Question 1

What is the form of the partial fractions expansion of:

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

1. $\frac{Ax+B}{(x-3)^2} + \frac{Cx+D}{x+4}$
2. $\frac{A}{x-3} - \frac{B}{x+4}$
3. $-\frac{A}{x-3} + \frac{B}{x+4}$
4. $\frac{A}{x-3} + \frac{B}{x+4}$
5. $\frac{A}{x-3} + \frac{Bx+C}{x+4}$
6. none of the above

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5. $\frac{A}{x-3} + \frac{Bx+C}{x+4}$
6. none of the above

4. $\frac{A}{x-3} + \frac{B}{x+4}$

Question 2

What is the form of the partial fractions expansion of:

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

1. $\frac{Ax+B}{(x-3)^2} + \frac{Cx+D}{x^2+4}$
2. $\frac{A}{x-3} - \frac{B}{x^2+4}$
3. $\frac{A}{x-3} + \frac{Bx+C}{x^2+4}$
4. $\frac{A}{x-3} + \frac{B}{x+4}$
5. $\frac{A}{x-3} + \frac{Bx+C}{x+4}$
6. none of the above

Question 2

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3. $\frac{A}{x-3} + \frac{Bx+C}{x^2+4}$
4. $\frac{A}{x-3} + \frac{B}{x+4}$
5. $\frac{A}{x-3} + \frac{Bx+C}{x+4}$
6. none of the above

3. $\frac{A}{x-3} + \frac{Bx+C}{x^2+4}$

Question 3

Evaluate the following integral. A and B are constants.

$$\int \left(\frac{A}{x+1} + \frac{B}{(x+1)^2} \right) dx$$

1. $A \ln|x+1| - \frac{B}{3(x+1)} + C$
2. $A \ln|x+1| - \frac{B}{2x+1} + C$
3. $A \ln|x+1| + \frac{B}{2(x+1)} + C$
4. $A \ln|x+1| - \frac{B}{2(x+1)} + C$
5. $A \ln|x+1| - \frac{B}{x+1} + C$
6. none of the above

Question 3

Evaluate the following integral. A and B are constants.

$$\int \left(\frac{A}{x+1} + \frac{B}{(x+1)^2} \right) dx$$

1. $A \ln|x+1| - \frac{B}{3(x+1)} + C$
2. $A \ln|x+1| - \frac{B}{2x+1} + C$
3. $A \ln|x+1| + \frac{B}{2(x+1)} + C$
4. $A \ln|x+1| - \frac{B}{2(x+1)} + C$
5. $A \ln|x+1| - \frac{B}{x+1} + C$
6. none of the above

5. $A \ln|x+1| - \frac{B}{x+1} + C$

Question 4

Evaluate the following integral. A and B are constants.

$$\int \left(\frac{A}{x-3} + \frac{B}{x+1} \right) dx$$

1. $A \ln|x-3| - \frac{B}{3(x+1)} + C$
2. $A \ln|x-3| - B \ln|x+1| + C$
3. $A \ln|x-3| + B \ln|x+1| + C$
4. $A \ln|x+1| - \frac{B}{2(x+1)} + C$
5. $A \ln|x+1| - \frac{B}{x+1} + C$
6. none of the above

Question 4

Evaluate the following integral. A and B are constants.

$$\int \left(\frac{A}{x-3} + \frac{B}{x+1} \right) dx$$

1. $A \ln|x-3| - \frac{B}{3(x+1)} + C$
2. $A \ln|x-3| - B \ln|x+1| + C$
3. $A \ln|x-3| + B \ln|x+1| + C$
4. $A \ln|x+1| - \frac{B}{2(x+1)} + C$
5. $A \ln|x+1| - \frac{B}{x+1} + C$
6. none of the above

3. $A \ln|x+1| + B \ln|x+1| + C$

Question 5

What is the form of the partial fractions expansion of:

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

1. $\frac{A}{x^2+1} + \frac{B}{(x^2+1)^2}$
2. $\frac{Ax+B}{x^2+1} + \frac{Cx+D}{(x^2+1)^2}$
3. $\frac{Ax+B}{x^2+1} - \frac{Cx+D}{(x+1)^2}$
4. $\frac{x-1}{x^2+1} + \frac{x-1}{(x^2+1)^2}$
5. $\frac{A}{x^2+1} + \frac{Cx+D}{(x^2+1)^2}$
6. none of the above

Question 5

What is the form of the partial fractions expansion of:

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

1. $\frac{A}{x^2+1} + \frac{B}{(x^2+1)^2}$
2. $\frac{Ax+B}{x^2+1} + \frac{Cx+D}{(x^2+1)^2}$
3. $\frac{Ax+B}{x^2+1} - \frac{Cx+D}{(x+1)^2}$
4. $\frac{x-1}{x^2+1} + \frac{x-1}{(x^2+1)^2}$
5. $\frac{A}{x^2+1} + \frac{Cx+D}{(x^2+1)^2}$
6. none of the above

