

MANONMANIAM SUNDARANAR UNIVERSITY

DIRECTORATE OF DISTANCE AND CONTINUING EDUCATION

INTERNAL ASSIGNMENT FOR MAY 2024 EXAMINATIONS

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 at most $n!$ 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 $\epsilon > 0$, there is an open set O containing A such that $m^*(O) \leq m^*(A) + \epsilon$.
(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 Equations

1) a) Derivation of Laplace's Equation for Gravitational. 1/2
(or)
b) State and Prove Uniqueness Theorem.

2) a) Solve $\nabla^2 u = 0$, $0 < x < a$, $0 < y < b$
 $u(x, 0) = f(x)$, $0 \leq x \leq a$.
 $u(x, b) = 0$
 $u_x(0, y) = 0$
 $u_x(a, y) = 0$.
(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 coefficient 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			a_i		
		w_1	w_2	w_3			
Source (Origin)	F_1	8	10	12	900	Supply (availability)	
	F_2	12	13	12	1000		
	F_3	14	10	11	1200		
		b_j	1200	1000	900	3100	Requirements

(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 constraint \leq

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

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

