

Pune Vidyarthi Griha's
College of Science and Technology
S.Y.B.Sc (Information Technology)

SET: 1

Applied Mathematics

(Time: 2½ hours)

Total Marks 75

Q.P. CODE:

N.B :-

1. All questions are compulsory.
2. Make suitable assumptions wherever necessary and state the assumptions made.
3. Answers to the same question must be written together.
4. Numbers to the right indicate marks.
5. Draw neat labeled diagrams wherever necessary.
6. Use of Non-programmable calculators is allowed.

Q.1 Attempt the following (Any Three) (Each of five marks)

a) Find Adjoint of matrix $A = \begin{bmatrix} 2 & -1 & 3 \\ -4 & 6 & -2 \\ 5 & 1 & 8 \end{bmatrix}$

b) Verify Caley Hamilton Theorem for $A = \begin{bmatrix} 1 & \sqrt{2} & 0 \\ \sqrt{2} & -1 & -0 \\ 0 & 0 & 1 \end{bmatrix}$.

c) Find the characteristic value of matrix $A = \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ -1 & 3 & -1 \end{bmatrix}$

d) Express in the form of $a+ib$ i.e $\frac{1+i}{1-i}$

e) Find the polar and exponential form of $z = -1 - \sqrt{3}i$

f) Solve the following system of equations.

$$6x_1 + x_2 + x_3 = -4$$

$$2x_1 - 3x_2 - x_3 = 0$$

$$-x_1 - 7x_2 - 2x_3 = 7$$

Q.2 Attempt the following (Any Three) (Each of five marks)

a) Solve $\frac{dy}{dx} = \frac{x}{y}$ by using method of separation of variables.

b) Check whether the given equation is homogeneous or not? And solve it.

$$x^2y dx - (x^3 + y^3)dy = 0$$

c) Verify that the given differential equation is Exact and Solve it.

$$3x^2y^4 dx + 4x^3y^3 dy = 0$$

d) Solve the given differential equation by using Integrating factor

$$(x - y) dx + xdy = 0$$

e) Solve the following non-homogeneous differential equation.

$$\frac{dy}{dx} = \frac{(x+y+3)}{(3x+3y-3)}$$