

Subject: Engineering Mathematics

DPP-07

Chapter: Calculus

Topic : Infinite Series

1. The summation of series,

$$S = 2 + \frac{5}{2} + \frac{8}{2^2} + \frac{11}{2^3} + \dots + \infty$$

- (a) 4.50 (b) 6.0
(c) 6.75 (d) 10.0

2. For
- $|x| \ll 1$
- ,
- $\cot h(x)$
- can be approximated as

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

3. For the function
- e^{-x}
- , the linear approximation around
- $x = 2$
- is

- (a) $(3 - x) e^{-2}$
(b) $1 - x$
(c) $[3 + 2\sqrt{2} - (1 + \sqrt{2})x] e^{-2}$
(d) e^{-2}

4. The limit of the following series as 'x' approaches
- $\frac{\pi}{2}$

is,

$$f(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

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

- 5.
- $\sin x$
- when expanded in powers of
- $\left(x - \frac{\pi}{2}\right)$
- is

- (a) $1 + \frac{\left(x - \frac{\pi}{2}\right)^2}{2!} + \frac{\left(x - \frac{\pi}{2}\right)^3}{3!} + \frac{\left(x - \frac{\pi}{2}\right)^4}{4!} + \dots$
(b) $1 - \frac{\left(x - \frac{\pi}{2}\right)^2}{2!} + \frac{\left(x - \frac{\pi}{2}\right)^4}{4!} - \dots$
(c) $\left(x - \frac{\pi}{2}\right)^2 + \frac{\left(x - \frac{\pi}{2}\right)^3}{3!} + \frac{\left(x - \frac{\pi}{2}\right)^5}{5!} + \dots$
(d) None of these

6. The sum of the infinite series,
- $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$
- is,

- (a) π (b) infinity
(c) 4 (d) $\frac{\pi^2}{4}$

7. For
- $x = \frac{\pi}{6}$
- , the sum of the series

$$\sum_{n=1}^{\infty} (\cos x)^{2n} = \cos^2 x + \cos^4 x + \dots \text{ is,}$$

- (a) π (b) 3
(c) ∞ (d) 1

8. The infinite series
- $1 + \frac{1}{2} + \frac{1}{3} + \dots$

- (a) converges (b) diverges
(c) oscillates (d) unstable

Answer Key

1. (d)
2. (c)
3. (a)
4. (d)

5. (b)
6. (b)
7. (b)
8. (b)



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