PARTIAL FRACTIONS

- An expression of the form $a_0x^n + a_1x^{n-1} + a_2x^{n-2} + ...+ a_n$, where n is a positive integer and a_0, a_1, a_2,.....a_n are real numbers and $a_0 \neq 0$ is called a polynomial of 'n'th degree in x.
- RATIONAL FRACTION: The quotient of two polynomials f(x) and $\Phi(x)$ where $\Phi(x) \neq 0$ is called a rational fraction.
- PROPER FRACTION: If the degree of f(x) is less than the degree of $\Phi(x)$ in a rational fraction $\frac{f(x)}{\Phi(x)}$, then the rational fraction is called a proper fraction.
- IMPROPER FRACTION: If the degree of f(x) is greater than or equal to the degree of $\Phi(x)$ in a rational fraction $\frac{f(x)}{\Phi(x)}$, then the rational fraction is called an improper fraction.
- If an improper rational fraction $\frac{f(x)}{\Phi(x)}$ is given, for splitting into partial fractions, then $\frac{f(x)}{\Phi(x)}$ should be expressed in the form $\frac{f(x)}{\Phi(x)}$ = quotient + $\frac{R(x)}{\Phi(x)}$ where R(x) is the ramainder of lower degree than $\Phi(x)$.
- If the polynomial f(x) is divided by x-a, then the remainder is f(a). If f(a) = 0, then f(x) is divisible by x - a.
- Let $\frac{f(x)}{\Phi(x)}$ be a proper fraction :

Case (i): when $\Phi(x)$ contains non-repeated liner factors only

$$\frac{f(x)}{(a_1x+b_1)(a_2x+b_2)....(a_nx+b_n)} = ,$$

$$\frac{A_1}{a_1x+b_1} + \frac{A_2}{a_2x+b_2} + \frac{A_3}{a_3x+b_3} + ... + \frac{A_n}{a_nx+b_n}$$

Case (ii): When $\Phi(x)$ contains repeated and non - repeated linear factors only

$$\frac{f(x)}{(a_1x+b_1)^2(a_2x+b_2)}$$

$$= \frac{A_1}{a_1x+b_1} + \frac{A_2}{(a_1x+b_1)^2} + \frac{A_3}{a_2x+b_2}$$

Case (III): When $\Phi(x)$ contains non - repeated irreducible factors only.

$$\frac{f(x)}{(a_1x^2+b_1x+c_1)(a_2x+b_2)} = \frac{Ax+B}{(a_1x^2+b_1x+c_1)} + \frac{C}{a_2x+b_2}$$

Case (iv): When $\Phi(x)$ contains repeated and non-repeated irreducible quadratic forms only.

$$\frac{f(x)}{(a_1x^2+b_1x+c_1)^2(a_2x^2+b_2x+c_2)} =$$

$$\frac{A_1x+B_1}{(a_1x^2+b_1x+c_1)} + \frac{A_2x+B_2}{(a_1x^2+b_1x+c_1)^2} + \frac{A_3x+B_3}{(a_2x^2+b_2x+c_2)}$$

- FORMULA :

$$\frac{f(x)}{(x+a)(x+b)} = \frac{f(-a)}{(x+a)(-a+b)} + \frac{f(-b)}{(x+b)(-b+a)}$$

- STANDARD PARTIAL FRACTIONS:
  - $\frac{1}{(ax+b)(cx+d)} = \frac{1}{ad-bc}\left(\frac{a}{ax+b} - \frac{c}{cx+d}\right)$
  - $\frac{1}{x^3(x+a)} = \frac{1}{a^3x} - \frac{1}{a^2x^2} + \frac{1}{ax^3} - \frac{1}{a^3(x+a)}$
  - $\frac{1}{(x^2+a^2)(x^2+b^2)} = \frac{1}{(b^2-a^2)}\left(\frac{1}{(x^2+a^2)} - \frac{1}{(x^2+b^2)}\right)$
  - $\frac{1}{(x^2+a^2)}\frac{1}{(x^2+b^2)(x^2+c^2)} = \frac{1}{(b^2-a^2)(c^2-a^2)(x^2+a^2)}$

