MILITARY COLLEGE MURREE
ENTRANCE EXAMINATION-2014
PAPER MATHS - CLASS 1ST YEAR

TIME - 1 Hour Total Marks – 50

Instructions

- All questions are compulsory.
- No marks will be awarded in case of cutting, over writing or use of lead pencil.
- Failing to abide by the following instructions will result in disqualification of the candidates:
  - Roll No will be written on first page of the answer sheet.
  - No identification marks e.g drawings, signatures etc will be marked on answer sheet.
  - Examination center will not be written on the answer sheet.
  - All questions will be attempted on the answer sheet only.
  - Paper will be attempted with blue ink. Black marker may be used for headings only.

Q1. a. Resolve into partial fraction $\frac{1}{x^3+1}$ **(5)**

b. Evaluate : $(1-3w-3w^2)^5$ **(5)**

Q2. **a**. Use theorem of Componendo and Dividendo to solve the equation **(5)**

$$\frac{\sqrt{x+3}+\sqrt{x-3}}{\sqrt{x+3}-\sqrt{x-3}} = \frac{4}{3}$$

b. If $\sin\theta = -\frac{1}{\sqrt{2}}$ and terminal side of the angle is not in quadrant III, find the values of $\tan\theta, \sec\theta \text{ and } \operatorname{cosec}\theta$ **(5)**

Q3. a. Use Synthetic division to find quotient and remainder of
$(x^2+7x-1) \div (x+1)$ **(5)**

b. The difference of a number and its reciprocal is $\frac{15}{4}$. Find the number. **(5)**

Q4. a. A road is inclined at an angle 5.7°. Suppose that we drive 2 miles up this road starting from sea level. How high above sea level are we? **(5)**

b. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \frac{\sin\theta}{1-\cos\theta}$ **(5)**

Q5. a. If $x+y=7 \text{ and } xy=12,$ then find the value of x^3+y^3 **(5)**

b. Determine the rational numbers a and b if

$$\frac{\sqrt{3}-1}{\sqrt{3}+1} + \frac{\sqrt{3}+1}{\sqrt{3}-1} = a+b\sqrt{3}$$ **(5)**