Arithmetic Series Exam Questions (from OCR 4722)

Q1, (June 2005, Q1)

A sequence S has terms $u_1, u_2, u_3, \ldots$ defined by

$$u_n = 3n - 1,$$

for $n \geqslant 1$.

(i) Write down the values of u_1, u_2 and u_3, and state what type of sequence S is. [3]

(ii) Evaluate $\sum_{n=1}^{100} u_n$. [3]

Q2, (Jan 2006, Q1)

The 20th term of an arithmetic progression is 10 and the 50th term is 70.

(i) **Find the first term and the common difference.** [4]

(ii) **Show that the sum of the first 29 terms is zero.** [2]

Q3, (Jan 2008, Q6)

A sequence of terms $u_1, u_2, u_3, \ldots$ is defined by

$$u_n = 2n + 5, \quad \text{for } n \geqslant 1.$$

(i) Write down the values of u_1, u_2 and u_3. [2]

(ii) State what type of sequence it is. [1]

(iii) Given that $\sum_{n=1}^{N} u_n = 2200$, find the value of N. [5]

Q4, (Jan 2013, Q2)

A sequence $u_1, u_2, u_3, \ldots$ is defined by

$$u_1 = 7 \quad \text{and} \quad u_{n+1} = u_n + 4 \quad \text{for } n \geqslant 1.$$

(i) Show that $u_{17} = 71$. **[2]**

(ii) Show that $\sum_{n=1}^{35} u_n = \sum_{n=36}^{50} u_n$. **[4]**

Q5, (Jun 2009, Q2)

The tenth term of an arithmetic progression is equal to twice the fourth term. The twentieth term of the progression is 44.

(i) Find the first term and the common difference. **[4]**

(ii) Find the sum of the first 50 terms. **[2]**

Q6, (Jan 2010, Q8)

A sequence $u_1, u_2, u_3, \ldots$ is defined by

$$u_1 = 8 \qquad \text{and} \qquad u_{n+1} = u_n + 3.$$

(i) Show that $u_5 = 20$. **[2]**

(ii) The nth term of the sequence can be written in the form $u_n = pn + q$. State the values of p and q. **[2]**

(iii) State what type of sequence it is. **[1]**

(iv) Find the value of N such that $\sum_{n=1}^{2N} u_n - \sum_{n=1}^{N} u_n = 1256$. **[5]**

Q7, (Jan 2011, Q2)

A sequence S has terms $u_1, u_2, u_3, \ldots$ defined by $u_n = 3n + 2$ for $n \geqslant 1$.

(i) Write down the values of u_1, u_2 and u_3. **[2]**

(ii) State what type of sequence S is. **[1]**

(iii) Find $\sum_{n=101}^{200} u_n$. **[3]**

Q8, (Jun 2014, Q2)

A sequence $u_1, u_2, u_3, \ldots$ is defined by $u_n = 3n - 1$, for $n \geqslant 1$.

(i) Find the values of u_1, u_2 and u_3. **[2]**

(ii) Find $\sum_{n=1}^{40} u_n$. **[3]**

Q9 (Jun 2015, Q7)

In an arithmetic progression the first term is 5 and the common difference is 3. The nth term of the progression is denoted by u_n.

(i) Find the value of u_{20}. **[2]**

(ii) Show that $\sum_{n=10}^{20} u_n = 517$. **[3]**

(iii) Find the value of N such that $\sum_{n=N}^{2N} u_n = 2750$. **[6]**