REVISION TEST 2 (Page 45)

Decimals, calculators and percentages

This assignment covers the material contained in Chapters 3 to 5.

1. Convert 0.048 to a proper fraction.

	Marks
$0.048 = \frac{48}{1000} = \frac{12}{250} = \frac{6}{125}$	2
Total:	**2**

2. Convert 6.4375 to a mixed number.

	Marks
$0.4375 = \frac{4375}{10\,000} = \frac{175}{400} = \frac{7}{16}$	2
Hence, $6.4375 = 6\frac{7}{16}$	1
Total:	**3**

3. Express $\frac{9}{32}$ as a decimal fraction.

	Marks
$32\overline{)9.0000}$ $\quad 0.28125$	
i.e. $\frac{9}{32} = 0.28125$	2
Total:	**2**

4. Express 0.0784 correct to 2 decimal places.

	Marks
0.0784 = 0.08, correct to 2 decimal places.	2
Total:	**2**

5. Express 0.0572953, correct to 4 significant figures.

	Marks
0.0572953 = 0.05730, correct to 4 significant figures.	2
Total:	**2**

6. Evaluate: (a) 46.7 + 2.085 + 6.4 + 0.07 (b) 68.51 – 136.34

	Marks
(a) 46.7 + 2.085 + 6.4 + 0.07 = 55.255	2
(b) 68.51 – 136.34 = –67.83	2
Total:	**4**

7. Determine 2.37 × 1.2

	Marks
237 12 2844	2
Hence, 2.37 × 1.2 = 2.844	1
Total:	**3**

8. Evaluate 250.46 ÷ 1.1, correct to 1 decimal place.

	Marks

$11\overline{)2504.60}$ (227.69)	2
Hence, $250.46 \div 1.1 = 227.7$, correct to 1 decimal place.	1
Total:	**3**

9. Evaluate $5.\dot{2} \times 12$

	Marks
$5.\dot{2} \times 12 = 5.22222222 \times 12 = 62.666666 = 62.\dot{6}$	2
Total:	**2**

10. Evaluate the following, correct to 4 significant figures: $3.3^2 - 2.7^3 + 1.8^4$

	Marks
$3.3^2 - 2.7^3 + 1.8^4 = 1.7046 = 1.705$, correct to 4 significant figures.	3
Total:	**3**

11. Evaluate $\sqrt{6.72} - \sqrt[3]{2.54}$ correct to 3 decimal places.

	Marks
$\sqrt{6.72} - \sqrt[3]{2.54} = 1.2278872\ldots. = 1.228$, correct to 3 decimal places.	3
Total:	**3**

12. Evaluate $\frac{1}{0.0071} - \frac{1}{0.065}$ correct to 4 significant figures.

	Marks
$\frac{1}{0.0071} - \frac{1}{0.065} = 125.4604\ldots = 125.5$, correct to 4 significant figures.	2

Total:	**2**

13. The potential difference, V volts, available at battery terminals is given by: $V = E - Ir$.

Evaluate V when $E = 7.23$, $I = 1.37$ and $r = 3.60$

	Marks
$V = E - Ir = 7.23 - 1.37 \times 3.60$ $= 7.23 - 4.932 = 2.298$ V	3
Total:	**3**

14. Evaluate $\frac{4}{9} + \frac{1}{5} - \frac{3}{8}$ as a decimal, correct to 3 significant figures.

	Marks
$\frac{4}{9} + \frac{1}{5} - \frac{3}{8} = \frac{97}{360} = 0.26944444\ldots = 0.269$, correct to 3 significant figures.	3
Total:	**3**

15. Evaluate $\frac{16 \times 10^{-6} \times 5 \times 10^{9}}{2 \times 10^{7}}$ in engineering form.

	Marks
$\frac{16 \times 10^{-6} \times 5 \times 10^{9}}{2 \times 10^{7}} = 4 \times 10^{-3}$	2
Total:	**2**

16. Evaluate resistance R, given $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ when $R_1 = 3.6$ kΩ, $R_2 = 7.2$ kΩ and $R_3 = 13.6$ kΩ.