    $\frac{1}{(c^2-b^2)(a^2-b^2)(x^2+b^2)} + \frac{1}{(a^2-c^2)(b^2-c^2)(x^2+c^2)}$
  - v. $\frac{x^2}{(x^2+a^2)(x^2+b^2)} = \frac{1}{a^2-b^2}\left[\frac{a^2}{x^2+a^2} - \frac{b^2}{x^2+b^2}\right]$

MULTIPLE CHOICE
LEVEL-1
NUMBER OF PARTIAL FRACTIONS:

1) Number of Partial Fractions of $\frac{2x+3}{x^2(x^2-1)^3}$

1) 5 2) 7 3) 8 4) 6

2) Number of Partial Fractions obtained from $\frac{1}{x^4(x^3+1)}$

1) 7 2) 8 3) 4 4) 3

3. Number of partial Frctions obtained from $\frac{3x-5}{(x+1)^3(x^2+1)^2}$

1) 5 2) 4 3) 6 4) 3

4. Number of Partial Fractions of $\frac{3x^2+1}{(x^2+1)^4}$

1) 4 2) 3 3) 2 4) 1

5. Number of Partial Fractions of $\frac{3x^2+70x+93}{(x-1)^4}$

1) 2 2) 4 3) 3 4) 5

6. Number of Partial Fractions of $\frac{x^3+x^2+1}{x^4+x^2+1}$ is

1) 2 2) 3 3) 4 4) 7

NON-REPEATED LINEAR FACTORS:

7. $\frac{2x-1}{(x-1)(2x+3)}=\frac{1}{5(x-1)}+\frac{k}{5(2x+3)}\Rightarrow k=$

1) 6 2) 7 3) 8 4) 9

8 $\frac{x}{(x+a)(x+b)}=\frac{1}{k}\left[\frac{a}{x+a}-\frac{b}{x+b}\right]\Rightarrow k=$

1) a-b 2)a+b 3)ab 4)1

9. $\frac{x+4}{(x^2-4)(x+1)}=\frac{A}{x-2}+\frac{B}{x+2}+\frac{C}{x+1}\Rightarrow A+B+C=$

1) 2 2) 0 3) -1 4) 1

10. $\frac{2x+1}{(x+a)(bx-1)}=\frac{5}{x+a}-\frac{3}{bx-1}\Rightarrow (a,b)=$

1) (2,-1) 2) (-2,-1) 3) (-2,1) 4) (2,1)

