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# MATHS

## BOOKS - OBJECTIVE RD SHARMA ENGLISH

## EXPONENTIAL AND LOGARITHMIC SERIES

**Illustration**

**1.** $\left(\frac{1}{1!}+\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\ldots\right)-\left(\frac{1}{\frac{1}{1}+\frac{1}{3!}+\frac{1}{5!}+\ldots}\right)$ is equal to

A. e+1

B. $\frac{e-1}{e+1}$

C. e-1

D. none of these

**Answer: N/A**

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**2.** The coefficient of $x^n$ in the expansion of $\frac{e^{7x}+e^n}{e^{3x}}$ is

A. 0

B. 1

C. 2

D. none of these

**Answer: N/A**

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**3.** The sum of the series $1+\frac{1}{4.2}!\frac{1}{16.4}!+\frac{1}{64.6}!+\ldots\ldots\ldots\to\infty$ is (A) $\frac{e+1}{2}\sqrt{e}$ (B) $\frac{e-1}{\sqrt{e}}$ (C) $\frac{e-1}{+}2\sqrt{e}$ (D) $\frac{e-1}{\sqrt{e}}$

A. $\frac{e+1}{2\sqrt{e}}$

B. $\frac{e-1}{2\sqrt{e}}$

C. $\frac{e+1}{2\sqrt{e}}$

D. $\frac{e-1}{2\sqrt{e}}$

**Answer: N/A**

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**4.** The sum of the series $\frac{1}{2!}-\frac{1}{3!}+\frac{1}{4!}-\frac{1}{5!}$+....up to $\infty$ is

A. $e^{-1/2}$

B. $e^{1/2}$

C. $e^{-2}$

D. $e^{-1}$

**Answer: N/A**

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**5.** If $x = 1 + 2 + \frac{4}{2!} + \frac{8}{3!} + \frac{16}{4!} + \ldots$ then $x^{-1}$ is equal to

A. $e^{-2}$

B. $e^{2}$

C. $e^{1/2}$

D. none of these

**Answer: N/A**

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**6.** The coefficient of $x^{10}$ in the series of $e^{2x}$ is

A. $\frac{2^9}{9!}$

B. $\frac{2^{10}}{10!}$

C. $\frac{1}{10!}$

D. none of these

**Answer: N/A**

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**7.** The coefficient of $x^n$ in the expansion of $e^{a+bx}$ in power of x is

A. $\frac{b^n}{n!}$

B. $e^a \frac{b^{n+1}}{n+1}!$

C. $e^a \frac{b^n}{n!}$

D. none of these

**Answer: N/A**

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**8.** Cofficient of $x^4$ in the expansion of $\frac{1-3x+x^2}{e^x}$ is

A. $\frac{5}{24}$

B. $\frac{4}{25}$

C. $\frac{24}{25}$

D. $\frac{25}{24}$

**Answer: N/A**

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**9.** The coefficient of $x^r$ in the expansion of $\frac{1-ax-x^2}{e^x}$ is

A. $\frac{(-1)^r}{r!}\{-r^2+r(a+1)+1\}$

B. $(-1)\frac{r}{r!}\{-r^2-r(a+1)+1\}$

C. $(-1)\frac{r}{r!}\{-r^2-r(a+1)+1\}$

D. none of these

**Answer: N/A**

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**10.** The coefficient of $x^n$ in the expansion of $\frac{a+bx+cx^2}{e^x}$ is

A. $\frac{(-1)^n}{n!}\{cn^2-(b+c)(n+a\}$

B. $\frac{(-1)^n}{n!}\{cn^2+(b+c)(n+a\}$

C. $\frac{(-1)^n}{n!}\{cn^2+(b+c)(n-a\}$

D. none of these

**Answer: N/A**

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**11.** The coefficient of $x^n$ in the expansion of $e^x$ is

A. $\sum_{r=n}^{\infty}\frac{r^n}{r!}$

B. $\frac{1}{n!}\sum_{r=1}^{\infty}\frac{r^n}{r!}$

C. $\frac{1}{n}\sum_{r=1}^{\infty}\frac{r^n}{r!}$

D. none of these

**Answer: N/A**

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**12.** The sum of the series

$\frac{1}{1!}+\frac{2}{2!}+\frac{3}{3!}+\frac{4}{4!}$+.....to $\infty$ is

A. e

B. 2e

C. $\frac{1}{2}e$

D. none of these

**Answer: N/A**

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**13.** The sum of the series

$\frac{1}{1!}x+\frac{2}{2!}x^2+\frac{3}{3!}x^3$..... To $\infty$ is

A. $e^x$

B. $xe^x$

C. $xe^x - 1$

D. none of these

**Answer: N/A**

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**14.** The sum of the series

$\frac{1^2}{1!} + \frac{2^2}{2!} + \frac{3^2}{3!}$+.....to $\infty$ is

A. e

B. 2e

C. 3e

D. none of these

**Answer: N/A**

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**15.** The sum of the series

$\frac{1}{1!}x + \frac{2}{2!}x^2 + \frac{3}{3!}x^3$..... To $\infty$ is

A. $x^2 e^x$

B. $\left(x + x^2\right)e^x$

C. $(x + 1)e^x$

D. $\left(2x + x^2\right)e^x$

**Answer: N/A**

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**16.** The sum of the series

