

ANSWER ALL QUESTIONS

TIME ALLOWED = 45 MINUTES

This test is marked out of 40 marks. You should show sufficient workings to make your methods clear. Answers without working may not gain full credit. Calculators are permitted in this test.

- 1 (a) Simplify $\sqrt{28}$. (1 mark)

Given that

$$a = \sqrt{28} \quad b = 4\sqrt{63} \quad c = -6\sqrt{7}$$

(b) find **simplified** expressions for

(i) $a + b$ (2 marks)

(ii) $2a^{-1} + c$ (4 marks)

(iii) $(2a^{-1} + c)(4a - b)$ (2 marks)

You should show your workings clearly.

- 2 Given that $3^{2x+4} = 27^y \times 3^{y-4}$, express y in terms of x . (4 marks)

- 3 (a) Without using a calculator, find the values of

(i) $2^4 \times 2^3 \div 4$ (2 marks)

(ii) $\frac{\sqrt{3^4} \times \sqrt[3]{27^4}}{3^7}$ (3 marks)

(b) Express

$$\frac{16p^2}{\sqrt{4p^3}}$$

in the form ap^n , where a and n are constants to be found. (3 marks)

- 4 With clear workings, find the values of a and b such that

$$a\sqrt{3} + b\sqrt{6} + \frac{\sqrt{2} - \sqrt{8}}{\sqrt{3} + \sqrt{6}} = 0$$

(5 marks)

- 5 Given that n is a non-zero constant, solve the equation

$$3^{8n^{\frac{4}{3}-2}} = 9^{n^{\frac{2}{3}-1}}$$

(5 marks)

- 6 Show that

$$\frac{3}{\sqrt{6} - \sqrt{2}} \equiv a(\sqrt{6} + \sqrt{2})$$

where a is a constant to be found. (4 marks)

6 Find the value of p such that

$$\frac{8p^3}{\sqrt{16\sqrt{p^3}}} = 32\sqrt{2}$$

(5 marks)

END OF TEST

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