11. $\frac{3x}{(x-a)(x-b)}=\frac{2}{x-a}+\frac{1}{x-b}\Rightarrow a:b=$

1) 2 : 1 2) -2 : 1 3) 1 : 2 4) -1 : 3

12. $\frac{mx+n}{(x-a)(x+b)}=\frac{ma+n}{(a+b)(x-a)}+k\Rightarrow k=$

1) $\frac{-mb+n}{(a+b)(x+b)}$ 2) $\frac{mb-n}{(a-b)(x+b)}$

3) $\frac{mb+n}{(a+b)(x+b)}$ 4) $\frac{mb-n}{(a+b)(x+b)}$

13. $\frac{x^2-10x+3}{(x-1)(x-2)(x-3)}=$

1) $\frac{3}{x-2}+\frac{9}{x-3}+\frac{10}{x-1}$

2) $\frac{13}{x-2}-\frac{9}{x-3}-\frac{3}{x-1}$

3) $\frac{9}{x-3}-\frac{13}{x-2}+\frac{3}{x-1}$

4) $\frac{9}{x-2}-\frac{13}{x-3}+\frac{3}{x-1}$

14. $\frac{5x+1}{(x+2)(x-1)}=\frac{A}{x+2}+\frac{B}{x-1}\Rightarrow 3B=$

1) A 2) 2A 3) 3A 4) 4A

15. $\frac{2x+3}{(x-3)(x+1)}=\frac{9}{4(x-3)}-\frac{p}{x+1}\Rightarrow p=$

1) $\frac{1}{4}$ 2) $-\frac{1}{4}$ 3) $\frac{7}{4}$ 4) $\frac{3}{4}$

16. $\frac{3x+7}{x^2-3x+2}=$

1) $\frac{5}{x-1}+\frac{8}{x-2}$ 2) $\frac{13}{x-2}-\frac{10}{x-1}$

3) $\frac{8}{x-1}+\frac{5}{x-2}$ 4) $\frac{2}{x-1}+\frac{3}{x-2}$

17. $\frac{1}{a^2-x^2}=$

1) $\frac{1}{a(a-x)}+\frac{1}{2a(a+x)}$

2) $\frac{1}{3a(a-x)}+\frac{1}{2a(a+x)}$

3) $\frac{1}{2a(a-x)}+\frac{1}{2a(a+x)}$

4) $\frac{1}{2a(a-x)}+\frac{1}{a(a+x)}$

18. $\frac{x+2}{x^3-x}=$

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

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

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

4) $\frac{1}{2(x+1)}+\frac{3}{2(x-1)}+\frac{2}{x}$

REPEATED LINEAR FACTORS:

19. $\frac{x^2+2x+3}{x^3}=\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x^3}\Rightarrow A+B-C=$

1) 6 2) 3 3) 1 4) 0

20. $\frac{3x+4}{(x-1)(x+1)^2}=\frac{A}{x-1}+\frac{B}{x+1}+\frac{C}{(x+1)^2}\Rightarrow A=$

1) $-\frac{1}{2}$ 2) $\frac{15}{4}$ 3) $\frac{7}{4}$ 4) $-\frac{1}{4}$

21. $\frac{1}{(x-3)(x^2+1)^2}=\frac{A}{x-3}+\frac{Bx+C}{x^2+1}+\frac{Dx+E}{(x^2+1)^2}\Rightarrow A=$

1) $\frac{1}{10}$ 2) $-\frac{1}{10}$ 3) $\frac{1}{100}$ 4) $-\frac{1}{100}$

22. If $\frac{ax+b}{(3x+4)^2}=\frac{1}{3x+4}-\frac{3}{(3x+4)^2}$ then a+b =

1) 3 2) 4 3) 5 4) 6

23. If $\frac{1}{(x-2)(x-3)^3}=\frac{A}{x-2}+\frac{B}{x-3}+\frac{C}{(x-3)^2}+\frac{D}{(x-3)^3}$ then B =

1) 1 2) -1 3) $\frac{1}{25}$ 4) 0

24. If $\frac{3x+4}{(x+1)^2(x-1)}=\frac{A}{x-1}+\frac{B}{x+1}+\frac{C}{(x+1)^2}$ then A =

1) - 1/2 2) 15/4 3) 7/4 4) -1/4

NON-REPEATED QUADRATIC FACTORS:

25. $\frac{Ax-1}{(1-x+x^2)(x+2)}=\frac{x}{1-x+x^2}-\frac{1}{x+2}\Rightarrow A=$

1) 3 2) 2 3) 4 4) 1

26. $\frac{2x+1}{(x-1)(x^2+1)}=\frac{A}{x-1}+\frac{Bx+C}{x^2+1}\Rightarrow C=$

1) 0 2) 1/2 3) -1/2 4) 5/2

27. $\frac{2x^2+3x+4}{(x-1)(x^2+2)}=\frac{A}{x-1}+\frac{Bx+C}{x^2+2}\Rightarrow B=$

1) 3 2) -1 3) -2 4) 1

28. $\frac{x^2}{(x^2+a^2)(x^2+b^2)}=k\left[\frac{a^2}{x^2+a^2}-\frac{b^2}{x^2+b^2}\right]\Rightarrow k=$

1) 1 2) $\frac{1}{a^2+b^2}$ 3) $\frac{1}{a^2-b^2}$ 4) $\frac{1}{b^2-a^2}$

29. $\frac{x^2+1}{(x^2+2)(2x^2+1)}=k\left[\frac{1}{x^2+2}+\frac{1}{2x^2+1}\right]\Rightarrow k=$

