

REG-RF-2223-ASM-SET 1-MATH**Suggested solutions****Multiple Choice Questions**1. ☐ C

$$2xy = 2 \cdot xy$$

$$4x^3y = 2^2 \cdot x^3y$$

$$6xy^2 = 2 \cdot 3 \cdot xy^2$$

$$\text{H.C.F.} = 2xy$$

$$\text{L.C.M.} = 12x^3y^2$$

2. ☐ A

$$10(x-2)(x+1) = 2 \cdot 5 \cdot (x-2)(x+1)$$

$$15(x-2)^2(x+3)^3 = 3 \cdot 5 \cdot (x-2)^2(x+3)^3$$

$$\text{H.C.F.} = 5(x-2)$$

$$\text{L.C.M.} = 2 \cdot 3 \cdot 5(x-2)^2(x+1)(x+3)^3$$

$$= 30(x-2)^2(x+1)(x+3)^3$$

3. ☐ C

$$6a^3b^2c = 2 \cdot 3 \cdot a^3b^2c$$

$$15a^2c^4 = 3 \cdot 5 \cdot a^2c^4$$

$$\text{L.C.M.} = 2 \cdot 3 \cdot 5 \cdot a^3b^2c^4 = 30a^3b^2c^4$$

4. ☐ A

$$xyz^3$$

$$x^2y^3z$$

$$\text{H.C.F.} = xyz$$

$$\text{L.C.M.} = x^2y^3z^3$$

5. ☐ C

$$2x^2 - x - 3 = (2x-3)(x+1)$$

$$2x^2 - 7x + 6 = (x-2)(2x-3)$$

$$2x^2 + 3x - 9 = (2x-3)(x+3)$$

$$\text{L.C.M.} = (2x-3)(x-2)(x+1)(x+3)$$

6. ☐ A

$$x^2 - 9 = (x+3)(x-3)$$

$$3x^2 - 7x - 6 = (x-3)(3x+2)$$

$$3x^3 - 81 = 3(x^3 - 27) = 3(x-3)(x^2 + 3x + 9)$$

$$\text{H.C.F.} = x-3$$

7. ☐ C

$$2x^2 - 5x - 3 = (x - 3)(2x + 1)$$

$$2x^2 + 7x + 3 = (2x + 1)(x + 3)$$

$$\text{H.C.F.} = 2x + 1$$

8. ☐ D

$$(x + 2)^2 = (x + 2)^2$$

$$2x^2 - 8 = 2(x^2 - 4) = 2(x + 2)(x - 2)$$

$$x^3 + 8 = (x + 2)(x^2 - 2x + 4)$$

$$\text{L.C.M.} = 2(x + 2)^2(x - 2)(x^2 - 2x + 4)$$

9. ☐ A

A. ✓.

B. ✗. $\text{L.C.M.} = 10x^2yz^3 \neq 20x^2yz^3$

C. ✗. $\text{L.C.M.} = 20x^2y^2z^3 \neq 20x^2yz^3$

D. ✗. $\text{L.C.M.} = 40x^3y^2z^4 \neq 20x^2yz^3$

10. ☐ B

A. ✗. $\text{H.C.F.} = 1 \neq 3(2x + 5)(x - 1)$

B. ✓.

C. ✗. $\text{H.C.F.} = 6(2x + 5)(x - 1)^2 \neq 3(2x + 5)(x - 1)$

D. ✗. $\text{H.C.F.} = 3(2x + 5)^2(x - 1) \neq 3(2x + 5)(x - 1)$

11. ☐ C

$$14a^2b^3c^4 = 2 \cdot 7 \cdot a^2b^3c^4$$

$$\text{The other monomial is } 5 \cdot 7 \cdot a^4b^3c^2 = 35a^4b^3c^2.$$

12. ☐ C

$$\text{The other one is } ab^4c^2.$$

13. ☐ C

The power of x is 3.

The power of y is 2 or 3.

The power of z is 1, 2, 3 or 4.

The answer is C.

14. C

We have

$$\begin{cases} 0 = a \left(\frac{1}{2}\right)^2 - b \left(\frac{1}{2}\right) - a \\ 0 = a \left(\frac{1}{2}\right)^2 + b \left(\frac{1}{2}\right) + 1 \end{cases}$$

Solving, we have $a = 2$ and $b = -3$.

