OLABISI ONABANJO UNIVERSITY, AGO-IWOYE

DEPARTMENT OF MATHEMATICAL SCIENCES

2002/2003 HARMATTAN SEMESTER EXAMINATION

COURSE CODE: MAT 101

COURSE TITLE: ELEMENTARY MATHEMATICS 1 Time: 2hrs

INSTRUCTION: ANSWER FOUR QUESTIONS

1(a) A recent survey of 40 students revealed that the number studying one or more of the three subjects mathematics (M), physics (P) and chemistry (C) is as follow:

SUBJECT	Number of Students
M	22
M and P	05
M and C	08
P and C	05
M, P and C	03

If the number of student who study physics as their only subject is the same as that of the chemistry. Find the number of students who study:

(i) only physics
(ii) only one subject

1(b) prove that

(i) $(A \cup B) \cup C = A \cup (B \cup C)$
(ii) $(A \cap B) \cap C = A \cap (B \cap C)$

2(a) find the relation between a, b, c if one root of the equation $ax2 + bx + c = 0$ is three times the other.

2(b) if α and β are the roots of the equation $2x2 + 8x + 7 = 0$

Find (i) $\alpha + \beta$ (ii) $\alpha\beta$ (iii) $\alpha^2 + \beta^2$

3(a) the 6^{th} term of an A.P is -23 and the 10 the term is 35. find the first term, the common difference and the sum of the first 15 terms of the series.

3(b) Prove that $\cos(A+B) = 2\cos^2 A = -1$

4(a) prove by mathematical induction that the sum $1^3 + 2^3 + 3^3 + \ldots + n^3 = \left(\frac{n(n+1)^2}{2}\right)$

4(b) from the first principle, show that the binomial expansion of

$$(1+x)n = 1 + nx + \frac{n(n-1)x^2}{2!} + \frac{n(n-1)(n-1)x^3}{3!} + \frac{n(n-r)\ldots\ldots n-r+1x^r}{n!} + \ldots + x^n$$

5(a)i Resolve into partial frcation $\frac{8x-28}{X^2-6x+8}$

$(x-2)(x-3)+8$

5(a)ii Resolve into partial fraction $\frac{x+7}{X^2+7x+10}$

5(b) if the roots of the equation $5x^2 - 4x - 3 = 0$ are α and β. Find the equation whose roots are:

(i) $k\alpha$ and $k\beta$

(ii) $3\alpha + \beta$ and $3\beta + \alpha$

(a) state De Moivre's theorem