MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

MODEL TEST PAPER 2

Category 1 Single Option Correct Type

1. If both roots of $x^2 - 2ax + a^2 - 1 = 0$ lies in $(-2, 1)$ then $[a]$, where $[.]$ denotes greatest integral function is

A. -1

B. 0

C. 1

D. 2

Answer: A

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2. Let R be a relation in N defined by $R = \{(x, y) : 2x + y = 8\}$, then range of R is

A. $\{1, 2, 3\}$

B. $\{2, 4, 6\}$

C. $\{1, 2, 3, 4, 6\}$

D. none of these

Answer: B

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3. if $f(x) = \dfrac{\sin(4\pi[x])}{1+[x]^2}$,where [x] is the greatest integer less than or equal to x,

A. $f(x)$ is not differentiable

B. $f'(x) > 0$

C. $f'(x) = 0 \forall x$

D. none of these

Answer: C

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4. If $z \neq 0, \int_0^{100} arg(-|z|)dx$ equals

A. 0

B. not defined

C. 100

D. 100π

Answer: D

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5. The sum of the series $\frac{1}{1!(n-1)!}+\frac{1}{3!(n-3)!}+\frac{1}{5!(n-5)!}+\ldots\ldots+\frac{1}{(n-1)!1!}$ is = (A) $\frac{1}{n!2^n}$ (B) $\frac{2^n}{n}!$ (C) $\frac{2^{n-1}}{n}!$ (D) $\frac{1}{n!2^{n-1}}$

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

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

C. $\frac{2^n}{(n-1)!}$

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

Answer: B

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6. In a 'multiple choice question' test there are eight questions. Each question has four alternative of which only one is correct. IF a candidate answers all the questions by choosing one answer for each question, then the number of ways to get exactly 4 correct answer is

A. 70

B. 2835

C. 5670

D. none of these

Answer: C

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7. There are two bosy B_1 and B_2. B_1 and n_1 different toys and B_2 and n_2 different toys. Find the number of ways in which B_1 and B_2 can exchange their toys in such a way that after exchanging they still have same number of toys but not the same set.

A. ${}^{m+n}C_m$

B. ${}^{m+1}C_{m-1}$

C. ${}^{m+n}P_n$

D. none of these

Answer: B

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8. If the roots of the equation $x^2 + 2ax + b = 0$ are real and distinct and they differ by at most 2m, then b lies in the interval

A. $(a^2 - m^2, a^2)$

B. $(a^2, a^2 + m^2)$

C. $[a^2 - m^2, a^2]$

D. $(a^2 - m^2, a^2 + m^2)$

Answer: C

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9. Let $f : \overrightarrow{NY}$ be a function defined as $f(x) = 4x + 3$, where $Y = \{y \in N : y = 4x + 3 \text{ for some } x \in N\}$. Show that f is invertible and its inverse is (1) $g(y)=\dfrac{3y+4}{3}$ (2) $g(y)=4+\dfrac{y+3}{4}$ (3) $g(y)=\dfrac{y+3}{4}$ (4) $g(y)=\dfrac{y-3}{4}$

A. $g(y)=4+\dfrac{y+4}{4}$

B. $g(y)=\dfrac{y+3}{4}$

C. $g(y)=\dfrac{3y+4}{3}$

D. $g(y)=\dfrac{y-3}{4}$

Answer: D

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10. Area bounded by $|x-1|\leq 2 \text{ and } x^2-y^2=1,$ is

A. $6\sqrt{3}+\frac{1}{2}\log\left|3+2\sqrt{2}\right|$

B. $6\sqrt{2}+\frac{1}{2}\log\left|3-2\sqrt{2}\right|$

C. $6\sqrt{2}-\log\left|3+2\sqrt{2}\right|$

D. none of these

Answer: C

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11. It is given that the events A and B are such that $P(A)=\frac{1}{4}, P\left(\frac{A}{B}\right)=\frac{1}{2}$ and $P\left(\frac{B}{A}\right)=\frac{2}{3}$. Then $P(B)$ is

A. $\frac{1}{3}$

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

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

D. $\frac{1}{6}$

Answer: A

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12. From the matrix equation AB=AC, we conclude B=C provided.