$1 + \frac{2^3}{2!} + \frac{3^3}{3!} + \frac{4^3}{4!}$+... to $\infty$ is

A. 2e

B. 3e

C. 4e

D. 5e

**Answer: N/A**

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**17.** The sum of the series

$x + \frac{2^3}{2!}x^2 + \frac{3^3}{3!}x^3 + \frac{4^3}{4!}x^4$+.....to $\infty$ is

A. $\left(x + x^2 + x^3\right)e^x$

B. $\left(x^2 + x^3\right)e^x$

C. $\left(x + 3x^2 + x^3\right)e^x$

D. $x^3e^x$

**Answer: N/A**

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**18.** The sum of the series

$$1+\frac{2^4}{2!}+\frac{3^4}{3!}+\frac{4^4}{4!}+\frac{5^4}{5!}+\text{.....is}$$

A. 12e

B. 5e

C. 14e

D. 15e

**Answer: N/A**

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**19.** The sum of the series

$$x+\frac{2^4}{2!}x^2+\frac{3^4}{3!}x^3+\frac{4^4}{4!}+\text{.....is}$$

A. $x^4e^x$

B. $\left(x+x^2+x^3+x^4\right)e^x$

C. $\left(x+7x^2+6x^3+x^4\right)e^x$

D. none of these

**Answer: N/A**

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**20.** The value of $9+\frac{16}{2!}+\frac{27}{3!}+\frac{42}{4!}+\ldots\ldots\infty$ is

A. $9e-6$

B. $11e-6$

C. $13e-6$

D. $12e-6$

**Answer: N/A**

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**21.** The value of $\frac{3}{1!}+\frac{5}{2!}+\frac{9}{3!}+\frac{15}{4!}+\frac{23}{4!}+\ldots\ldots\infty,$

A. $4e+3$

B. $4e-3$

C. $3e-4$

D. $3e+4$

**Answer: N/A**

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**22.** If $x-\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+\ldots..$ to $\infty=y$ , then $y+\frac{y^2}{2!}+\frac{y^3}{3!}+\ldots.$ + to $\infty$ is equal to

A. $e^y-1$

B. $\log_e(1+y)$

C. $x^3=e^y$

D. $x = 1 + e^y$

**Answer: N/A**

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**23.** The sum of the series

$\left(\frac{a-b}{a}\right) + \frac{1}{2}\left(\frac{a-b}{a}\right)^2 + \frac{1}{3}\left(\frac{a-b}{a}\right)^3 + \ldots\ldots\infty$ will be

A. $\log_e\left(\frac{a}{b}\right)$

B. $\log_{a-b}(a)$

C. $\log_b(a)$

D. $\log_{a-b}(b)$

**Answer: N/A**

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**24.** Prove that :

$$(\log)_e\left(\frac{x+1}{x}\right)=2\left[\frac{1}{(2x+1)}+\frac{1}{3(2x+1)^3}+\frac{1}{5(2x+1)^5}+\right]$$

A. $\frac{\log(x)}{x+1}$

B. $\frac{\log(x+1)}{x}$

C. $\log(2x+1)$

D. $\frac{\log(1)}{2x+1}$

**Answer: N/A**

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**25.** The sum of the infite series

$$\left(\frac{1}{3}\right)^2+\frac{1}{3}\left(\frac{1}{3}\right)^4+\frac{1}{5}\left(\frac{1}{3}\right)^6+\text{.....is}$$

A. $\frac{1}{4}\log_e 2$

B. $\frac{1}{2}\log_e 2$

C. $\frac{1}{6}\log_e 2$

D. $\frac{1}{4}\frac{\log_e 3}{2}$

**Answer: N/A**

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**26.** If $\alpha$ and $\beta$ are the roots of the equation $x^2 - px + q = 0$ then the value of $(\alpha+\beta)x - \left(\frac{\alpha^2+\beta^2}{2}\right)x^2 + \left(\frac{\alpha^3+\beta^3}{3}\right)x^3 + \ldots$ is

A. $\log\left(1 + px + qx^2\right)$

B. $\log\left(1 + qx + px^2\right)$

C. $\log\left(x^2 + px + q\right)$

D. none of these

**Answer: N/A**

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**27.** If $S = \frac{\left(y-1-\frac{1}{2}(y-1)^2+\frac{1}{3}(y-1)\right)^3}{a-1-\frac{1}{2}(a-1)^2+\frac{1}{3}(a-1)^3}$.... Then S is equal to

A. $\log_e y$

B. $\log_a y$

C. $\log_e a$

D. $\log_y a$

**Answer: N/A**

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**28.** The coefficient of $x^n$ in the exansion of $\log_e\left(1+3x+2x^2\right)$ is

A. $(-1)^n\left(\frac{2^n+1}{n}\right)$

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

C. $\frac{2^{n+1}}{n}$

D. none of these

**Answer: N/A**

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**29.** If n is not a multiple of 3, then the coefficient of $x^n$ in the expansion of $\log_e\left(1+x+x^2\right)$ is : (A) $\frac{1}{n}$ (B) $\frac{2}{n}$ (C) $-\frac{1}{n}$ (D) $-\frac{2}{n}$

A. $\frac{-2}{n}$

B. $\frac{2}{n}$

C. $\frac{1}{n}$

D. none of these

**Answer: N/A**

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**30.** The coefficient of $x^n$ when n is a multiple of 3 in the expansion of log $\left(1+x+x^2\right)$ is