	Marks
$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{3.6} + \frac{1}{7.2} + \frac{1}{13.6} = 0.490196078\ldots$	2

from which, $R = \dfrac{1}{0.490196078} = 2.04\ \text{k}\Omega$	1
Total:	**3**

17. Evaluate $6\frac{2}{7} - 4\frac{5}{9}$ as a mixed number and as a decimal, correct to 3 decimal places.

	Marks
$6\frac{2}{7} - 4\frac{5}{9} = \frac{44}{7} - \frac{41}{9} = \frac{396-287}{63} = \frac{109}{63} = 1\frac{46}{63}$	2
= 1.730, correct to 3 decimal places.	1
Total:	**3**

18. Evaluate, correct to 3 decimal places: $\sqrt{\left[\dfrac{2\,\text{e}^{1.7}\times 3.67^3}{4.61\times\sqrt{3\pi}}\right]}$

	Marks
$\sqrt{\left[\dfrac{2\,\text{e}^{1.7}\times 3.67^3}{4.61\times\sqrt{3\pi}}\right]}$ = 6.184, correct to 3 decimal places.	3
Total:	**3**

19. If $a = 0.270$, $b = 15.85$, $c = 0.038$, $d = 28.7$ and $e = 0.680$, evaluate v correct to 3 significant figures, given that $v = \sqrt{\left(\dfrac{ab}{c} - \dfrac{d}{e}\right)}$

	Marks
$v = \sqrt{\left(\dfrac{ab}{c} - \dfrac{d}{e}\right)} = \sqrt{\left(\dfrac{0.270\times 15.85}{0.038} - \dfrac{28.7}{0.680}\right)}$ = 8.39, correct to 3 significant figures.	4
Total:	**4**

20. Evaluate the following, each correct to 2 decimal places:

(a) $\left(\dfrac{36.2^2 \times 0.561}{27.8 \times 12.83}\right)^3$ (b) $\sqrt{\left(\dfrac{14.69^2}{\sqrt{17.42} \times 37.98}\right)}$

	Marks
(a) $\left(\dfrac{36.2^2 \times 0.561}{27.8 \times 12.83}\right)^3$ = 8.76, correct to 2 decimal places.	2
(b) $\sqrt{\left(\dfrac{14.69^2}{\sqrt{17.42} \times 37.98}\right)}$ = 1.17, correct to 2 decimal places.	2
Total:	**4**

21. If 1.6 km = 1 mile, determine the speed of 45 miles/hour in kilometres per hour.

	Marks
Speed = 45 miles/hour = 45 × 1.6 km/h = 72 km/h	2
Total:	**2**

22. The area A of a circle is given by $A = \pi r^2$. Find the area of a circle of radius r = 3.73 cm, correct to 2 decimal places.

	Marks
Area $A = \pi r^2 = \pi \times 3.73^2 = 43.71$, correct to 2 decimal places.	3
Total:	**3**

23. Evaluate B, correct to 3 significant figures, when $W = 7.20$, $v = 10.0$ and $g = 9.81$, given that $B = \dfrac{Wv^2}{2g}$.

	Marks

$B = \frac{Wv^2}{2g} = \frac{7.20 \times 10.0^2}{2 \times 9.81} = 36.7$, correct to 3 significant figures. Total:	3 **3**

24. Express 56.25% as a fraction in its simplest form.

	Marks
$56.25\% = \frac{56.25}{100} = \frac{5625}{10\,000} = \frac{225}{400} = \frac{9}{16}$	3
Total:	**3**

25. 12.5% of a length of wood is 70 cm. What is the full length?

	Marks
If 12.5% of a length of wood is 70 cm, then $1\% = \frac{70}{12.5}$	1
and full length, i.e. $100\% = \frac{70}{12.5} \times 100 = 560$ cm or 5.60 m	2
Total:	**3**

26. A metal rod, 1.20 m long, is heated and its length expands by 42 mm. Calculate the percentage increase in length.

	Marks
Percentage increase in length $= \frac{42}{1.20 \times 10^3} \times 100\% = 3.5\%$	2
Total:	**2**

27. A man buys a house and makes a 20% profit when he sells it three years later for £312 000. What did he pay for it originally?

	Marks

Original cost $= \dfrac{\text{new value}}{100+\%\text{change}} \times 100\% = \dfrac{312\,000}{100+20} \times 100\% = £260\,000$	3
Total:	**3**

TOTAL MARKS FOR REVISION TEST 2: 75