

6. OPERATIONS ON POLYNOMIALS

①

2025/26

Class: VII. MATHEMATICS

FOUNDATION: SOLUTIONS

TEACHING TASK
TEEMAINS LEVEL

01. $-7x^3 + 2x^2 - 9x^3 + 6x^2 - 7x + 6 + 3x - 9$

$$= -16x^3 + 8x^2 - 4x - 3$$

Ans: C

02. $(9x^2 - 8xy + 11y^2) - [4x^2 + 7xy + 3y^2 + 1 + 2x^2 - 5xy - 2y^2 + 8]$

$$= (9x^2 - 8xy + 11y^2) - (6x^2 + 2xy + y^2 + 9)$$

$$= 9x^2 - 8xy + 11y^2 - 6x^2 - 2xy - y^2 - 9$$

$$= 3x^2 - 10xy + 10y^2 - 9$$

Ans: A

03. $12p^4q^4$

Ans: D

04. $(\frac{1}{3}y^3 + \frac{5}{7}y^2 - 2) - (-\frac{2}{3}y^3 - \frac{2}{7}y^2 - 5)$

$$= \frac{1}{3}y^3 + \frac{5}{7}y^2 - 2 + \frac{2}{3}y^3 + \frac{2}{7}y^2 + 5$$

$$= y^3 + y^2 + 3$$

Ans: B

$$05 \quad \frac{2x(8x^3 + 4x^2 + 2x + 3)}{Ax} = 8x^3 + 4x^2 + 2x + 3 \quad (2)$$

$$\Rightarrow A = 2$$

$$\therefore \frac{8x^3 + 4x^2 + 10x}{2x} = 4x^2 + 2x + 5 \quad \text{Ans. D}$$

$$06 \quad \left(\frac{7}{2} - \frac{x}{3} - \frac{x^2}{5} \right) - \left(\frac{9}{2} + \frac{x}{2} + \frac{3}{5}x^2 + \frac{7}{4}x^3 \right)$$

$$= \frac{7}{2} - \frac{x}{3} - \frac{x^2}{5} - \frac{9}{2} - \frac{x}{2} - \frac{3}{5}x^2 - \frac{7}{4}x^3$$

$$= -1 - \frac{5}{6}x - \frac{4}{5}x^2 - \frac{7}{4}x^3 \quad \text{Ans: A}$$

$$07 \quad \frac{A \times B}{4xy} = A = \frac{4xy[8x^7y^3 + 4x^3y^2 + xy^3]}{4xy}$$

$$\therefore A = 8x^7y^3 + 4x^3y^2 + xy^3$$

$$B = \frac{16x^5y^4}{4x^2y^2} = 4x^3y^2$$

$$= \frac{(8x^7y^3 + 4x^3y^2 + xy^3) \times 4x^3y^2}{4x^3y^3}$$

$$= (8x^7y^3 + 4x^3y^2 + xy^3)x$$

$$= 8x^7y^2 + 4x^3y + xy^2 \quad \text{Ans: A}$$

$$\text{Now, } \frac{A \times B}{4x^3y^3}$$

08 We know $a+b+c=0 \Rightarrow a^3+b^3+c^3=3abc$ (3)

$$(x-y) + (y-z) + (z-x) = 0$$

$$\Rightarrow (x-y)^3 + (y-z)^3 + (z-x)^3 = 3(x-y)(y-z)(z-x)$$

Ans: A

09 $\frac{3}{2}a - \frac{5}{4}b + \frac{2}{5}c + \frac{2}{3}a - \frac{7}{2}b + \frac{7}{2}c + \frac{5}{3}a + \frac{5}{2}b - \frac{5}{4}c$

$$= \left(\frac{3}{2} + \frac{2}{3} + \frac{5}{3}\right)a + \left(-\frac{5}{4} - \frac{7}{2} + \frac{5}{2}\right)b + \left(\frac{2}{5} + \frac{7}{2} - \frac{5}{4}\right)c$$