A. $-\frac{2}{n}$

B. $\frac{1}{n}$

C. $\frac{2}{n}$

D. none of these

**Answer: N/A**

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31. $\sum_{n=1}^{\infty} \frac{1}{2n(2n+1)}$ is equal to

A. $\log_e\left(\frac{2}{e}\right)$

B. $1-\log_e 2$

C. $1-\frac{\log_e(1)}{2e}$

D. $\frac{\log(1)}{2e}$

**Answer: N/A**

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**32.** The sum of the series

$\frac{1}{1.23} + \frac{1}{3.45} + \frac{1}{5.67} + \ldots\infty$ is

A. $\log_e 2 - \frac{1}{2}$

B. $\log_e 2$

C. $\log_e 2 + \frac{1}{2}$

D. $\log_e 2 + 1$

**Answer: N/A**

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**33.** The sum of the series $\frac{5}{1.\,2.3} + \frac{7}{3.\,4.5} + \frac{9}{5.\,6.7} +$ ....is equal to

A. $\log(8/e)$

B. $\log(e/8)$

C. log 8e

D. log 8

**Answer: N/A**

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## Section I Solved Mcqs

**1.** If $y = -\left\{x^3 + \frac{x^6}{2} + \frac{x^9}{3} + \ldots.\right\}$ then

A. $x^3 = 1 - e^y$

B. $x = \log_e(1 + y)$

C. $x^3 = e^y$

D. $x = 1 + e^y$

**Answer: N/A**

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**2.** Find the following sum :

$$\frac{1}{n!}+\frac{1}{2!(n-2)!}+\frac{1}{4!(n-4)!}+\ldots..$$

A. $\frac{2n-1}{2!}$

B. $\frac{2^n}{n+1}!$

C. $\frac{2^n}{n!}$

D. $\frac{2^n-2}{n-1}!$

**Answer: N/A**

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**3.** The sum of the series $\Sigma_{\infty}^{n=0}\frac{n^2-n+1}{n!}$ is

A. 2e

B. $\frac{3}{2}e$

C. e

D. 3e

**Answer: N/A**

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**4.** The sum of the series

$\frac{2}{1!}+\frac{4}{3!}+\frac{6}{5!}+\ldots\ldots\text{to}\infty$ equals

A. e+1

B. e-1

C. $e^{-1}$

D. e

**Answer: N/A**

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**5.** The coefficient of $x^{10}$ in the expansion o f$10^x$ in ascending power of x is

A. $\frac{(\log_e 10)^{10}}{10!}$

B. $\frac{1}{10}$

C. $\frac{(\log_{10} e)^{10}}{10!}$

D. none of these

**Answer: N/A**

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**6.** In the expansion of $\frac{e^x - 1 - x}{x^2}$ is ascending powers of x the fourth term is

A. $\frac{x^3}{5!}$

B. $\frac{x^4}{4!}$

C. $\frac{x^3}{3!}$

D. none of these

**Answer: N/A**

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**7.** In the expansion of $\log_{10}(1-x)$, $|x|<1$ the coefficient of $x^n$ is

A. $-\frac{1}{n}$

B. $-\frac{1}{n}\log 10^e$

C. $\frac{1}{n}$

D. $\frac{1}{n}\log 10^e$

**Answer: N/A**

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**8.** Sum of series $\frac{9}{1!}+\frac{19}{2!}+\frac{35}{3!}+\frac{57}{4!}+\ldots$ (A) $7e-3$ (B) $12e-5$ (C) $16e-5$ (D) none

A. $16e-5$

B. $7e-3$

C. $12e-5$

D. $11e-5$

**Answer: N/A**

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**9.** The constant term in the expansion of $\frac{3^x-2^x}{x^2}$ is

A. $\log_e 3$

B. $(\log_e 6)\times\left\{(\log_e)\left(\frac{3}{2}\right)\right\}$

C. $\frac{1}{2}(\log_e 6)\times\left\{(\log_e)\left(\frac{3}{2}\right)\right\}$

D. none of these

**Answer: N/A**

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**10.** $\Sigma_{n=1}^{\infty} \frac{x^{2n}}{2n-1}$ is equal to

A. $\frac{x}{2}\log_e\left(\frac{1+x}{1+x}\right)$

B. $\frac{1}{2}\log_e\left(\frac{1+x^2}{1-x^2}\right)$

C. $x\log_e\left(\frac{1+x}{1-x}\right)$

D. none of these

**Answer: N/A**

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**11.** Then sum of the series

$1+\frac{1+3}{2!}x+\frac{1+3+5}{3!}x^2+\frac{1+3+5+7}{4!}x^3$x+...is

A. $(x+1)e^x$

B. $(x-1)e^x$

C. $xe^X+1$

D. $d+e^x$

**Answer: N/A**

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**12.**

$\frac{1}{e^{3x}}\left(e^x+e^{5x}\right)=a_0+a_1x+a_2x^2+\ldots\ldots\ldots\Rightarrow 2a_1+2^3a_3+2^5a_5+\ldots\ldots$

A. $e^2+e^{-2}$

B. $\frac{e^4-e^{-4}}{2}$

C. $\left(e^4+e^{-4}\right)$

D. $e^4 + e^{-4} - \left(e^4 + e^{-4}\right)$

**Answer: N/A**

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**13.** Let $S = x - \frac{x^3}{3!} + \frac{x^5}{5!}...$ and $C = 1 - \frac{x^2}{2!} + \frac{x^4}{4!}$ Then,