1) $\frac{1}{4}$ 2) $\frac{1}{3}$ 3) $\frac{1}{5}$ 4) $\frac{1}{2}$

30. $\frac{x^2}{(x^2+1)(x^2+4)}=\frac{A}{x^2+1}+\frac{B}{x^2+4}\Rightarrow A+B=$

1) 0 2) 1 3) 2 4) 3

31. $\frac{x^2-x-1}{x^3-8}=\frac{A}{x-2}+\frac{Bx+C}{x^2+2x+4}\Rightarrow A+B=$

1) 0 2) 1 3) -1 4) 2

32. $\frac{1}{(x+1)(x^2+2x+2)}=\frac{A}{x+1}+\frac{Bx+C}{(x+1)^2+1}\Rightarrow A+B=$

1) 2 2) -1 3) 1 4) 0

33. $\frac{x^2-x-3}{x^3-1}=\frac{A}{x-1}+\frac{Bx+C}{x^2+x+1}\Rightarrow 2A+B+C=$

1) 0 2) 4 3) 2 4) 6

34. $\frac{x^2+1}{(x^2+4)(x-2)}=\frac{Ax+B}{x^2+4}+\frac{C}{x-2}\Rightarrow A+B-C=$

1) 2 2) $\frac{1}{2}$ 3) $\frac{1}{3}$ 4) $\frac{1}{4}$

35. $\frac{(x+1)^2}{x^3+x}=\frac{A}{x}+\frac{Bx+C}{x^2+1}\Rightarrow Sin^{-1}\left[\frac{A}{C}\right]=$

1) $\frac{\pi}{6}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{2}$

36. If $\frac{(x+1)^2}{x(x^2+1)}=\frac{A}{x}+\frac{Bx+C}{x^2+1}$, then $Cos^{-1}\left(\frac{A}{C}\right)=$

1) $\frac{\pi}{6}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{2}$

37. If $\frac{1}{x(x^2+a^2)}=\frac{A}{x}+\frac{Bx+C}{x^2+a^2}$ then $Tan^{-1}\left(\frac{A}{B}\right)$

1) $\frac{3\pi}{4}$ 2) $\frac{\pi}{4}$ 3) $-\frac{\pi}{4}$ 4) $\frac{\pi}{3}$

38. If $\frac{x^2+1}{x^4+x^2+1}=\frac{Ax+B}{x^2+x+1}+\frac{Cx+D}{x^2-x+1}$ then A+C=

1) B + D 2) B + D - 1
3) B + D + 1 4) B + D + 2

39. $\frac{1}{x^4+1}=$

1) $\left[\frac{x+\sqrt{2}}{2\sqrt{2}(x^2+\sqrt{2}x+1)}-\frac{x+\sqrt{2}}{2\sqrt{2}\left(x^2-\sqrt{2}x+1\right)}\right]$

2) $\left[\frac{x+\sqrt{2}}{x^2+\sqrt{2}x+1}-\frac{x+\sqrt{2}}{\left(x^2-\sqrt{2}x+1\right)}\right]$

3) $\left[\frac{x+\sqrt{2}}{2\sqrt{2}(x^2+\sqrt{2}x+1)}-\frac{\sqrt{2}-x}{\left(2\sqrt{2}(x^2-\sqrt{2}x+1)\right)}\right]$

4) $\frac{1}{2\sqrt{2}}\left[\frac{x+\sqrt{2}}{(x^2+\sqrt{2}x+1)}+\frac{\sqrt{2}-x}{\left(x^2-\sqrt{2}x+1\right)}\right]$

40. $\frac{5x^2+1}{x^3-1} =$

1) $\frac{3}{x-1}+\frac{2x+1}{x^2+x+1}$ 2) $\frac{4}{x-1}+\frac{5x+1}{x^2+x+1}$

3) $\frac{2}{x-1}+\frac{3x+1}{x^2+x+1}$ 4) $\frac{1}{x-1}+\frac{4x+1}{x^2+x+1}$

REPEATED QUADRATIC FACTORS:

41. $\frac{3x^2+5}{(x^2+1)^2}=\frac{A}{(x^2+1)}+\frac{B}{(x^2+1)^2}\Rightarrow (A,B)=$

