



**ICLES'**  
**MOTILAL JHUNJHUNWALA COLLEGE**  
**OF**  
**ARTS, SCIENCE AND COMMERCE**  
**VASHI, NAVI MUMBAI - 400703**  
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**QUESTION PAPERS**  
**I SEMESTER AND ATKT EXAMINATION**  
**F.Y. B.SC. INFORMATION TECHNOLOGY**  
**OCTOBER : 2014**

<u>REGULAR</u>		<u>ATKT</u>	
<u>SUBJECT</u>	<u>MARKS</u>	<u>SUBJECT</u>	<u>MARKS</u>
APPLIED MATHEMATICS - I	75	~~~~~	~~
PROFESSIONAL COMMUNICATION SKILL	75	~~~~~	~~
ELECTRONICS AND COMMUNICATION TECHNIQUES	75	~~~~~	~~
FUNDAMENTALS OF DIGITAL COMPUTING	75	~~~~~	~~
INTRODUCTION TO C ++	75	~~~~~	~~

**ICLES' MOTILAL JHUJHUNWALA COLLEGE,  
VASHI, NAVI MUMBAI  
EXAMINATION OCT-2014 (SEM -I)**

**CLASS: F.Y.I.T**

**SUBJECT: Applied Maths-I**

**Sub Code:**

**TIME: 2 $\frac{1}{2}$  hrs**

**MARKS: 75**

**NOTE: 1. All questions are compulsory.  
2. Figures to the right indicate full marks**

**Q.1) Attempt any two.**

**(10 Marks)**

i) Find the cofactor, adjoint and inverse of A .

Where

$$A = \begin{pmatrix} 2 & -1 & 3 \\ 0 & 2 & 0 \\ 2 & 1 & 1 \end{pmatrix}$$

ii) Reduce the matrix and find rank of it.

$$A = \begin{pmatrix} 1 & 3 & 5 & 7 \\ 4 & 6 & 8 & 10 \\ 15 & 27 & 39 & 51 \\ 0 & 12 & 18 & 24 \end{pmatrix}$$

iii) Investigate for the consistency of the following eq<sup>n</sup>s and find the solution:

$$x+y+z = 3, \quad x+2y+3z = 4, \quad x+4y+9z = 6.$$

iv) For what values of k the equation have solution & solve them in each case.

$$x+y+z=1, \quad x+2y+4z=k, \quad x+4y+10z=k^2.$$

**Q.2) Attempt any two.**

**(10 Marks)**

i) State whether the following vectors are linear dependence. If so find their relation.

$$X_1 = [1, 2, 4], \quad X_2 = [2, -1, 3], \quad X_3 = [0, 1, 2]$$

ii) Find the Eigen values and show that (a) product of Eigen values = |A|

$$A = \begin{pmatrix} 2 & 1 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{pmatrix}$$

iii) Check whether the matrix A is Derogatory.

$$A = \begin{pmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{pmatrix}$$

iv) Verify Cayley-hamilton's theorem for matrix A. Also Find A<sup>-1</sup>.

$$A = \begin{pmatrix} 1 & 4 \\ 1 & 1 \end{pmatrix}$$

**Q.3) Attempt any two.**

**(10 Marks)**

i) Find the directional derivatives of  $f(x,y,z) = x^2yz + 4xz^2 + xyz$  at the point (1,2,3) in the direction of vector  $-2i + j - k$ .

ii) Find a)  $R \cdot \nabla \phi$ , b) Find curl F (where  $F = \nabla \phi$  and  $R = xi + yj + kz$  if  $\phi(x, y, z) = x^3 + y^3 + z^3 - 3xyz$ )