A. $C^2 + S^2$ is not independent of x

B. 2CS = sin 2x

C. $C^2 - S^2$ is independent of x

D. none of these

**Answer: a,b,c**

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**14.** The sum of series $\frac{2}{3!} + \frac{4}{5!} + \frac{6}{7!} + \ldots\ldots\ldots . \infty$ is :

A. $e^{-1}$

B. 2e

C. $e^{-2}$

D. $2e^{-2}$

**Answer: N/A**

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**15.** The sum of the series $S = \Sigma_{n=1}^{\infty} \frac{1}{n-1}!$ is

A. $1/e$

B. $e^2$

C. $-e^2$

D. e

**Answer: N/A**

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**16.** The sum of the series $\log_e(3) + \frac{(\log_e(3))^3}{3!} + \frac{(\log_e(3))^5}{5!} + .... +$ is

A. 4/3

B. 2

C. 1

D. 0

**Answer: N/A**

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**17.** The value of

$1 + (\log_e x) + \frac{(\log_e x)^2}{2!} + \frac{(\log_e x)^3}{3!} + \ldots\infty$

A. $\log_e x$

B. $-\log_e x$

C. $2\log_e x$

D. x

**Answer: N/A**

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**18.** $(1+3)\log_e 3 + \frac{1+3^2}{2!}(\log_e 3)^2 + \frac{1+3^3}{3!}(\log_e 3)^3 + .... \infty =$ (a)28 (b) 30 (c)25 (d) 0

A. 18

B. 28

C. 36

D. none of these

**Answer: N/A**

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**19.** If $a > 0$ and $x \in R$, then

$1 + (x \log_e a) + \frac{x^2}{2!}(\log_e a)^2 + \frac{x^3}{3!}(\log_e a)^3 + \ldots. \infty$ is equal to

A. a

B. $a^x$

C. $a^{\log_e a}$

D. x

**Answer: N/A**

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**20.** $\frac{2}{2!} + \frac{2+4}{3!} + \frac{2+4+6}{4!} + \ldots. \infty$ is equal to

A. $e - 2$

B. $e - 1$

C. e

D. $e^{-1}$

**Answer: N/A**

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**21.** $1+\frac{2x}{1!}+\frac{3x^2}{2!}+\frac{4x^3}{3!}+..\infty$ is equal to

A. $xe^x$

B. $(x+1)e^x$

C. $xe^{-x}$

D. $(x+1)e^{-x}$

**Answer: N/A**

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**22.** $\frac{1}{2}\left(\frac{1}{2}+\frac{1}{3}\right)-\frac{1}{4}\left(\frac{1}{2^2}+\frac{1}{3^2}\right)+\frac{1}{6}\left(\frac{1}{2^3}+\frac{1}{3^3}\right)+...\infty$ is equal to

A. $\log_e 2$

B. $\log_e 3$

C. $\log_e \sqrt{2}$

D. $\log_e \sqrt{3}$

**Answer: N/A**

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**23.** The sum of series

$$\frac{(1)^2}{1.2!} + \frac{1^2+2^2}{2.3!} + \left(1^2+2^2+3^2\right)/(3.4!) + .. + \frac{1^2+2^2+\ldots+n^2}{n.(n+1)}! + .$$

is equals to

A. $e^2$

B. $\frac{1}{2}\left(e+e^{-1}\right)^2$

C. $\frac{3e-1}{6}$

D. 40

**Answer: N/A**

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**24.** The sum of the series $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+..\to\infty$ is

A. $\frac{e^2-2}{e}$

B. $\frac{(e-1)^2}{2e}$

C. $\frac{e^2-1}{2e}$

D. $\frac{e^2-1}{2}$

**Answer: N/A**

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**25.** If $0<y<2^{1/3}$ and $x\left(y^3-1\right)=1$ then

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

A. $\log\left(\frac{y^3}{2-y^3}\right)$

B. $\log\left(\frac{y^3}{1-y^3}\right)$

C. $\log\left(\frac{2y^3}{1-y^3}\right)$

D. $\log\left(\frac{y^3}{1-2y^3}\right)$

**Answer: N/A**

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**26.** The sum of the series

$\frac{1}{2!}+\frac{1+2}{3!}+\frac{1+2+3}{4!}+..\to\infty$ is equal to

A. $\frac{e}{2}$

B. $\frac{e}{3}$

C. $\frac{e}{4}$

D. $\frac{e}{5}$

**Answer: N/A**

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## Section Ii Assertion Reason Type

**1.** Statement -1: The sum of the series

$\frac{1}{1!}+\frac{2}{2!}+\frac{3}{3!}+\frac{4}{4!}+..\to\infty$ is e

Statement 2: The sum of the seies

$\frac{1}{1!}x+\frac{2}{2!}x^2+\frac{3}{3!}x^3+\frac{4}{4!}x^4..\to\infty isxe^x$

A. Statement 1 is true, Statement 2 is true Statement 2 is correct explanation for statement 1

B. Statement 2 is true.

C. Statement 1 is true.

D. Statement 1 is false ,Statement 2 is true.

**Answer: N/A**

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**2.** Let x and a be positive real numbers

Statement 1: The sum of theries

$$1+\frac{\left(\log_e x\right)^2}{2!}+\frac{\left(\log_e x\right)^3}{3!}+\left(\log_e x\right)^2+\ldots\rightarrow\infty isx$$