2. $\frac{Ax+B}{x^2+1} + \frac{Cx+D}{(x^2+1)^2}$

Question 6

Evaluate the following integral:

$$\int x^2 e^{-x} dx$$

1. $-x^2e^{-x} - 2xe^{-x} - 2e^{-x} + C$
2. $x^2e^{-x} - 2xe^{-x} + 2e^{-x} + C$
3. $-x^2e^{-x} + 2xe^{-x} - 2e^{-x} + C$
4. $x^2e^{-x} + 2xe^{-x} + 2e^{-x} + C$
5. $-x^2e^{-x} + 2xe^{-x} + 2e^{-x} + C$
6. none of the above

Question 6

Evaluate the following integral:

$$\int x^2 e^{-x} dx$$

1. $-x^2e^{-x} - 2xe^{-x} - 2e^{-x} + C$
2. $x^2e^{-x} - 2xe^{-x} + 2e^{-x} + C$
3. $-x^2e^{-x} + 2xe^{-x} - 2e^{-x} + C$
4. $x^2e^{-x} + 2xe^{-x} + 2e^{-x} + C$
5. $-x^2e^{-x} + 2xe^{-x} + 2e^{-x} + C$
6. none of the above

1. $-x^2e^{-x} - 2xe^{-x} - 2e^{-x} + C$

Question 7

$$\int \sin^5 x \; dx$$

Which of the following are equivalent to the above integral?

1. $-\int (1-u^2)du$
2. $\int u^2 du$
3. $-\int (1-u^2)^2 du$
4. $-\int (1-u)^2 du$
5. $\int (1-u)^2 du$
6. none of the above

Question 7

$$\int \sin^5 x \; dx$$

Which of the following are equivalent to the above integral?

1. $-\int (1-u^2)du$
2. $\int u^2 du$
3. $-\int (1-u^2)^2 du$
4. $-\int (1-u)^2 du$
5. $\int (1-u)^2 du$
6. none of the above

3. $-\int (1-u^2)^2 du$ with $u = \cos x$

Question 8

$$\int \cos^2\theta \; d\theta$$

Which of the following is equivalent to the above integral?

1. $-\frac{1}{2}\int(1-\cos 2\theta)d\theta$
2. $-\frac{1}{2}\int(1-2\cos 2\theta)d\theta$
3. $\frac{1}{2}\int(1-2\cos\theta)d\theta$
4. $\frac{1}{2}\int(1+\cos 2\theta)d\theta$
5. $\frac{1}{2}\int(1-\cos 2\theta)d\theta$
6. none of the above

Question 8

$$\int \cos^2\theta \; d\theta$$

Which of the following is equivalent to the above integral?

1. $-\frac{1}{2}\int(1-\cos 2\theta)d\theta$
2. $-\frac{1}{2}\int(1-2\cos 2\theta)d\theta$
3. $\frac{1}{2}\int(1-2\cos\theta)d\theta$
4. $\frac{1}{2}\int(1+\cos 2\theta)d\theta$
5. $\frac{1}{2}\int(1-\cos 2\theta)d\theta$
6. none of the above

4. $\frac{1}{2}\int(1+\cos 2\theta)d\theta$ from $\cos^2\theta = \frac{1}{2}(1+\cos 2\theta)$

Question 9

$$\int \tan^3\theta \sec^2\theta \, d\theta$$

Which of the following is equivalent to the above integral?

1. $\int (u^2-1)u \, du$
2. $\int (u^2-1)u^2 \, du$
3. $\int (1-u^2)u \, du$
4. $-\int (u^2-1)u \, du$
5. $\int (1-u^2)u^2 \, du$
6. none of the above

Question 9

$$\int \tan^3\theta \sec^2\theta \, d\theta$$

Which of the following is equivalent to the above integral?

1. $\int (u^2-1)u \, du$
2. $\int (u^2-1)u^2 \, du$
3. $\int (1-u^2)u \, du$
4. $-\int (u^2-1)u \, du$
5. $\int (1-u^2)u^2 \, du$
6. none of the above

1. $\int (u^2-1)u \, du$ with $u = \sec\theta$

Question 10

$$\int \frac{dx}{\sqrt{x^2-4}}$$

Which of the following is equivalent to the above integral?

1. $\int \tan\theta \; d\theta$
2. $-\int \sec\theta \; d\theta$
3. $\int \sec\theta \tan\theta \; d\theta$
4. $-\int \tan\theta \; d\theta$
5. $\int \sec\theta \; d\theta$
6. none of the above

Question 10

$$\int \frac{dx}{\sqrt{x^2-4}}$$

Which of the following is equivalent to the above integral?

1. $\int \tan\theta \; d\theta$
2. $-\int \sec\theta \; d\theta$
3. $\int \sec\theta \tan\theta \; d\theta$
4. $-\int \tan\theta \; d\theta$
5. $\int \sec\theta \; d\theta$
6. none of the above

5. $\int \sec\theta \; d\theta$ with $u = 2\sec\theta$