# MONAD UNIVERSITY HAPUR (UP)

**Course: MSc. Sem-III (Maths) COMPLEX ANALYSIS**

Assignment No: 1

Due date of submission: 10.11.2016

Instruction

1. Write the responses to the assignment in your own handwriting.
2. Submit the responses to your HOD within the due date.
3. Write your Name, Program me, and Enrolment No. clearly at the top of the page.

Q.1.

(a) State and Prove Cauchy integral formula.

(b)

Find the value of the integral $\int_0^{1+i}(x - y + i\ x^2)$ dz along the straight line from z=0 to z=1+i.

Q2.

(a) Find the bilinear transformation which transforms the points z = 2, 1, 0 into w = 1, 0, i.

(b) State and prove Rouche's theorem.

# MONAD UNIVERSITY HAPUR (UP)

**Course: MSc. SEM-III (Maths) COMPLEX ANALYSIS**

Assignment No: 2

Due date of submission: 10.11.2016

Instruction

1. Write the responses to the assignment in your own handwriting.
2. Submit the responses to your HOD within the due date.
3. Write your Name, Program me, and Enrolment No. clearly at the top of the page.

Q.1.

(a) Expand the series for the function $f(z) = \frac{1}{z^2-3z+2}$ in the region $|z| < 1$ .

(b). Prove that $\int_0^{2\pi} \frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}$

Q2.

(a) State and prove Hadamard's three circles theorem.

(b) State and prove Poisson-Jensen formula.

# MONAD UNIVERSITY HAPUR (UP)

COURSE: - **MATHEMATICAL METHODS**

***Assignment No-1***

*Date of submission:-* 10.11.2016

Instructions

a) Write the response to the assignment in your own handwriting.
b) Submit the response to your HOD within the due date.
c) Write your name, Programme and Enrolment No. clearly at the top of the page.

Q.1

a) If $L\{f(s)\} = F(P)$ then evaluate $L\{e^{as} f(s)\}$

b) Show that the function $\phi(x) = (1 - x)$ is a solution of the Integral equation $\int_0^x e^{x-\xi} \phi(\xi)\, d\xi = x$ .

Q.2

a) Find the half range sine series for x in (0,2).

b) Solve the integral equation $x = \int_0^x e^{x-\xi} \phi(\xi)\, d\xi$

# MONAD UNIVERSITY HAPUR (UP)

COURSE: - **MATHEMATICAL METHODS**

***Assignment No-2***

*Date of submission:-* 10.11.2016

Instructions

1) Write the response to the assignment in your own handwriting.

2) Submit the response to your HOD within the due date.

3) Write your name, Programme and Enrolment No. clearly at the top of the page.

Q.1

a)Solve Abel's Integral Equation $x = \int_a^x \frac{\phi(\xi)d\xi}{[x-\xi]^{\frac{1}{2}}}$, .

b) Find the Resolvent kernel of the integral equation with the following kernel $k(x,\xi) = 2(x-\xi)$

Q.2

a) Solve the integral equation using Laplace transform $\int_0^\infty \phi(\xi)d(x-\xi)\ d\xi = 16\sin 4\xi$ .

b) Prove that all iterated kernels of a symmetric kernel are also symmetric.

# MONAD UNIVERSITY HAPUR (UP)

COURSE:- **FUNCTIONAL ANALYSIS**

Assignment No-1

Date of submission:- 10.11.2016

Instructions

1) Write the response to the assignment in your own handwriting.

2) Submit the response to your HOD within the due date.

3) Write your name, Programme and Enrolment No. clearly at the top of the page.

Q.1

a) If N be a normed linear space and if d be a function from $N \times N \to R$ define by $d(x,y) = \|x - y\|$. Then prove that d is metric on N.

b) Prove that $\|\|x\| - \|y\|\| \le \|x - y\|$ for all $x, y \in N$.

Q.2

a) If $p > 1$, $\frac{1}{p} + \frac{1}{q} = 1$ and $a \ge 0, b \ge 0$ then prove

b) If N is a banach space .Then $B(N)$ is a Banach algebra with the algebraic operations $(T+U)(x) = T(x) + U(x)$:

$(TU)(x) = T(U)(x)$;

$(\propto T)(x) = \propto T(x)$ and the operations norm

$\|T\| = sub\{\|T(x)\| : x \in N \ \|x\| \le 1\}$ Further, multiplication in $B(N)$ is jointly continuous?

# MONAD UNIVERSITY HAPUR (UP)

COURSE: -**FUNCTIONAL ANALYSIS**

***Assignment No-2***

*Date of submission:* - 10.11.2016

Instructions

1) Write the response to the assignment in your own handwriting.

2) Submit the response to your HOD within the due date.

3) Write your name, Programme and Enrolment No. clearly at the top of the page.

Q.1

(a) State and proof RIESZ-LEMMA?

(b) If N is a normal operator on a Hilbert space H then?

Q.2

(a)State and proof 'THE CLOED GRAPH THEOREM'?

**(b) If $A_1$ and $A_2$ are self adjoint operator on H then their product $A_1A_2$ is self** *adjoint* $\Leftrightarrow A_1A_2 = A_2A_1$

# MONAD UNIVERSITY HAPUR (UP)

**Course: MSc. Sam-III (Maths) DIFFERENTIAL GEOMETRY**

Assignment No: 1

Due date of submission: 10.11.2016

Instruction

4. Write the responses to the assignment in your own handwriting.
5. Submit the responses to your HOD within the due date.
6. Write your Name, Program me, and Enrolment No. clearly at the top of the page.

Q.1.

(a) Define Osculating Plane and find the equation of the osculating plane.

(b)

State and prove "SERRET-FRENET FORMULAE".

Q2.

(a) Let $k_1$ and $k_2$ be the principal curvatures of a surface patch $\sigma$ (u, v). The Gaussian Curvature of $\sigma$ is $K = k_1 k_2$, and its mean curvature is $H = (\kappa 1 + \kappa 2) / 2$.

(b) Prove that surface $xy = (z - c)^2$ is developable.

# MONAD UNIVERSITY HAPUR (UP)

**Course: MSc. Sam-III (Maths) DIFFERENTIAL GEOMETRY**

Assignment No: 2

Due date of submission: 10.11.2016

Instruction

1. Write the responses to the assignment in your own handwriting.
2. Submit the responses to your HOD within the due date.
3. Write your Name, Program me, and Enrolment No. clearly at the top of the page.

Q.1.

(a) State and prove Monge's theorem.

(b)State and prove Mainardi Codazzi equations.

Q2.

(a) State and prove Geodesics, Clairaut's theorem.

(b) State and prove Dini's theorem.