

**Note :-** All questions from each section carry equal marks. All questions are compulsory and answer limit are approximately 250 words. Start the answer of each section from new page. Maximum limit of pages of answer booklet are approximately 16 pages. Answer should be written by the student in his/her own handwriting mandatory. The first page of answersheet should be download by the student from university website [www.bubhopal.ac.in](http://www.bubhopal.ac.in) is mandatory.

**/Section-A**

**Linear Algebra & Numerical Analysis**

**[Maximum Marks : Reg. 40  
Pvt. 50]**

1.

State and prove Cuachy Schwarz inequality.

2.

$$x^3 - x - 1 = 0$$

Find a root of the equation  $x^3 - x - 1 = 0$  using the bisection method.

**/Section-B**

**Real Complex Analysis**

**[Maximum Marks : Reg. 40  
Pvt. 50]**

3.

State and prove Abel's test.

4.

In a metric space, show that every open sphere is an open set.

A, B, C, D, E

**/Section-C**

**Statistical Methods-A**

**[Maximum Marks : Reg. 40  
Pvt. 50]**

5. State and prove Bay's theorem.

6. Find the students t for following variable values in a sample of eight : -4, -2, -2, 0, 2, 2, 3, 3 taking the mean of the universe to be zero.

t'                      -4, -2, -2, 0, 2, 2, 3, 3

**/Section-C**

**Discrete Maths-B**

**[Maximum Marks : Reg. 40  
Pvt. 50]**

5. Find out the conjunctive normal form of the function  $F(x, y, z) = (x.y^1 + x.z)^1 + x^1$

$$F(x, y, z) = (x.y^1 + x.z)^1 + x^1$$

6. Prove that a tree with n vertices has n - 1 edges.

n

(n - 1)

**/Section-C**  
**Mechanics-C**

**[Maximum Marks : Reg. 40  
Pvt. 50**

5.  $x = 0, y - z = a; y = 0, z - x = a; z = 0, x - y = a$

Three forces act along the straight lines  $x = 0, y - z = a; y = 0, z - x = a; z = 0, x - y = a$ . Show that they can not reduce to a couple.

6.  $r = ae^{m\theta}$

A particle describe an equiangular spiral  $r = ae^{m\theta}$  with a constant velocity. Find the components of velocity and acceleration along the radius vector and perpendicular to it.

**/Section-C**  
**Mathematical Modelling-D**

**[Maximum Marks : Reg. 40  
Pvt. 50**

5.  
What is compartment model.

6.  
What do you understand by economic model ?

**/Section-C**  
**Financial Mathematics-E**

**[Maximum Marks : Reg. 40  
Pvt. 50**

5.  
What is difference between risk and speculation ?

6.  
Explain annuities and its kinds.