$$= \left(\frac{23}{6}\right)a - \frac{9b}{4} + \frac{31}{10}c$$

Ans: —

10 $A+B+C = \left(\frac{7}{2} + \frac{3}{2}\right)x^3 + \left(-\frac{1}{2} + \frac{7}{2} + \frac{3}{2}\right)x^2$

$$+ \left(-1 - \frac{5}{2}\right)x + \left(\frac{5}{3} + \frac{1}{3} - 2\right)$$

$$= 5x^3 + \frac{9}{2}x^2 - \frac{7}{2}x$$

Ans: C

JEE ADVANCED LEVEL

01. $\frac{2a}{3} + \frac{4a}{3} + 8a = 10a > 8a, 9a$ Ans: D
A

02 $[9m(m-12)] - [6m(m-13) + 5m(3-m)]$

$$= (9m^2 - 108m) - (6m^2 - 78m + 15m - 5m^2)$$

$$= 9m^2 - 108m - 6m^2 + 78m - 15m - 5m^2$$

$$= -2m^2 - 45m$$

Ans: —

03

please correct the question

④

If $\boxed{2m^2} + 4m^3 + 2m^4 - m^6$ is divisible by

$\sqrt{2} m^2$, then quotient is

$$A) \frac{2m^2 + 4m^3 + 2m^4 - m^6}{\sqrt{2} m^2}$$

$$= \frac{m^2(2 + 4m + 2m^2 - m^4)}{\sqrt{2} m^2}$$

$$= \frac{-m^4 + 2m^2 + 4m + 2}{\sqrt{2}} \rightarrow \text{option A} \checkmark$$

$$B) \frac{2(1 + 2m + m^2) - m^4}{\sqrt{2}} \checkmark$$

$$C) -\frac{1}{\sqrt{2}} m^4 + \sqrt{2} m^2 + 2\sqrt{2} m + \sqrt{2} \checkmark$$

$$D) \sqrt{2}(1 + 2m + m^2) - \frac{m^4}{\sqrt{2}} \checkmark$$

Ans. A, B, C, D

04 Statement I: $3x^2 + x + a = 8$

$$x = 1 \Rightarrow 3 + 1 + a = 8 \Rightarrow a = 4 \text{ (True)}$$

Statement II: Conceptual (True)

Ans. A

05 Statement I: $ab \times a^2 b = a^3 b^2 = (1)^3 (2)^2 = 4 \text{ (True)}$

Statement II: Conceptual (True)

Ans: A

06 Assertion: $\frac{4x^2+2x}{2x} = \frac{2x(2x+1)}{2x} = 2x+1$ (True) (5)

Reason: Conceptual (True)

Ans. A

07 Assertion: $4x^2-x+2-2x^2-3x+1$
 $= 2x^2-4x+3$ (True)

Reason: Conceptual (True)

Ans. A

08 $A = \frac{18x^4y^2+15x^3y^2-27x^2y}{-3xy}$
 $= \frac{-3xy(-6x^3y^2-5xy+9x)}{-3xy}$
 $= -6x^3y^2-5xy+9x$

Ans. D

09 $B = \frac{144x^3y^8}{9xy^2} = 16x^2y^6$

Ans. B

10 $A \times B = (-6x^3y^2-5xy+9x)(16x^2y^6)$
 $= -96x^5y^8-80x^3y^7+144x^3y^6$

Ans. A

11 $(6x^2+3x-8)-(2x^2+x-5) = 4x^2+2x-3$

Ans. A

12 -3

Ans. A

~~13 4-5-2~~

$$13 \quad 8 - 5 = 3$$

Ans: 3

$$14 \quad 6a - 3a - 4b + 2a - b - 5a + 7b$$

$$= 2b$$

Ans: 2b

$$15 \quad a) -6x^2y \times 7x^3y^3 = -42x^5y^4 (s)$$

$$b) (-4ac)(-6a^2b^3)(2a^3b^4c^3) = 48a^6b^5c^7 (r)$$

$$c) (4a)(5b)(-6ab) = -120a^2b^2 (q)$$

$$d) \left(-\frac{3}{5}x^2\right)\left(\frac{15}{6}y^2z^2\right)\left(\frac{4}{7}x^2y^2z^2\right)$$