A. A si singular

B. A is skew symmetric

C. A is non - singular

D. none of these

Answer: C

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13. The given expression $f(x) = \dfrac{1}{\tan x + \cot x + \sec x + \text{cosec x}}$ is equivalent to

A. $\dfrac{1}{2(\sin x + \cos x - 1)}$

B. $\dfrac{\sin x + \cos x - 1}{2}$

C. $\dfrac{1}{2(\sin x - \cos x + 1)}$

D. $\dfrac{\sin x - \cos x + 1}{2}$

Answer: B

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14. In any $!ABC$,If $\cot\left(\frac{A}{2}\right), \cot\left(\frac{B}{2}\right), \cot\left(\frac{C}{2}\right)$ are in A.P.,then a,b,c are in

A. G.P.

B. H.P

C. A.P.

D. A.G.P.

Answer: C

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15. If $\omega = z/[z - (1/3)i]$ and $|\omega| = 1$, then find the locus of z.

A. a circle

B. an ellipse

C. a parabola

D. a straight line

Answer: D

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16. If $g(x) = \int 0 \times^{x} \log_e(ex)dx$, then $g'(\pi)$ equals

A. $\pi^{\pi} \log_e(e\pi)$

B. $\pi \log_e \pi$

C. $\pi^{\pi} \log_e \pi$

D. none of these

Answer: A

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17. A value of c for which the conclusion of Mean value theorem holds for the function $f(x) = \log_e x$ on the interval [1, 3] is

A. $\log_3 e$

B. $\log_e 3$

C. $2\log_3 e$

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

Answer: C

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18. $x\frac{dy}{dx} = y(\log y - \log x + 1)$

A. $x \log \frac{y}{x} = cy$

B. $y \log\left(\frac{x}{y}\right) = cx$

C. $\log\left(\frac{x}{y}\right) = cy$

D. $\log\left(\frac{y}{x}\right) = cx$

Answer: D

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19. The equation of the straight line passing through the point $(4.\ 3)$ and making intercepts on the co ordinate axes whose sum is -1, is

A. $\frac{x}{2}+\frac{y}{3}=1 \text{ or } \frac{x}{2}+\frac{y}{1}=1$

B. $\frac{x}{2}-\frac{y}{3}=-1 \text{ or } \frac{x}{-2}+\frac{y}{1}=1$

C. $\frac{x}{2}+\frac{y}{3}=-1 \text{ or } \frac{x}{-2}+\frac{y}{1}=1$

D. $\frac{x}{2}-\frac{y}{3}=1 \text{ or } \frac{x}{-2}+\frac{y}{1}=1$

Answer: D

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20. If $n(U)=700, n(A)=200, n(B)=240$ and $n(A\cap B)=100$, then $n\left(A^C\cup B^C\right)$ is equal to

A. 260

B. 560

C. 360

D. 600

Answer: D

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21. The third term of a G.P. is 7, the product of its first five terms is

A. 7^4

B. 7^5

C. 7^6

D. 7^3

Answer: B

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22. Four parts of 24 are in A.P. such that the ratio of product of extremes to products of means is $7:15$, then four parts are

A. $\frac{3}{2}, \frac{9}{2}, \frac{15}{2}, \frac{21}{2}$

B. $\frac{11}{2}, \frac{13}{2}, 3, 9$

C. $\frac{5}{2}, \frac{15}{2}, \frac{9}{2}, \frac{21}{2}$

D. $\frac{21}{2}, \frac{9}{2}, \frac{15}{2}, \frac{7}{2}$

Answer: A

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23. If the coefficient of rth term and $(r+1)^{th}$ term in the expansion of $(1+x)^{20}$ are in ratio $1:2$, then r is equal to

A. 6

B. 7

C. 8

D. 9

Answer: B

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24. Find the equation of tangent to the curve y $= 1 + e^{-2x}$

Where it cuts the line y=2

A. $x + 2y = 2$

B. $2x + y = 2$

C. $x - 2y = 1$

D. $x - 2y + 2 = 0$

Answer: B

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25. The ratio in which the xy - plane divides the join of (1, 2, 3) and (4, 2, 1) is

A. $3:1$ internally

B. $3:1$ externally

C. $1:2$ internally

D. $2:1$ externally

Answer: B

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26. If P is a point in space such that $OP = 12$ and $\overrightarrow{OP}$ is inclied at angle of 45° and 60° with OX and OY respectively, then the position vector of P is

A. $6\hat{i} + 6\hat{j} + 6\sqrt{2}\hat{k}$

B. $6\hat{i} + 6\sqrt{2}\hat{j} \pm 6\hat{k}$

C. $6\sqrt{2}\hat{i} + 6\hat{j} \pm 6\hat{k}$

D. none of these

Answer: C

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27. The point in which the line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ meets the plane $x - 2y + z = 20$ is