Statement2: The sum of the series

$$1+\left(x\log_e a\right)+\frac{x^2}{2!}\left(\log_e x\right)\Bigg)^2+\frac{x^3}{3!}\frac{\left(\log_e a\right)^3}{3!}+\rightarrow\infty isa^x$$

A. 1

B. 2

C. 3

D. statement 1 is true and statement 2 is a correct explantion for statement-1

**Answer: N/A**

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**3.** Let $a = \Sigma_{n=0}^{\infty} \frac{x^{3n}}{(3n)}!, b = \Sigma_{n=1}^{\infty} \frac{x^{3n-2}}{3n-2}!$ and $C = \Sigma_{n=1}^{\infty} \frac{x^{3n-1}}{3n-1}!$ and w be a complex cube root of unity

Statement 1: a+b+c $= e^x, a + bw + cw^2 = e^{wx}$ and $a + bw^2 + cw = e^{w^2}$

Statement 2: $a^3 + b^3 + C^3 - 3abc = 1$

A. 1

B. 2

C. 3

D. 4

**Answer: N/A**

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**4.** Let n be a natureal number and $0 < x < 1$

Statement 1: The coefficient of $x^n \in \frac{\log(1)}{1 + x + x^2} is \frac{1}{n}$ when n is not a multiple of 3

Statement 2: The coefficient of $x^n \in \frac{\log(1)}{1-x+x^2-x^3} is \frac{1}{n}$ when n is an odd natural number

A. statement 1 is not true, statement 2 is true.

B. statement 1 is true.

C. statement 2 is false.

D. none of these.

**Answer: a**

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**5.** Statement 1: If

$\log\left(1-x+x^2\right) = a_1 x + a_2 x^{32} + a_3 x^3 + . .$

then $a_3 + a_6 + a_9 + . . = \frac{2}{3}\log_e 2$

Statement 2: $1 - \frac{1}{2} + \frac{1}{3} - \frac{11}{4} + \frac{1}{5} - \frac{1}{6} + . . = \log_e 2$

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Exercise

**1.** The value of $\sqrt{c}$ rounded off of three decimal places is

A. 1.648

B. 1.65

C. 1.652

D. none of these

**Answer: a**

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**2.** The sum of the series

$$1+\frac{1+a}{2!}+\frac{1+a+a^2}{3!}+\frac{1+a+a^2+a^3}{4!}+\text{.....is}$$

A. $\frac{e^a-e}{a-1}$

B. $\frac{e^a-e}{a+1}$

C. $\frac{e^{2a}+1}{a-1}$

D. $\frac{e^{a}+e}{a-1}$

**Answer: a**

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**3.** The sum of series $\Sigma_{n=1}^{\infty}\frac{2n}{2n+1}!$ is

A. e

B. $e^{-1}$

C. 2e

D. $2e^{-1}$

**Answer: b**

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**4.** The value of $\log_3 e - \log_9 e + \log_{27} e - \log_{81} e + \ldots\infty$ is

A. $\log_2 3$

B. $\log_3 2$

C. $\log_{10} e$

D. $\log_e 2$

**Answer: b**

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**5.** Prove that $\frac{4}{1!} + \frac{11}{21} + \frac{22}{3!} + \frac{37}{4!} + \frac{56}{5!} + \ldots\infty = 6e - 1$

A. 6e

B. $6e$

C. $6e - 1$

D. $5e$

**Answer: c**

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**6.** The coefficient of x^n in the expansion of $\left(1+\frac{x^2}{2!}+\frac{x^4}{4!}..\right)^2$ when n is odd

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**7.** The coefficent of $x^n$ in the expansion of $\left(1+\frac{x^2}{2!}+\frac{x^4}{4!}+\ldots\right)^2$ When n is odd is

A. $\frac{2^n}{n!}$

B. $\frac{2^n}{2n!}$

C. 0

D. $\frac{2^{2x}}{n!}$

**Answer: b**

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**8.** If $\alpha, \beta$ are the roots of the equation $ax^2 + bx + c = 0$ then $\log\left(a - bx + cx^2\right)$ is equal to

A. $\log a + (\alpha + \beta)x + \frac{\alpha^2 + \beta^1}{2}x^2 + \frac{\alpha^3 + \beta^3}{3}x^3$+...

B. $\log a + (\alpha + \beta)x + \frac{\alpha^2 + \beta^2}{2}x^2 + \frac{\alpha^3 + \beta^3}{3}x^3$+...

C. $\log a - (\alpha + \beta)x - \frac{\alpha^2 + \beta^1}{2}x^2 - \frac{\alpha^3 + \beta^3}{3}x^3$+...

D. none of these

**Answer: c**

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**9.** The sum of the series

$1 + \frac{1+2}{2!} + \frac{1+2+2^2}{3!} + \left(1 + 2 + 2^2 + 2^3\right)$+...is

A. $e^2$

B. $e^2 + e$

C. $e^2 - e$

D. $e^2 - e - 1$

**Answer: c**

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**10.** The sum of the series

$1 + \frac{1^2 + 2^2}{2!} + \frac{1^2 + 2^2 + 3^2}{3!} + \frac{1^2 + 2^2 + 3^2 + 4^2}{4!}$+.. Is

