**Question 1**

Evaluate $8^{\frac{5}{3}}$  ..........................  **(2 marks)**

**Question 2**

Express $\frac{1}{\sqrt[3]{x}}$ in the form $x^{n}$   **.......................... (2 marks)**

**Question 3**

Find the value of $\left(\frac{1}{5}\right)^{-3}$   **.......................... (2 marks)**

**Question 4**

One of the following is equal to $\sqrt{9^{16x^{2}}}$  for all values of $x$ . Which one?

[   ]  $3^{4x}$  [   ]  $3^{4x^{2}}$  [   ]  $3^{8x^{2}}$
[   ]  $9^{4x}$  [   ]  $9^{8x^{2}}$

**Question 5**

Simplify $\sqrt{x^{5}× x^{9}}$  Give your answer in the form $x^{p}$  where $p$  is an integer.

 **.......................... (2 marks)**

**Question 6**

Which of these has the smallest value?

[   ]  $2016^{-1}$  [   ]  $2016^{-1/2}$  [   ]  $2016^{0}$
[   ]  $2016^{1/2}$  [   ]  $2016^{1}$

**Question 7**

$\frac{\left(a^{r}\right)^{2}}{\left(a^{t}\right)^{3}}$  can be written in the form $a^{u}$

Find an expression for $u$  in terms of $r$  and $t$ .

$u=$  **.......................... (2 marks)**

**Question 8**

$\left(13^{-6}\right)^{4}×13^{5}=13^{k}$  Find the value of $k$ .

 **.......................... (2 marks)**

**Question 9**

Write $\sqrt{\frac{1}{m^{6}}}$  as a single power of $m$

 **.......................... (2 marks)**

**Question 10**

Write $\frac{\sqrt[3]{81}}{3}$  in the form $3^{k}$ , where $k$  is a constant to be found.

 **.......................... (3 marks)**

**Question 11**

Given that $3^{x}=9^{x+1}$  work out the value of $x$

 **.......................... (2 marks)**

**Question 12**

$128=4^{2x}×2^{x}$  Work out the value of $x$

 **.......................... (3 marks)**

**Question 13**

Simplify $\sqrt{20}$

 **.......................... (1 mark)**

**Question 14**

Write $\sqrt{50}$  in the form $k\sqrt{2}$ , where $k$  is an integer.

 **.......................... (1 mark)**

**Question 15**

Simplify $\sqrt{x^{6} y^{10}}$ , giving your answer in terms of $x$  and $y$

 **.......................... (2 marks)**

**Question 16**

Fully simplify $6\sqrt{2}+2\sqrt{18}$

 **.......................... (1 mark)**

**Question 17**

Expand $\left(2+\sqrt{3}\right)\left(1+\sqrt{3}\right)$

Give your answer in the form $a+b\sqrt{3}$ , where $a$  and $b$  are integers.

 **.......................... (2 marks)**

**Question 18**

Work out $\left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)$  Give your answer in its simplest form.

 **.......................... (2 marks)**

**Question 19**

Expand $\left(5+3\sqrt{2}\right)^{2}$

Give your answer in the form $\left(a+b\sqrt{2}\right)$ , where $a$ and $b$ are integers.

 **.......................... (2 marks)**

**Question 20**

Expand and simplify $\left(\sqrt{5}+3\right)\left(\sqrt{5}-2\right)\left(\sqrt{5}+1\right)$

 **.......................... (4 marks)**

**Question 21**

Rationalise the denominator of  $\frac{10}{\sqrt{5}}$

 **.......................... (2 marks)**

**Question 22**

Express $\left(\frac{1}{\sqrt{3}}\right)^{7}$  in the form $\left(\frac{\sqrt{b}}{c}\right)$  where $b$  and $c$  are integers.

 **.......................... (3 marks)**

**Question 23**

Evaluate: $\frac{2}{\sqrt{2}}-\sqrt{2}$

 **.......................... (2 marks)**

**Question 24**

Write $\frac{14}{\sqrt{7}}$  in the form $b\sqrt{c}$

 **.......................... (2 marks)**

**Question 25**

Rationalise the denominator $\frac{\sqrt{2}}{1-\sqrt{3}}$

**.......................... (3 marks)**

**Question 26**

Rationalise the denominator $\frac{5-\sqrt{3}}{1+\sqrt{3}}$

 **.......................... (3 marks)**

**Question 27**

Rationalise the denominator and simplify $\frac{5\sqrt{5}-2}{2\sqrt{5}-3}$

 **.......................... (4 marks)**