$$= -\frac{6}{7}x^6y^4z^2 (p)$$

Ans: s, r, q, p

$$16 \quad a) (2a+3b)(4a^2-6ab+9b^2)$$

$$= (2a+3b) [(2a)^2 - (2a)(3b) + (3b)^2]$$

$$= (2a)^3 + (3b)^3 = 8a^3 + 27b^3 (t)$$

$$b) (3x+4y)(9x^2-12xy+16y^2)$$

$$= (3x+4y) [(3x)^2 - (3x)(4y) + (4y)^2]$$

$$= (3x)^3 + (4y)^3 - 27x^3 + 64y^3 (q)$$

$$c) (4a)^3 + (3)^3 = 64a^3 + 27 (p)$$

$$d) (5a)^3 - (3)^3 = 125a^3 - 27 (s)$$

Ans: t, q, p, s

LEARNERS TASK (CUE'S)

⑨

01. $3a^2b - 4a^2b + 9a^2b = 8a^2b$ Ans: B

02. $A+B = (a^2+a+1) + (a^2-a+1)$
 $= 2(a^2+1)$ Ans: C

03. $0 - (-3xy) = 3xy$ Ans: A

04. $(4a+3) - (5a+6) = 4a+3-5a-6$
 $= -a-3$ Ans: C

05. $12xy - (-5xy) = 17xy$ Ans: C

06. $-12x^4y$ Ans: C

07. $-2b$ Ans: D

08. $-8abc$ Ans: B

09. a^7 Ans: C

10. $\frac{b}{a}$ Ans: B

IEEE MAINS LEVEL

01. $A+2B = (x+2) + 2(2x) = 5x+2$ Ans: C

~~$(3a+2b) + (a+b) = 4a+3b = 4 \cdot 0 + 3 = 3$~~ Ans: C

$$02. (a+b) + (3a+2b) = 4a+3b = 4(0) + 3(1) \quad \textcircled{8} \\ = 3 \quad \text{Ans. C}$$

$$03 \quad (2x^2+3xy) - (3x^2+2xy) \\ = 2x^2+3xy - 3x^2-2xy \\ = -x^2+xy \quad \text{Ans: C}$$

$$04 \quad 2p^4q^3r^2 \quad \text{Ans: A}$$

$$05 \quad 5a^2 - 7b^2 \quad \text{Ans. A}$$

$$06 \quad \frac{A}{B} = \frac{-10x^3y^2 + 15x^2y^3}{-\frac{5}{2}x^4y^2} = 4x - 6y \quad \text{Ans: A}$$

$$06 \quad = \cancel{4(x)}$$

$$07 \quad 4x^2 - 5xy + 3y^2 + 8x^2 + 7xy - 6y^2 - 2x^2 - 9xy + 13y^2 \\ = 10x^2 - 7xy + 10y^2 \quad \text{Ans: B}$$

$$08 \quad (a^4 + 4a^2b^2 + b^4) - (a^4 - 8a^2b^2 + b^4) = 12a^2b^2 \\ \text{Ans: D}$$

$$09. \quad (2p^2q^2) \times \left(-\frac{3}{4}p^3q\right) + (-5p^4q)(pq^2) \\ = -\frac{3}{2}p^5q^3 - 5p^5q^3 \\ = -\frac{13}{2}p^5q^3 \quad \text{Ans. B}$$