A. 3e

B. $\frac{17}{6}e$

C. $\frac{31}{6}e$

D. $\frac{13}{6}e$

**Answer: c**

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**11.** The coefficent of $x^n$ in the series

$$1+\frac{a+bx}{1!}+\frac{(a+bx)^2}{2!}+\frac{(a+bx)^3}{3!}+\text{...is}$$

A. $\frac{b^n}{n!}$

B. $e^b\frac{b^n}{n!}$

C. $e^a\frac{b^n}{m!}$

D. $\frac{e^b a^n}{n!}$

**Answer: a**

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**12.** The sum of the series $\frac{1^2.2^2}{1!}+\frac{2^2.3^2}{2!}+\frac{3^2.4^2}{3!}+..$ Is

A. 27e

B. 24e

C. 28e

D. 25e

**Answer: a**

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**13.** The value of $(x+y)(x-y)+\frac{1}{2!}(x+y)(x-y)\left(x^2+y^2\right)+\frac{1}{3!}(x+y)(x-y)\left(x^4+$

... is :

A. $e^{x^2}-e^{y^2}$

B. $e^{x^2}+e^{y^2}$

C. $e^{x^2}-\left(y^2\right)$

D. $e^{x^2}+\left(y^2\right)$

**Answer: b**

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**14.** If $e^x = y + \sqrt{1 + y^2}$ then the value of y is

A. $e^x - e^{-x}$

B. $\frac{1}{2}\left(e^x - e^{-x}\right)$

C. $e^x + e^{-x}$

D. $\frac{1}{2}\left(e^x + e^{-x}\right)$

**Answer: d**

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**15.** If $\frac{e^{5x} + e^x}{e^{3x}}$ is expand in a series of ascending powers of x and n is and odd natural number then the coefficent of $x^n$ is

A. $\frac{2^n}{n!}$

B. $\frac{2^{n+1}}{2n}!$

C. $\frac{2^{2n}}{2n}!$

D. none of these

**Answer: d**

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**16.** In the expansion of $\frac{e^{7x}+e^{3x}}{e^{5x}}$ the constant term is

A. $\frac{\left(4^{n-1}+(1-2)\right)^{n}}{n!}$

B. $\frac{4^{n-1}+(2n)}{n!}$

C. $\frac{\left(4^{n-1}+(1-2)\right)^{n-1}}{n!}$

D. none of these

**Answer: d**

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**17.** The value of $\frac{\sqrt{2-1}}{\sqrt{2}}+3-2\frac{\sqrt{2}}{4}+\left(5\sqrt{2}-\frac{7}{6}\right)\sqrt{2}+17-12\frac{\sqrt{2}}{16}+..+++..+$ is

A. $\log_e 2$

B. $\log_e \sqrt{2}$

C. $\log_e 3$

D. $\log_e \sqrt{3}$

**Answer: a**

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**18.** If $y = 2x^2 - 1$ then $\frac{1}{x^2} + \frac{1}{2x^4} + \frac{1}{3x^6} + \ldots\infty$ equals to

A. -$\log_e \left( \frac{y-1}{y+1} \right)$

B. $\log_e \left( \frac{1+y}{1-y} \right)$

C. $\log_e \left( \frac{1-y}{1+y} \right)$

D. $\log \left( \frac{1+2y}{1-2y} \right)$

**Answer: A**

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**19.** The sum of $\sum_{n=1}^{\infty} {}^{n}C_{2} \cdot \frac{3^{n-2}}{n!}$ equal

A. $e^{3/2}$

B. $\frac{1}{2}e^{3}$

C. $e^{-3/2}$

D. $e^{-3}$

**Answer: a**

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**20.** If $\frac{e^{x}}{1-x} = B_0 + B_1 x + B_2 x^2 + \ldots + B_n x^n + \ldots$, then the value of $B_n - B_{n-1}$ is

A. $\frac{1}{n!}$

B. $\frac{1}{n-1}!$

C. $\frac{1}{n!} - \frac{1}{n-1}!$

D. 1

**Answer: d**

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**21.** If $S = \Sigma_{n=1}^{\infty} \frac{{}^nC_0 + {}^nC_1 + {}^nc_2 + .. + {}^nC_n}{{}^nP_n}$ then S equals

A. 2e

B. $2e - 1$

C. $2e + 1$

D. none of these

**Answer: d**

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**22.** If $S = \sum_{n=2}^{\infty} \frac{3n^2+1}{(n^2-1)^3}$ then 9/4Sequals

A. $e-2$

B. $e+2$

C. $2e$

D. none of these

**Answer: b**

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**23.** $\frac{1}{1.2} + \frac{1.3}{1.2.3.4} + \frac{1.3.5}{1.2.3.4.5.6} + \ldots . \infty$

A. $e-1$

B. $e^{1/2}-1$

C. $e^{1/2}+e$

D. none of these

**Answer: B**

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**24.** The sum of the series $\frac{12}{2!}+\frac{28}{3!}+\frac{50}{4!}+\frac{78}{5!}+$ ...is

A. e

B. 3e

C. 4e

D. 5e

**Answer: D**

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**25.** If $a=\Sigma_{n=0}^{\infty}\frac{x^{3x}}{3n}!, b=\Sigma_{n=1}^{\infty}\frac{x^{3n-2}}{3n-2!}$ and $C=\Sigma_{n=1}^{\infty}\frac{x^{3n-1}}{3n-1!}$

then the value of $a^3+b^3+C^3-3abc$ is

A. 1

B. 0

C. -1

D. -2

**Answer: a**

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**26.** If $S_n$ denotes the sum of the products of the products of the first n natureal number taken two at a time