1) (2,3) 2) (3,2) 3) (2,-3) 4) (-2,3)

42. $\frac{x^4+24x^2+28}{(x^2+1)^3} =$

1) $\frac{1}{x^2+1}+\frac{22}{(x^2+1)^2}+\frac{5}{(x^2+1)^3}$

2) $\frac{1}{x^2+1}-\frac{22}{(x^2+1)^2}+\frac{5}{(x^2+1)^3}$

3) $\frac{1}{x^2+1}+\frac{22}{(x^2+1)^2}+\frac{28}{(x^2+1)^3}$

4) $\frac{1}{x^2+1}+\frac{23}{(x^2+1)^2}+\frac{4}{(x^2+1)^3}$

43. $\frac{x^2+5}{(x^2+2)^2}=\frac{1}{x^2+2}+\frac{k}{\left(x^2+2\right)^2}\Rightarrow k=$

1) 1 2) 2 3) 3 4) 5

IMPROPER FRACTIONS:

44. $\frac{x^2+x+1}{(x+1)^2}=A+\frac{B}{x+1}+\frac{C}{(x+1)^2}\Rightarrow A+B+C=$

1) 3 2)2 3)0 4)1

45. $\frac{x^4}{(x-1)(x-2)}=x^2+3x+k+\frac{16}{x-2}-\frac{1}{x-1}\Rightarrow k=$

1) 8 2) 1 3) 9 4) 7

46. $\frac{x^3}{(x-a)(x-b)(x-c)}=k+\frac{A}{x-a}+\frac{B}{x-b}+\frac{C}{x-c}\Rightarrow k=$

1) abc 2) a+b+c 3) ab+bc+ca 4) 1

47. $\frac{x^4}{(x-a)(x-b)(x-c)}=p(x)+\frac{A}{x-a}+\frac{B}{x-b}+\frac{C}{x-c}\Rightarrow p(x)=$

1) x 2) x+a 3) x+a+b 4) x+a+b+c

48. $\frac{x^3}{x^2-x+2}=x+k-\left[\frac{x+2}{x^2-x+2}\right]\Rightarrow k=$

1)4 2)2 3)1 4)3

49. $\frac{x^4+1}{(x-1)(x-2)}=ax^2+bx+c+\frac{17}{x-2}-\frac{2}{x-1}\Rightarrow c=$

1)3 2)7 3)1 4)5

50. $\frac{4x^2-12x+13}{4x^2-16x+15} =$

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

2) $1+\frac{2}{2x-5}+\frac{4}{2x-3}$

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

4) $1+\frac{4}{2x-5}-\frac{2}{2x-3}$

51. If $\frac{x^3}{(x-a)(x-b)(x-c)}=1+\frac{A}{x-a}+\frac{B}{x-b}+\frac{C}{x-c}$ then A =

1) $\frac{a^3}{(c-b)(c-b)}$ 2) $\frac{a^3}{(b-c)(b-a)}$

3) $\frac{a^3}{(a-b)(a-c)}$ 4) 1

52. If $\frac{(x-a)(x-b)}{(x-c)(x-d)}=K+\frac{A}{x-c}+\frac{B}{x-d}$ then k =

1) 1 2) 2 3) 3 4) 4

53. $a_k=\frac{1}{k(k+1)}\ for\ k=1,2,3,...n then\left(\sum_{k=1}^{n}a_k\right)^2$

1) $\frac{n}{n-1}$ 2) $\frac{n^6}{(n+1)^6}$

3) $\frac{n^4}{(n-1)^4}$ 4) $\frac{n^2}{(n+1)^2}$

REMAINDER THEOREM:

54. The remainder obtained when the polynomial $x^4 - 3x^3 + 9x^2 - 27x + 81$ is divided by x - 3 is
1) 0 2) 3 3) 81 4) 27

55. The remainder obtained when the polynomial $1+x+x^3+x^9+x^{27}+x^{81}+x^{243}$ is divided by x - 1 is
1) 1 2) 4 3) 0 4) 7

