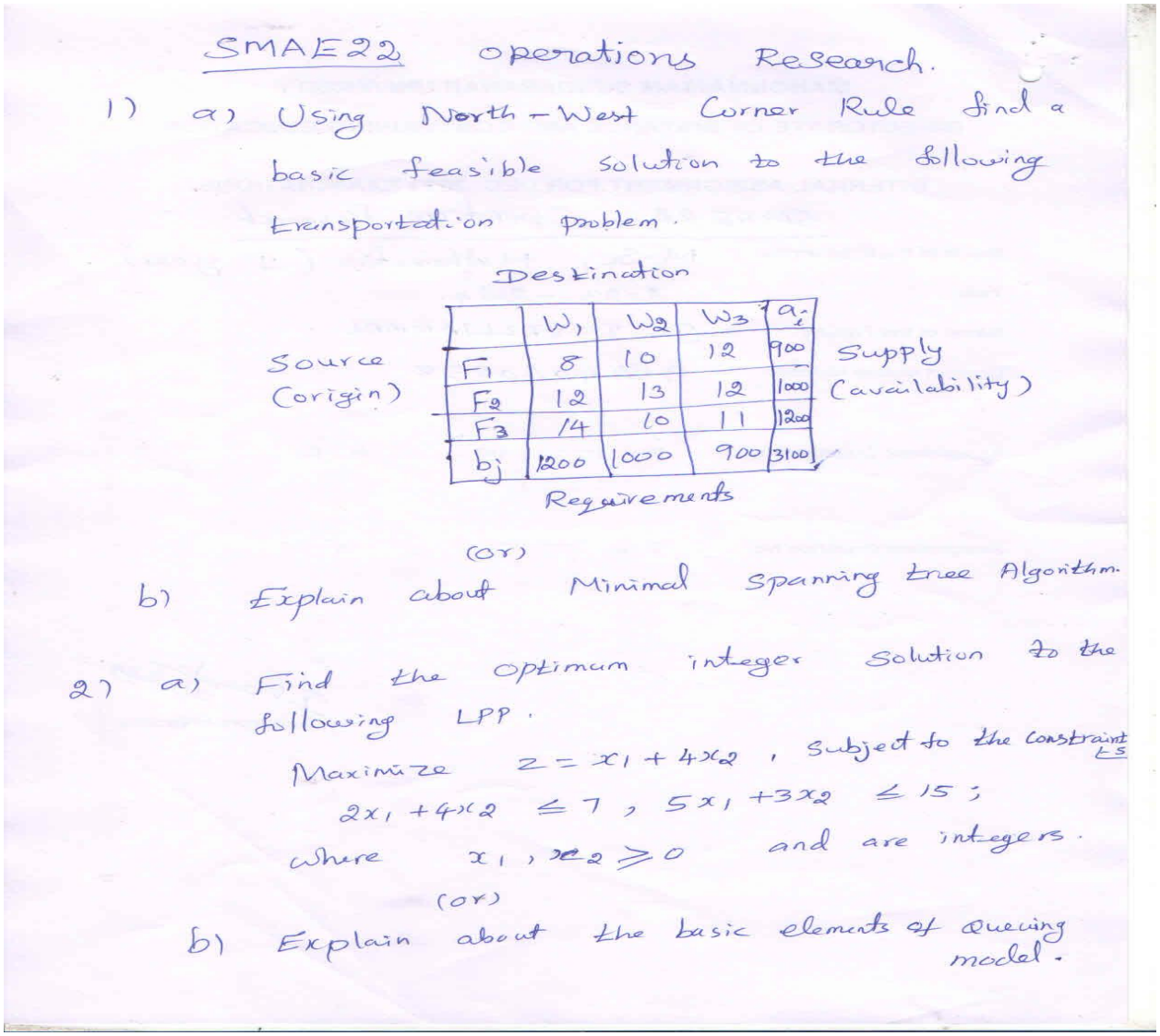
M. Sc Mathematics – Second Semester

Operations Research

Sub-Code: SMAE22



SMAE22 Operations Research.

1) a) Using North-West Corner Rule find a basic feasible solution to the following transportation problem.

Destination

Source (Origin)	W_1	W_2	W_3	a_i (Supply (Availability))
F_1	8	10	12	900
F_2	12	13	12	1000
F_3	14	10	11	1200
b_j (Requirements)	1200	1000	900	3100

(or)

b) Explain about Minimal Spanning tree Algorithm.

2) a) Find the optimum integer solution to the following LPP.

Maximize $Z = x_1 + 4x_2$, Subject to the constraints

$2x_1 + 4x_2 \leq 7$, $5x_1 + 3x_2 \leq 15$;

where $x_1, x_2 \geq 0$ and are integers.

(or)

b) Explain about the basic elements of Queuing model.

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M. Sc Mathematics – Second Semester

Mathematical Documentation using LaTex

Sub-Code: SMAS21