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Office of the Controller of Examinations
 Sanothimi, Bhaktapur

Program: Regular/Back Exam-2073, Bhadra/Ashwin
 Diploma in Civil/Architecture/Mechanical/
 Automobile/ Information Technology/ Computer
 / Electrical/ Electrical & Electronics/Electronics/
 Geomatics/Engineering
Year/Part: I/II (New Course)
Subject: Math II

Full Mark: 80

Pass Mark: 32
Time: 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt All questions
Group "A" [3x(5+5)=30]

1. a) Define Transpose of a matrix. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 0 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$, [1+4=5]
 verify that $(AB)^T = B^T A^T$.

[5]

b) Prove that

$$\begin{bmatrix} a+b+2c & c & c \\ a & b+c+2a & a \\ b & b & c+a+2b \end{bmatrix} = 2(a+b+c)^3$$

2. a) Show that the line joining the points (1,2,2) and (4,5,6) is [5]
 perpendicular to the line joining (5,-3,4) and (7,-1,1).

[5]

b) Find the equation of the plane containing the lines
 through the origin with direction cosines proportional to
 2,1,-2 and 5,2,-3.

3. a) Define absolute value of a complex number. [1+4=5]

If $\frac{1-ix}{1+ix} = a - ib$. Prove that $a^2 + b^2 = 1$

b) Apply De-moiver's theorem to compute the cube roots of [5]
 unity.

Group "B" [10X5=50]

4. Solve by using Cramer's Rule or ROW Equivalent Matrix [5]
 method:

$$x+y-z=3$$

$$-2y+z=10$$

$$5x-y-2z=-3$$

5. In any $\triangle ABC$, Prove by vector method that [5]

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

Question Paper Diploma 2nd Semester Mathematics

A Loxley



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