10 $(5a^6)(-10a^2)(-2 \cdot \frac{1}{2} a^2 b^3)$ ⑨

$$= 0 + 50 \times \frac{21}{10} \times a^9 \cdot b^5$$

$$= +105(1)^9 \left(\frac{1}{2}\right)^5 = \frac{+105}{32}$$

Ans: D

11 $\frac{10}{9} \cdot x^4 y z^3 = \frac{10}{9} \cdot (1)^4 (-4) (2)^3$

$$= -\frac{320}{9}$$

Ans: B

12 JEE ADVANCED LEVEL

01. perimeter = $3(x - 2y + 3xy)$

$$= 3x - 6y + 9xy$$

Ans: A, C

02 $(2x+8)(x-3)$

$$= 2x^2 - 6x + 8x - 24 = 2x^2 + 2x - 24$$

$$= 2(x^2 + x - 12)$$

Ans: A, C

03 Statement I:

(10)

$$\begin{aligned} & (x^2 - 2xy + y^2) + (x^2 + 2xy + y^2) - x^2 - 4xy + 4y^2 \\ &= x^2 - \cancel{2xy} + y^2 + \cancel{x^2} + \cancel{2xy} + y^2 - \cancel{x^2} - 4xy + 4y^2 \\ &= x^2 - 4xy + 6y^2 \text{ (False)} \end{aligned}$$

Statement II:

$$\begin{aligned} & (9b^2 - 3c^2) + (2b^2 + bc - 2c^2) - (2b^2 - 2bc - c^2) \\ &= 9b^2 - 3c^2 + \cancel{2b^2} + bc - 2c^2 - \cancel{2b^2} + 2bc + c^2 \\ &= 9b^2 + 3bc - 4c^2 \text{ (False)} \end{aligned}$$

Ans: B

04 Statement I: $\left(\frac{K}{40}\right) \div \frac{K}{4} = \frac{K}{10} \times \frac{4}{K} = \frac{1}{10}$ (True)

Statement II: $\frac{1}{36} \times \frac{75P}{14} = \frac{5P}{4}$ (True) Ans: A

05 Assertion: $(a+2)(a+3) = a^2 + 5a + 6$ (True)

Reason: Conceptual (True) Ans: A

06 Assertion: Conceptual (True)

Reason: Conceptual (True) Ans: A

07 $A+B = 6px - 2qy + 3rz + 6qy - rz - 11px$

$= -5px + 4qy + 2rz$ Ans: A

$$08 \quad A+2B = (\cancel{px+2y+2z}) + 2(\cancel{\quad})$$

$$08 \quad A+2B = (6px - 2y + 3z) + 2(6y - z - 11px) \\ = 6px - 2y + 3z + 12y - 2z - 22px \\ = -16px + 10y + z \quad \text{Ans: C}$$

$$09 \quad A+B+C = (6px - 2y + 3z) + (6y - z - 11px) \\ + (10z - 2px - 3y) \\ = -7px + y + 12z \quad \text{Ans: B}$$

$$10 \quad A+B = 4x^2 - 2x + 4 \quad \text{Ans: A}$$

$$11 \quad B+C = 2x^2 + x + 8 \quad \text{Ans: B}$$

$$12 \quad 2A+B+C = 2(7x^2 - 4x + 5) + (-3x^2 + 2x - 1) \\ + (5x^2 - x + 9) \\ = 16x^2 - 7x + 18 \quad \text{Ans: D}$$

$$13 \quad \frac{2a(5a^2 + 6b)}{2a} = 5(2)^2 + 6(-1) = 14 \quad \text{Ans: 14}$$

$$14 \quad (x^3 - 3x^2 + 5x - 2) - (x^3 - 3x^2 + 5x - 6) = 4 \\ \text{Ans: 4}$$

15 $p=24, q=48$

(12)

$$\frac{q x^4 y^3}{p x^2 y^2} = \frac{48}{24} x^2 y = 2x^2 y = K x^2 y \Rightarrow K=2$$