A. $\frac{11e}{24}$

B. $\frac{11e}{12}$

C. $\frac{13e}{24}$

D. none of these

**Answer: b**

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**27.** $\sum_{n=0}^{\infty} \frac{(\log_e x)^n}{n!}$ is equal to

A. $\log_e x$

B. $x$

C. $\log_x e$

D. none of these

**Answer: b**

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**28.** If $a = \Sigma_{n=1}^{\infty} \frac{2n}{2n-1!}, b = \Sigma_{-}(n=1)^{\infty} \frac{2n}{2n+1!}$ then ab equals

A. 1

B. $e^2$

C. $\frac{e-1}{e+1}$

D. $\frac{e+1}{e-1}$

**Answer: a**

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**29.** The value of

$$\left(1+\frac{a^2x^2}{2!}+\frac{a^4x^4}{4!}+\ldots\right)^2-\left(ax+\frac{a^3x^3}{3!}+\frac{a^5x^5}{5!}+..\right)^2 \text{ is}$$

A. $e^{a^x}$

B. $e^{-a^x}$

C. 1

D. 0

**Answer: C**

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**30.** If $S_n = \frac{1^2.(2)}{1!} + \frac{2^2.3}{2!} + \frac{3^2.4}{3!} + \ldots \frac{n^2.(n+1)}{n!}$ then $\lim_{n \to \infty} S_n$ is equal to

A. 3e

B. 5e

C. 7e

D. 9e

**Answer: c**

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**31.** If $S = \Sigma_{n=0}^{\infty} \frac{(\log x)^{2n}}{2n!}$, then S equals

A. $x + x^{-1}$

B. $x - x^{-1}$

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

D. none of these

**Answer: c**

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**32.** If $y+\frac{y^3}{3}+\frac{Y^5}{5}+\ldots\infty=2\left(x+\frac{x^3}{3}+\frac{x^5}{5}+..\infty\right)$, then

A. y=2x

B. log y=2 log x

C. $x^2y=2x-y$

D. none of these

**Answer: c**

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**33.** The value of $\log 2+2\left(\frac{1}{5}+\frac{1}{3}.\frac{1}{5^3}+\frac{1}{5}.\frac{1\square}{5^5}+..+\infty\right)$ is

A. log2+log3

B. log 2+2

C. $\frac{1}{2}\log 2$

D. log 3

**Answer: d**

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**34.** The sum of series

$\frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} - \frac{1}{4.5} + \ldots\ldots$ is

A. $\log_e\left(\frac{4}{e}\right)$

B. $\frac{4}{e}$

C. $\log_e\left(\frac{e}{4}\right)$

D. $\frac{e}{4}$

**Answer: b**

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35. $e^{(x-1)-\frac{1}{2}(x-1)^2+\frac{(x-1)^3}{3}-\frac{(x-1)^4}{4}+\cdots\cdots}$ is eqaul to

A. $\log(x-1)$

B. $\log x$

C. x

D. none of these

**Answer: c**

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36. $2\left\{\frac{m-n}{m+n}+\frac{1}{3}\left(\frac{m-n}{m+n}\right)^3+\frac{1}{5}\left(\frac{m-n}{m+n}\right)^5+..\right\}$` is equals to

A. $\log\left(\frac{m}{n}\right)$

B. $\log\left(\frac{n}{m}\right)$

C. $\log\left(\frac{n}{m}\right)$

D. none of these

**Answer: a**

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**37.** $\log_4 2 - \log_8 2 + \log_{16} 2 - \ldots . \infty$

A. $e^{-2}$

B. $\log_e 2 + 1$

C. $\log_e 3 - 2$

D. $1 - \log_e 2$

**Answer: d**

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Chapter Test

**1.** The series expansion of $\log\left\{(1+x)^{1+x}(1-x)^{1-x}\right\}$ is

A. $2\left\{\frac{x^2}{1.2}+\frac{x^4}{3.4}+\frac{x^6}{5.6}+..\right\}$

B. $\left\{\frac{x^2}{1.2}+\frac{x^4}{3.4}+\frac{x^6}{5.6}+..\right\}$

C. $2\left\{\frac{x^2}{1.2}+\frac{x^4}{2.3}+\frac{x^6}{3.4}+..\right\}$

D. none of these

**Answer: a**

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**2.** 2log x-log(x+1)-log(x-1) is equals to

A. $x^2+\frac{1}{2}x^4+\frac{1}{3}x^6$+..

B. $\frac{1}{x^2}+\frac{1}{2x^4}+\frac{1}{3x^6}$+..

C. $-\left\{\frac{1}{x^2}+\frac{1}{2x^4}+\frac{1}{3x^6}\right.$+..

D. $-\frac{1}{n}(w)^n+w^{2n}$

**Answer: b**

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**3.** The coefficient of $x^n$ in the expansion of

$\log_e\left(1+3x+2x^2\right)$ is

A. $\frac{2}{n}$

B.

C. $\frac{1}{n}$

D.

