

SRI PADMAVATI MAHILA VISVAVIDYALAYAM::TIRUPATI

Master of Science (Mathematics) Second Semester

ASSIGNMENT

M.Sc.MD 2.01 – COMPLEX ANALYSIS

All questions carry equal marks

4 x 5 = 20 Marks

- 1) (a) State and prove Cauchy-Riemann equation in polar form
(b) Find the mobius transformation which carries points $-1, i, 1+i$ onto $i, \infty, 1$.
- 2) (a) State and prove Cauchy key lemma.
(b) Evaluate $\int_0^{\infty} \frac{\sin x}{x} dx$
- 3) ~~(a)~~ State and prove Cauchy's integral formula
- 4) ~~(a)~~ State and prove Cauchy's Homard Theorem.

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M.Sc.MD 2.02 – ADVANCED ALGEBRA

All questions carry equal marks

4 x 5 = 20 Marks

- 1) Let F be a field, then prove that there exists an algebraically closed field K containing F as a subfield.
- 2) Let E be a finite extension of field F . Then prove that following are equivalent.
 - (a) $E = F(\alpha)$ for some $\alpha \in E$
 - (b) There are only a finite no. of intermediate fields between F and E .
- 3) State and prove Fundamental theorem of Galois theory.
- 4) Show that the polynomial $x^5 - 9x + 3$ is not solvable by radicals over \mathbb{Q} .

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M.Sc.MD 2.03 – PRINCIPLES OF MECHANICS

All questions carry equal marks

4 x 5 = 20 Marks

- ①. State and prove principle of Least action.
- ②. Derive the equations of canonical transformations.
- ③. Show that the stress tensor is of rank 2.
- ④. (i) State and prove equation of continuity.
(ii) Derive velocity potential for an viscous fluid.

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M.Sc.MD 2.04 – PARTIAL DIFFERENTIAL EQUATIONS

All questions carry equal marks

4 x 5 = 20 Marks

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1. Show that the general solution of $xp + yq = z$ is $F\left(\frac{x}{y}, \frac{y}{z}\right) = 0$.
 2. Find the integral curves of the equation $\frac{dx}{xy} = \frac{dy}{y^2} = \frac{dz}{xyz-2x^2}$.
 3. a). Solve the equation $(x^2z-y^3)dx + 3xy^2dy + x^3dz = 0$ and show that it is integrable.
b). Find the particular integral of the equation $(D^2 - D^1)z = e^{x+y}$.
 4. Solve the one dimensional diffusion equation using separation of variables

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M.Sc.MD 2.05 – OPERATIONS RESEARCH

All questions carry equal marks

4 x 5 = 20 Marks

1. Solve the following 2×2 game graphically

		play B			
		B ₁	B ₂	B ₃	B ₄
play A	A ₁	2	1	0	-2
	A ₂	1	0	3	2

2. Explain $\{(M/M/1); (N/Fcfs)\}$ system and solve it under steady state condition.

3. Find the optimum order quantity for a product for which the price breaks are as follows.

<u>Quantity</u>	<u>purchasing cost per unit (RS)</u>
$0 \leq Q_1 < 100$	20
$100 \leq Q_2 < 200$	18
$200 \leq Q_3$	16

4. A small project consist of seven activities for which the relevant dates are given below

Activity	Preceding activities	Activity duration (days)
A	-	4
B	-	7
C	-	6
D	A, B	5
E	A, B	7
F	C, D, E	6
G	C, D, E	5

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- (i) Draw the network find the project completion time.
 - (ii) calculate total float for each of the activities and highlight the critical path
 - (iii) draw the time Scaled diagram.