Ans: 2

16 a) $2(x^2+1)(r)$

b) $2x(s)$

c) $2A+B = 2x^2+2x+2 + x^2-x+1$
 $= 3x^2+x+3 (q)$

d) $2A-B = 2x^2+2x+2 - x^2+x-1$
 $= x^2+3x+1 (p)$ Ans: r, s, q, p

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NOTE: Please Change

$$A = 4x^3 + \boxed{3x^2} - 2x - 1$$

A) $A+B+C = 4x^3+3x^2-2x-1 + 4x^3-3x^2+2x+1$
 $- 4x^3-3x^2+2x+1$
 $= 4x^3-3x^2+2x+1 (p)$

B) $A-B+C = 4x^3+3x^2-2x-1 - 4x^3+3x^2-2x-1$
 $+ 4x^3-3x^2+2x+1$
 $= -4x^3+3x^2-2x-1 (c)$

C) $A+B-C = 4x^3+3x^2-2x-1 + 4x^3-3x^2+2x+1$
 $+ 4x^3+3x^2-2x-1$
 $= 12x^3+3x^2-2x-1 (r)$

d) $-A+B+C = -4x^3-9x^2+6x+3 (s)$
 Ans: p, r, s

$$18) a) \frac{8x+4}{2} = 4x+2 (r)$$

(13)

$$b) \frac{-36x+48}{-12} = 3x-4 (s)$$

$$c) \frac{6x^2y-4xy}{-2xy} = -3x+2 (p)$$

$$d) \frac{9x^2y^2+3x^2y}{3xy} = 3xy+x (t)$$

Ans: r, s, p, t

ADDITIONAL PRACTICE QUESTIONS

01 $-100a^6$

Ans: A

02 $6xy$

Ans: D

$$03 \quad \frac{1}{2} s^2 t (s+t) = \frac{1}{2} s^3 t + \frac{1}{2} s^2 t^2$$

$$= \frac{1}{2} \left(\frac{1}{2}\right)^3 (5) + \frac{1}{2} \left(\frac{1}{2}\right)^2 (5)^2$$

$$= \frac{385}{16}$$

Ans: C

$$04 \quad \left(\frac{1}{2} + \frac{2}{3}\right)a^2 + \left(\frac{1}{3} + \frac{3}{4}\right)b^3 + \left(-\frac{1}{4} - \frac{4}{5}\right)c^3$$

$$= \frac{7}{6}a^2 + \frac{13}{12}b^3 - \frac{21}{20}c^3$$

Ans: D

$$05 \left(\frac{11}{2} - \frac{13}{7} \right)xy + \left(\frac{12}{5} - \frac{11}{2} \right)y + \left(\frac{13}{7} - \frac{12}{5} \right)x \quad (14)$$

$$= \frac{51}{14}xy - \frac{31}{10}y - \frac{19}{35}x$$

$$= \frac{51}{14} \cdot 7 \cdot 2 - \frac{31}{10} \cdot 2 - \frac{19}{35} \cdot 7$$

$$= 51 - \frac{31}{5} - \frac{19}{5} = 41$$

Ans. D

$$06 (2p^2 - p + 1) + (11p^2 - 3p + 5) + x = 7p^2 - 8p + 9$$

$$\Rightarrow (13p^2 - 4p + 6) + x = 7p^2 - 8p + 9$$

$$\Rightarrow x = -6p^2 - 4p + 3$$

Ans: A

$$07 \frac{A \times B}{4} = \frac{8x^3 - 4x^2 + 16x + 16x^2 - 8x + 32}{4}$$

$$= 2x^3 + 3x^2 + 2x + 8$$

Ans. D

$$08 (a^4 - 4a^2b^2 + b^4) - (a^4 + 8a^2b^2 + b^4)$$

$$= -12a^2b^2$$

Ans. D

$\Rightarrow$ THE END $\Leftarrow$