Multiple-choice section

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Answer | D | D | B | A | C | C | B | C | C | B |

Question 1 [3.1]

D

*h*8 × *h* = *h*8 + 1

= *h*9

Question 2 [3.6]

D

(*y* + 2)2

= *y*2 + 2 × 2 × *y* + 22

= *y*2 + 4*y* + 4

Question 3 [3.5]

B

3(*x* – 1)

= 3 × *x* – 3 × 1

= 3*x* – 3

Question 4 [3.7]

A

5*g*2*t* – 10*g*2

= 5*g*2(*t* – 2)

Question 5 [3.3]

C

All non-zero digits are significant.

End zero is not significant.

Middle zeros are significant.

Therefore, there are 5 significant figures.

Question 6 [3.8]

C

*wb* + 2*w* + 4*b* + 8

*wb* and 4*b* share the common factor of *b*.

2*w* and 8 share the common factor of 2.

*wb* + 4*b* + 2*w* + 8 = *b*(*w* + 4) + 2(*w* + 4)

Question 7 [3.1]

B

18*m*8 ÷ 6*m*2

= 

= 3*m*8 – 2

= 3*m*6

Question 8 [3.2]

C

24 × 34

= (2 × 3)4

= 64

Question 9 [3.4]

C

**

Question 10 [3.2]

B

3-2 = 

Multiple-choice total marks: 10

Short answer section

Question 11 3 marks [3.3]

Scientists use scientific notation to write very large or very small numbers in a convenient way. When writing index numbers, the index indicates the number of times the base is multiplied by itself.

Question 12 2 marks [3.5, 3.7]

‘Factorise’ and ‘expand’ are opposite instructions. To factorise is to express something as a product of its factors (often using brackets). To expand means to multiply these factors (to remove the brackets by multiplying factors inside the brackets by the factors outside).

e.g. 4*x* + 10*xy*:

The common factor is 2*x*, so place it outside of a pair of brackets and place the other factors inside:   
2*x*(2 + 5*y*)

Expanding these brackets gives the original expression:   
2*x* × 2 + 2*x* × 5*y* = 4*x* + 10*xy*

Question 13 2 marks [3.1]

(a) 2*w*4 × 6*w*8 = 12*w*12

**(b)** 15*c*9 ÷ 3*c* = 5*c*8

Question 14 4 marks [3.1]

(a)  = 

(b) (*f*6)3 × (*f*2)2

= *f*18 × *f*4

= *f*22

Question 15 4 marks [3.2]

|  |  |
| --- | --- |
| (a) (5*v*2)2  = 52*v*4  = 25*v*4 | (b) =  = |

Question 16 2 marks [3.2]

(a) *k*-4 = 

(b) *t*13 ÷ *t*16

= *t*-3

= 

Question 17 3 marks [3.2]

(a) 80 = 1

(b) 3*m*0

= 3 × 1

= 3

(c) (21*u*)0

= 210*u*0

= 1 × 1

= 1

Question 18 4 marks [3.3]

(a) 2.34 × 105

(b) 566 000

(c) 3.08 × 10-2

(d) 0.002 79

Question 19 2 marks [3.3]



= 77 419.4

= 7.741 94 × 104

Question 20 1 mark [3.3]

(a) 4

(b) 2

Question 21 3 marks [3.4]

(a) *d* = 

*d* × *v* = *m*

*m* = *dv*

(b) *pq* – *s* = *b*

*pq* = *b* + *s*



Question 22 3 marks [3.5]

(a) 2(*m* – 4*j*) = 2*m* – 8*j*

(b) 2(*u* – 3) + 4(*u* + 5*f*)

= 2*u* – 6 + 4*u* + 20*f*

= 6*u* + 20*f* – 6

= 20*f* + 6*u* – 6

Question 23 4 marks [3.5]

(a) (*g* + 7)(*g* + 3)

= *g*(*g* + 3) + 7(*g* + 3)

= *g*2 + 3*g* + 7*g* + 21

= *g*2 + 10*g* + 21

**(b)** (*r* – 8)(*r* + 7)

= *r*(*r* + 7) – 8)(*r* + 7)

= *r*2 + 7*r* – 8*r* – 56

= *r*2 – *r* – 56

Question 24 4 marks [3.6]

(a) (*a* + 3)2

= *a*2 + 2 × 3 × *a* + 32

= *a*2 + 6*a* + 9

**(b)** (*p* – 8)2

= *p*2 – 2 × *p* × 8+ 82

= *p*2 – 16*p* + 64

Question 25 2 marks [3.6]

(a) (*w* – *z*)(*w* + *z*) = *w*2 – *z*2

(b) (*y* – 4)(*y* + 4) = *y*2 – 16

Question 26 3 marks [3.7]

(a) 28*c* – 14 = 14(2*c* – 1)

**(b)** 4*fgh* – 3*gh* = *gh*(4*f* – 3)

Question 27 2 marks [3.7]

(a) 2(*k* – 3) + *b*(*k* – 3) = (*k* – 3)(2 + *b*)

**(b)** 5*y*(3*z* + 2) – 7(3*z* + 2) = (3*z* + 2)(5*y* – 7)

Question 28 2 marks [3.8]

*mp* + 7*m* + 5*p* + 35

= *m*(*p* + 7) + 5(*p* + 7)

= (*m* + 5)(*p* + 7)

Short answer total marks: 50

Extended answer section

Question 29 5 marks [3.3]

(a) 57 910 000 km = 5.791 × 107 km

(b) 108 200 000

Zeros between non-zero digits are significant. Zeros after a non-zero digit are not significant. Therefore there are 4 significant figures.

(c) (1.433 × 109) – (2.2794 × 108) km = 1.205 06 × 109 km

Mars is 1.205 06 × 109 km closer to the Sun than Saturn.

(d) 149 600 000 km = 1.496 × 108 km

Extended answer total marks: 5

TOTAL test marks: 65