56. The remainder obtained when $x^{64} + x^{27} + 1$ is divided by x + 1 is
1) 3 2) 2 3) 1 4) -1

57. If the remainders of the polynomial f(x) when divided x+1 and x-1 are 3, 7 then the remainder of f(x) when divided by $(x^2 - 1)$ is
1) x + 4 2) 2x + 3 3) 2x + 4 4) 2x + 5

58. The remainders of polynomial f(x) when divided by x-1, x-2 are 2,3 then the remainder of f(x) when divided by (x-1) (x-2) is
1) 0 2) 1 3) 2 4) x+1

59 If the remainders of the polynomial f(x) when divided by x-1,x-2,x-3 are 1,3,7 then the remainder of f(x) when divided by (x-1)(x-2)(x-3) is
1)11 2)x^2 - x+1 3)x^2+x+1 4)12

60 If a-1 is factor of $a^5 - a^4 - 4a^3 + 4a^2+4a+k$ then k =
1) 4 2) 2 3) -4 4) -2

LEVEL- II

61. The coefficient of x^n in $\frac{x-4}{x^2-5x+6}$ is

1) $\frac{1}{3^{n+1}} - \frac{1}{2^n}$ 2) $\frac{1}{3^{n+1}} + \frac{1}{2^n}$

3) $\frac{1}{5^{n+1}} + \frac{1}{2^n}$ 4) $\frac{1}{5^{n+1}} + \frac{1}{3^n}$

62. $\frac{2x+1}{(x-1)(x^2+1)} = \frac{A}{x-1} + \frac{Bx+c}{x^2+1} \Rightarrow \frac{A-B}{C} =$
1) 8 2) 6 3) 4 4) 2

63. If $\frac{x^2+3}{x^4(x+3)} = \frac{A}{x+3} + \frac{B}{x} + \frac{C}{x^2} + \frac{D}{x^3} + \frac{E}{x^4}$,
then C=
1)4/9 2)4/7 3)4/58 4)3/7

64. If $\frac{x^2}{(x^2+1)(x^2+2)} = \frac{Ax+B}{x^2+1} + \frac{Cx+D}{x^2+2}$
then (A,C) =
1)(1,-1) 2)(1,1) 3)(0,0) 4)(1,2)

65. If $\frac{x^2+5x+1}{(x+1)(x+2)(x+3)} =$

$\frac{A}{x+1} + \frac{B}{(x+1)(x+2)} + \frac{C}{(x+1)(x+2)(x+3)}$
then B =
1)1 2)-5 3)0 4)10

KEY

1)3	2)3	3) 1	4)3	5)3
6)1	7)3	8) 1	9)2	10)3
11)2	12)4	13)2	14)2	15)1
16)2	17)3	18)1	19)4	20)3
21)3	22)2	23)1	24)3	25)1
26)2	27)2	28)3	29)2	30)2
31)2	32)4	33)3	34)2	35)1
36)3	37)3	38)2	39)4	40)3
41)2	42)1	43)3	44)4	45)4
46)4	47)4	48)3	49)2	50)4
51)3	52)1	53)4	54)3	55)4
56)3	57)4	58)4	59)2	60)3
61)1	62)2	63)1	64)3	65)3

HINTS

6. Factors of
$x^4 + x^2 + 1 = (x^2 + x + 1)(x^2 - x + 1)$

23. Put x=2 then A= -1, comparing x^3 Coefficient: A+B=0, B= -A

36. Put x=0 then A=1, compare x Coefficient:
C=2 ; $\frac{A}{C} = \frac{1}{2}$

37. x^2 Coefficient A+B=0, $\frac{A}{B} = -1$

38. Compare x^3 Coefficient: A+C=0
Compare Constant term: B+D=1

39. Put x=0 and verify options

42. Put x^2+1=y

51. Put x=a

53. $\left[\sum\left(\frac{1}{k} - \frac{1}{k+1}\right)\right]^2$

59. Put x=1, 2, 3 and verify options

63. Put x=0, compare constants, E=1

Compare "x" coefficients, D= $\frac{-1}{3}$

compare "x^2" coefficients, C= $\frac{4}{9}$

65. $x^2 + 5x + 1 = x^2 + 5x + 6 - 5$

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

$= \frac{1}{(x+1)} + \frac{0}{(x+1)(x+2)} + \frac{(-5)}{(x+1)(x+2)(x+3)}$

NEW PATTERN QUESTIONS

1. If $\frac{3x^2+10x+13}{(x-1)^4} = \frac{A}{(x-1)^2} +$

$\frac{B}{(x-1)^3} + \frac{C}{(x-1)^4}$ then descending order of A, B, C is
1. A, B, C 2. C, B, A 3. A, C, B 4. C, A, B