15. D

I. ✓. $x + 1$ is a common factor of $f(x)$ and $g(x)$.

II. ✗. $x - 2$ is a factor of $f(x) \times g(x)$.

$$0 = f(2) \times g(2)$$

$$f(2) = 0 \quad \text{or} \quad g(2) = 0$$

III. ✓.

16. D

Required answer is the L.C.M. of $2a^2b$ and $4ab^3$.

Required answer is $4a^2b^3$.

17. A

Required H.C.F. is the H.C.F. of $9(x + 1)^3$ and $3(x - 3)(x + 1)$.

Required H.C.F. is $3(x + 1)$.

18. B

Required L.C.M. is the L.C.M. of $18x^3yz^2$ and $24x^4y^2$.

Required L.C.M. is $2^3 \cdot 3^2 \cdot x^4y^2z^2 = 72x^4y^2z^2$.

Conventional Questions

19. (a) $f\left(-\frac{4}{3}\right) = 3\left(-\frac{4}{3}\right)^3 + 22\left(-\frac{4}{3}\right)^2 + 51\left(-\frac{4}{3}\right) + 36$ 1M
 $= 0$
 $g\left(-\frac{4}{3}\right) = 3\left(-\frac{4}{3}\right)^3 - 8\left(-\frac{4}{3}\right)^2 - 31\left(-\frac{4}{3}\right) - 20$
 $= 0$
 $3x + 4$ is a common factor of $f(x)$ and $g(x)$. 1
 $f(x) = 3x^3 + 22x^2 + 51x + 36$
 $= (3x + 4)(x^2 + 6x + 9)$ 1M
 $= (3x + 4)(x + 3)^2$ 1A
 $g(x) = 3x^3 - 8x^2 - 31x - 20$
 $= (3x + 4)(x^2 - 4x - 5)$
 $= (3x + 4)(x - 5)(x + 1)$ 1A
 (b) H.C.F. = $3x + 4$ 1A
 L.C.M. = $(3x + 4)(x + 1)(x + 3)^2(x - 5)$ 1A
20. (a) We have

$$\begin{cases} 0 = 2(4)^2 + 4a + 4b \\ 0 = -a(4)^2 - 4a + 12b \end{cases}$$
 1M
1M
 Solving, we have $a = -3$ and $b = -5$. 1A+1A
- (b) $f(x) = 2x^2 - 3x - 20$
 $= (x - 4)(2x + 5)$ 1A
 $g(x) = 3x^2 + 3x - 60$
 $= 3(x - 4)(x + 5)$ 1A
 L.C.M. = $3(x - 4)(x + 5)(2x + 5)$ 1A
21. (a) We have

$$\begin{cases} 0 = 4^2 - 12a + 2b \\ 0 = 4^2 + 4a - 2b \end{cases}$$
 1M
1M
 Solving, we have $a = 4$ and $b = 16$. 1A+1A
- (b) $f(x) = x^2 - 12x + 32$
 $= (x - 4)(x - 8)$ 1A
 $g(x) = x^2 + 4x - 32$
 $= (x - 4)(x + 8)$ 1A
 L.C.M. = $(x - 4)(x - 8)(x + 8)$ 1A

22. (a) (i) We have

$$\begin{cases} 0 = 1 + 2 + a + b & 1\text{M} \\ 0 = 1 + a + 14 - 2b & 1\text{M} \end{cases}$$

Solving, we have $a = -7$ and $b = 4$. 1A+1A

(ii) $f(x) = x^3 + 2x^2 - 7x + 4$

$$\begin{aligned} &= (x - 1)(x^2 + 3x - 4) \\ &= (x - 1)^2(x + 4) \end{aligned} \quad 1\text{A}$$

$$\begin{aligned} g(x) &= x^3 - 7x^2 + 14x - 8 \\ &= (x - 1)(x^2 - 6x + 8) \\ &= (x - 1)(x - 2)(x - 4) \end{aligned} \quad 1\text{A}$$

(b) L.C.M. $= (x - 1)^2(x - 2)(x - 4)(x + 4)$ 1A