

- 1 The expression  $i^0 \cdot i^1 \cdot i^2 \cdot i^3 \cdot i^4$  is equal to  
(1) 1 (3)  $i$   
060410b (2) -1 (b)- $i$
- 2 The expression  $\frac{i^{16}}{i^3}$  is equivalent to  
(1) 1 (3)  $i$   
010518b (2) -1 (4)  $-i$
- 3 What is the multiplicative inverse of  $3i$ ?  
(1)  $-3i$  (3)  $\frac{1}{3}$   
060614b (2) -3 (4)  $-\frac{i}{3}$
- 4 The expression  $3i(2i^2 - 5i)$  is equivalent to  
(1)  $15 - 6i$  (3)  $-15 - 5i$   
080702b (2)  $15 - 5i$  (4)  $-1 + 0i$
- 5 The complex number  $c + di$  is equal to  $(2 + i)^2$ . What is the value of  $c$ ?  
080621b
- 6 The expression  $(-1 + i)^3$  is equivalent to  
(1)  $-3i$  (3)  $-1 - i$   
010219b (2)  $-2 - 2i$  (4)  $2 + 2i$
- 7 Show that the product of  $a + bi$  and its conjugate is a real number.  
080122b
- 8 In an electrical circuit, the voltage,  $E$ , in volts, the current,  $I$ , in amps, and the opposition to the flow of current, called impedance,  $Z$ , in ohms, are related by the equation  $E = IZ$ . A circuit has a current of  $(3 + i)$  amps and an impedance of  $(-2 + i)$  ohms. Determine the voltage in  $a + bi$  form.  
010325b
- 9 The relationship between voltage,  $E$ , current,  $I$ , and resistance,  $Z$ , is given by the equation  $E = IZ$ . If a circuit has a current  $I = 3 + 2i$  and a resistance  $Z = 2 - i$ , what is the voltage of this circuit?  
060304b  
(1)  $8 + i$  (3)  $4 + i$   
(2)  $8 + 7i$  (4)  $4 - i$