2. I : Number of partial fractions of $\frac{x^3+x^2+1}{x^4+x^2+1}$ is 4.
II : Number of partial fractions of $\frac{3x+5}{(x-1)^2(x^2+1)^3}$ is 5 which of the above statement is true.
1. only I 2. Only II
3. Both I and II 4. Neither I nor II

3. Match the following with I, II, III
If $\frac{x^2-x+3}{x^3-1}=\frac{A}{(x-1)}+\frac{Bx+C}{(x^2+x+1)}$ then
I) A = a) 0
II) B = b) 1
III) C = c) - 2
1. a, b, c 2. b, a, c 3. b, c, a 4. a, c, b

4. ***Assertion (A)*** : The remainder obtained when the polynomial $x^4-3x^3+9x^2-27x+81$ is divided by $x-3$ is 81.
Reason (R) : The remainder obtained when the polynomial $f(x)$ is divided by $x-a$ is $f(a)$.
1. Both A and R are true but R is correct explanation of A
2. Both A and R are true but R not correct explanation of A
3. A is true and R is false
4. A is false and R is true

5. $\frac{x^2+3x+5}{(x+1)(x+2)(x+3)}$
$=\frac{A}{(x+1)}+\frac{B}{(x+1)(x+2)}+\frac{C}{(x+1)(x+2)(x+3)}$ then ascending order of A, B, C is
1. B, A, C 2. A, B, C 3. C, A, B 4. B, C, A

6. I : If $(x-1)$ is a factor of $x^5-x^4-4x^3+4x^2+4x+k$ then $k=-4$
II : If the remainders of the polynomial $f(x)$ when divided $(x+1)$ and $(x-1)$ are 3, 7 then the remainder of $f(x)$ when divided by (x^2-1) is $(2x+5)$.
Which of the following statement is true
1. only I 2. Only II
3. Both I and II 4. Neither I nor II

7. If $\frac{x^2+3}{x^4(x+3)}=\frac{A}{(x+3)}+\frac{B}{x}+\frac{C}{x^2}+\frac{D}{x^3}+\frac{E}{x^4}$ then
Match the following with I, II, III, IV, V
I) A = a) $\frac{4}{9}$
II) C = b) $\frac{4}{27}$
III) B = c) $-\frac{1}{3}$
IV) E = d) $-\frac{4}{27}$
V) D = e) 1
1. b, a, d, e, c 2. b,a,e,d,c
3. d,b,e,a,c 4. a,b,c,d,e

8. Assertion (A) : If
$\frac{5x+1}{(x+2)(x-1)}=\frac{A}{(x+2)}+\frac{B}{(x-1)}$ and
$\sin\theta=(A+B)$ then $\sin\theta$ does not exist
Reason (R) : $\sin\theta\in[-1,1]$
1. Both A and R are true but R is correct explanation of A
2. Both A and R are true but R not correct explanation of A
3. A is true and R is false
4. A is false and R is true

KEY

1) 2	2)2	3) 2	4)1	5)1
6)3	7)1		8) 1	

PREVIOUS EAMCET QUESTIONS

(EAMCET 82)

1. If $\frac{3x}{(x-6)(x+a)}=\frac{2}{x-6}+\frac{1}{x+a}$ then a=
1. 2 2. -3 3. 3 4. -2

(EAMCET 85)

2. If $\frac{x^4+24x^2+28}{(x^2+1)^3}$
$=\frac{Ax+B}{x^2+1}+\frac{Cx+D}{(x^2+1)^2}+\frac{Ex+F}{(x^2+1)^3}$ then A=
1. 1 2. -1 3. 0 4. 2

