



## MONAD UNIVERSITY HAPUR (UP)

**Programme:**M.Sc.

**Semester:** III

**Course:** MMTH-211, Complex Analysis

Assignment No: 2

Due date of submission: 23.10.2017

### Instructions:

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, Programme and Enrolment No. clearly at the top of the page.

Q.1.

- (a) Show that  $\int_0^{2\pi} \frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}$ .
- (b) If  $u - v = (x - y)(x^2 + 4xy + y^2)$ , then find the analytic function  $f(z) = u + iv$ .

Q.2.

- (a) Prove that  $\int_0^\infty \frac{\cos x^2 + \sin x^2 - 1}{x^2} dx = 0$ .
- (b) State and prove the Fundamental theorem of Algebra.



## MONAD UNIVERSITY HAPUR (UP)

Programme: **M.Sc**

Semester: **III**

Course: **MMTH-212, Differential Geometry**

Assignment No: **1**

Due date of submission: **23.10.2017**

### Instructions

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, Programme and Enrolment Number clearly at the top of the page.

Q.1

- a) Find the envelope of  $lx + my + nz = p$  when  $a^2l^2 + b^2m^2 + c^2n^2 = p^2$
- b) State and prove Monge's theorem

Q.2

- a) State and prove Mainardi Codazzi equation.
- b) State and prove Bonnets theorem on parallel surface.



## MONAD UNIVERSITY HAPUR (UP)

**Programme:** M.Sc.

**Semester:** III

**Course:** MMTH-213, Mathematical Methods

**Assignment No:** 2

**Due date of submission:** 23.10.2017

### **Instructions:**

1. Write the responses to the assignment in your own handwriting.
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3. Write your Name, Programme and Enrolment No. clearly at the top of the page.

Q.1.

- (a) Show that the functions  $\sin x, \sin 2x, \dots$  are orthogonal on the interval  $(0, \pi)$ .
- (b) Find the half-range sine series for  $x$  in  $(0, 2)$ .

Q.2.

- (a) Solve the following partial differential equation by separation of variables:

$$\frac{\partial^2 z}{\partial x^2} = x^2 \frac{\partial^2 z}{\partial y^2}.$$

- (b) Obtain the solution of the Laplace equation  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 1$  by separation of variables.



## MONAD UNIVERSITY HAPUR (UP)

Programme: **M.Sc.**

Semester: **III**

Course: **MMTH-214, Functional Analysis**

Assignment No: **2**

Due date of submission: **23.10.2017**

### **Instructions:**

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, Programme and Enrolment Number clearly at the top of the page.

Q.1

- (a) State Hahn-Banach theorem for real linear spaces.
- (b) Define Hilbert space with an example.

Q.2

- (a) Define orthonormal set. Obtain orthonormal basis for  $V_3(\mathbb{R})$  with the standard inner product for the vectors  $(1,0,1)$ ,  $(1,0,-1)$  and  $(0,3,4)$ .
- (b) Define unitary and normal operators. Prove that every unitary operator is normal.



## MONAD UNIVERSITY HAPUR (UP)

Programme: **M.Sc.**

Semester: **III**

Course: **MMTH-215, Bio Mathematics**

Assignment No: **2**

Due date of submission: **23.10.2017**

### **Instructions:**

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, Programme and Enrolment Number clearly at the top of the page.

Q.1.

- (a) Discuss May's predator-prey model.
- (b) Write down the two species competition model with carrying capacities. Also discuss the stability about possible equilibrium points.

Q.2.

- (a) Define Bio-fluid dynamics and Poiseuille flow.
- (b) Discuss SIR model.