**Answer: b**

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**4.** If $x \neq 0$ then the sum of the series

$1+\frac{x}{2!}+\frac{2x^2}{3!}+\frac{3x^3}{4!}+..\rightarrow\infty$ is

A. $\frac{e^x + 1}{x}$

B. $\frac{e^x(x-1)}{x})$

C. $\frac{e^x(x-1)+1}{x}$

D. none of these

**Answer: d**

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**5.** If $\log\left(1 - x + x^2\right) = a_1 x + a_2 x^2 + a_3 x^3 +$...and n is not a mutiple of 3 then $a_n$ is equal to

A. $\frac{1}{n}$

B. $\frac{(-1)^n}{n}$

C. $\frac{(-1)^{n-1}}{n}$

D. $\frac{(-1)^{n-1}}{n}\left(w^n + w^{2n}\right)$

**Answer: b**

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**6.** If $\log\left(1-x+x^2\right)=a_1x+a_2x^2+a_3x^3+\ldots$

then $a_3+a_6+a_9+..$ is equal to

A. log 2

B. $\frac{2}{3}\log 2$

C. $\frac{1}{3}\log 2$

D. `2 log 2

**Answer: b**

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**7.** The coefficient of $x^n$ in the expansion of $\log_a(1+x)$ is

A. $\frac{(-1)^{n-1}}{n}$

B. $\frac{(-1)^{n-1}}{n}\log_a e$

C. $\frac{(-1)^{n-1}}{n}\log_e a$

D. $-\frac{1^{n-1}}{n}\log_a e$

**Answer: b**

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**8.** The coeffiecent of $n^{-r}$ in the expansion of $\log_{10}\left(\frac{n}{n-1}\right)$ is

A. $\frac{1}{r\log_e 10}$

B. $-\frac{1}{r\log_e 10}$

C. $\frac{1}{r!\log_e 10}$

D. $\log_e 1-(1)\frac{n}{\log_e}$

**Answer: a**

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**9.** The sum of the series

$$\frac{x-1}{x+1}+\frac{1}{2}\frac{x^2-1}{(x+1)^2}+\frac{1}{3}\frac{x^3-1}{(x+1)^3}+\ldots$$ is equal to

A. $\log_e x$

B. $2\log_e x$

C. $-\log_e(x+1)$

D. none of these

**Answer: a**

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**10.** The sum of series $2\left[7^{-1}+3^{-1}.7^{-3}+5^{-1}.7^{-5}+\ldots\right]$ is

A. $\log_e\left(\frac{4}{3}\right)$

B. $\log_e\left(\frac{3}{4}\right)$

C. $2\log_e\left(\frac{3}{4}\right)$

D. $2\log e\left(\frac{4}{3}\right)$

**Answer: a**

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**11.** The coefficient of $x^6$ in the expansion of

$\log\left\{(1+x)^{1+x}(1-x)^{1-x}\right\}$ is

A. $\frac{1}{15}$

B. $\frac{1}{30}$

C. $\frac{1}{10}$

D. $\frac{1}{45}$

**Answer: a**

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**12.** The sum of the series $\frac{1}{2}x^2 + \frac{2}{3}x^3 + \frac{3}{4}x^4 + \frac{4}{5}x^5 + \ldots$ is :

A. $\frac{x}{1+x} + \log(1+x)$

B. $\frac{x}{1-x} + \log(1-x)$

C. $-\frac{x}{1+x} + \log(1+x)$

D. none of these

**Answer: b**

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**13.** If $x, y, z$ are three consecutive positive integers and $X - Z + 2 = 0$, then $\frac{1}{2}\log_e x + \frac{1}{2}\log_e z + \frac{1}{2xz+1} + \frac{1}{3}\left(\frac{1}{2xz+1}\right)^3 + \ldots.$ is equal to

A. $\log_e x$

B. $\log_e y$

C. $\log_e z$

D. none of these

**Answer: b**

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**14.** The sum of the series $\frac{(1)^2.2}{1!}+\frac{2^2.3}{2!}+\frac{3^2.4}{3!}+\frac{4^2.5}{4!}+..$is

A. 5e

B. 3e

C. 7e

D. 2e

**Answer: c**

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**15.** The value of $1-\log_e 2+\frac{(\log_e 2)^2}{2!}-\frac{(\log_e 2)^3}{3!}+..$ is

A. 2

B. $\frac{1}{2}$

C. $\log_e 3$

D. none of these

**Answer: b**

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**16.** $1 + \frac{(\log_e n)^2}{2!} + \frac{(\log_e n)^4}{4!} + \ldots =$

A. n

B. $\frac{1}{n}$

C. $\frac{n + n^{-1}}{2}$

D. $\frac{e^n + e^{-n}}{2}$

**Answer: c**

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17. $\frac{2}{3!}+\frac{4}{5!}+\frac{6}{7!}+$ ..is equal to

A. $e^{1/2}$

B. $e^{-1}$

C. e

D. $e^{-1/3}$

**Answer: b**

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18. Sum of n terms of the series $\frac{1}{1.2.3.4.}+\frac{1}{2.3.4.5}+\frac{1}{3.4.5.6}+\ldots.$

A. $\frac{1}{6}\log_e 2-\frac{1}{24}$

B. $\frac{5}{2}-\log_e 2$

C. $\frac{3}{2}-\log_e 2$

D. none of these

**Answer: a**

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**19.** The value of

$$1 + (\log_e x) + \frac{(\log_e x)^2}{2!} + \frac{(\log_e x)^3}{3!} + \ldots \infty$$

A. 2

B. $\frac{1}{2}$

C. $\log_e 3$

D. none of these

**Answer: a**

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**20.** If $|x| < 1$ then the coefficient of $x^3$ in the expansion of $\log(1 + x + x^2)$ is ascending power of x is

A. $\frac{2}{3}$

B. $\frac{4}{3}$

C. $\frac{-2}{3}$

D. $-\frac{4}{3}$

**Answer: c**

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