(EAMCET 91)

3. The remainder that obtains when $1+x+x^3+x^9+x^{27}+x^{81}+x^{243}$ is divided by x-1 is

1. 0 2. 5 3. 2 4. 7

(EAMCET 92)

4. The remainder that obtains when $x^{64}+x^{27}+1$ is divided by x+1 is

1. 1 2. -1 3. 0 4. 2

(EAMCET 94)

5. If $\frac{3x+4}{(x+1)^2(x-1)}=\frac{A}{x-1}+\frac{B}{x+1}+\frac{C}{(x+1)^2}$ then A=

1. $\frac{7}{4}$ 2. $\frac{1}{4}$ 3. $\frac{10}{3}$ 4. 1

(EAMCET 96)

6. If $\frac{3x+4}{x^2-3x+2}=\frac{A}{x-2}+\frac{B}{x-1}$ then (A, B)=

1. (7, 10) 2. (10, 7)
3. (10, -7) 4. (-10, 7)

(EAMCET 97, 98)

7. If $\frac{(x+1)^2}{x^3+x}=\frac{A}{x}-\frac{Bx+C}{x^2+1}$ then $\sin^{-1}\left(\frac{A}{C}\right)=$

1. $\frac{\pi}{6}$ 2. $\frac{\pi}{4}$ 3. $\frac{\pi}{3}$ 4. $\frac{\pi}{2}$

(EAMCET 99)

8. If $\frac{1}{(1-2x)(1+3x)}=\frac{A}{1-2x}+\frac{B}{1+3x}$ then 2B=

1. A 2. 2A 3. 3A 4. -3A

(EAMCET 2000)

9. If $\frac{x^2+5}{(x^2+2)^2}=\frac{1}{x^2+2}+\frac{K}{(x^2+2)^2}$ then K=

1. 1 2. 2 3. 3 4. 4

(EAMCET 2002)

10. If $\frac{1-x+6x^2}{x-x^3}=\frac{A}{x}+\frac{B}{1-x}+\frac{C}{1+x}$ then A=

1. 1 2. 2 3. 3 4. 4

(EAMCET 2003)

11. Let a,b,c be such that

$\frac{1}{(1-x)(1-2x)(1-3x)}=\frac{a}{1-x}+\frac{b}{1-2x}+\frac{c}{1-3x}$ then

$\frac{a}{1}+\frac{b}{3}+\frac{c}{5}=$

1. $\frac{1}{15}$ 2. $\frac{1}{6}$ 3. $\frac{1}{5}$ 4. $\frac{1}{3}$

(EAMCET 2004)

12. If $\frac{x-4}{x^2-5x+6}$ can be expanded in the ascending powers of x, then the coefficient of x^3

1. $\frac{-73}{648}$ 2. $\frac{73}{648}$ 3. $\frac{71}{648}$ 4. $\frac{-71}{648}$

13. $\frac{x+1}{(2x-1)(3x+1)}=\frac{A}{2x-1}+\frac{B}{3x+1}$

$\Rightarrow 16A+9B=$

1. 4 2. 5 3. 6 4. 8

(EAMCET 2005)

14. If $\frac{x^3}{(2x-1)(x+2)(x-3)}=$

$A+\frac{B}{(2x-1)}+\frac{C}{(x+2)}+\frac{D}{(x-3)}$ then A=

1. $\frac{1}{2}$ 2. $\frac{-1}{50}$ 3. $\frac{-8}{25}$ 4. $\frac{27}{25}$

(EAMCET 2007)

15. If $\frac{3x}{(x-a)(x-b)}=\frac{2}{x-a}+\frac{1}{x-b}$ then a : b =

(E-2007)

1) 1 : 2 2) -2 : 1
3) 1 : 3 4) 3 : 1

KEY

1. 3	2. 3	3. 4	4. 1	5. 1
6. 2	7. 1	8. 3	9. 3	10. 1
11. 1	12. 1	13. 3	14. 1	15. 2