A. $(7, -8, 26)$

B. $(8, 7, 26)$

C. $(7, 8, 26)$

D. none of these

Answer: B

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28. The maximum value of $f(x) = |xInx|$ in $x \in (0, 1)$ is

A. $1/e$

B. e

C. 1

D. none of these

Answer: A

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29. If the line $ax + by + c = 0$ is normal to the curve $xy + 5 = 0$, then

A. $a > 0, b > 0$

B. $b > 0, a < 0$

C. $b < 0, a > 0$

D. none of these

Answer: A

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30. If $(\log)_2 x + (\log)_2 y \geq 6,$ then the least value of $x + y$ is 4 (b) 8 (d) 16 (d) 32

A. 4

B. 8

C. 16

D. 32

Answer: C

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31. The equation of the plane perpendicular to the line $\frac{x-1}{1}, \frac{y-2}{-1}, \frac{z+1}{2}$ and passing through the point $(2, 3, 1)$. Is

A. $\vec{r}.\left(\hat{i}+\hat{j}+2\hat{k}\right)=1$

B. $\vec{r}.\left(\hat{i}-\hat{j}+2\hat{k}\right)=1$

C. $\vec{r}.\left(\hat{i}-\hat{j}+2\hat{k}\right)=7$

D. none of these

Answer: B

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32. Let $f(x)=\int_{x^2}^{x^3}\frac{dt}{\ln t}$ for $x>1$ and $g(x)=\int_1^x\left(2t^2-\ln t\right)f(t)dt(x>1)$, then:

A. f(x) is an increasing function

B. f(x) has a minima at x = 1

C. f(x) is a decreasing function

D. f(x) has a maxima at x = 1

Answer: A

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33. The rang of $y = \frac{|\sin x|}{1 + |\sin x|}$ is

A. $0 < y < 1$

B. $0 \leq y \leq 1$

C. $0 \leq y < 1$

D. none of these

Answer: D

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34. The most general solution of the equation $\log_{\cos\theta}\tan\theta + \log_{\sin\theta}\cot\theta = 0$, is

A. $n\pi + \frac{\pi}{4}, n \in Z$

B. $n\pi - \frac{\pi}{4}, n \in Z$

C. $2n\pi - \frac{\pi}{4}, n \in Z$

D. $2n\pi + \frac{\pi}{4}, n \in Z$

Answer: A

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35. General solution of the equation : $\sin x + \cos x = \min_{a \varepsilon R} \{1, a^2 - 4a + 6\}$ is :

A. $\frac{n\pi}{2} + (-1)^n \frac{\pi}{4}, n \in Z$

B. $2n\pi + (-1)^n \frac{\pi}{4}, n \in Z$

C. $n\pi + (-1)^{n+1} \frac{\pi}{4}, n \in Z$

D. $n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4}, n \in Z$

Answer: D

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36. If the extremities of a diameter of a circle are $(0, 0)$ and $(a^3, 1/a^3$

)then the circle passes through which one of the following points ?

A. $\left(a, \frac{1}{a}\right)$

B. $\left(a^2, \frac{1}{a^2}\right)$

C. $\left(\frac{1}{a^2}, a^2\right)$

D. $\left(\frac{1}{a}, a\right)$

Answer: D

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37. If in a triangle ABC, $a\cos^2\left(\frac{C}{2}\right)os^2\left(\frac{A}{2}\right)=\frac{3b}{2}$, then the sides $a, b, andc$ are in A.P. b. are in G.P. c. are in H.P. d. satisfy $a+b=\cdot$

A. satisfy $a+b=c$

B. are in A.P.

C. are in G.P.

D. are in H.P.

Answer: B

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38. If ω be the imaginary cube root of 1, the value of $\frac{7+11\omega+3\omega^2}{13+7\omega+11\omega^2}+\frac{7+11\omega+13\omega^2}{11+13\omega+7\omega^2}$ will be

A. 2

B. 3

C. 0

D. -1

Answer: D

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39. The coefficient of the term independent of x in $\left[\left[\sqrt{\left(\frac{x}{3}\right)}+\frac{\sqrt{3}}{x^2}\right]^{10}\right]$ is

A. 1

B. $5/12$

C. ${}^{10}C_1$

D. none of these

Answer: D

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40. If α, β are the roots of $x^2 - ax + b = 0$, then $\lim_{x \to \alpha} \frac{e^{x^2 - ax + b}}{x - \alpha} =$

A. $\beta - \alpha$

B. $\alpha - \beta$

C. 1

D. $2\alpha - a$

Answer: B

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41. The standard deviation of 50 values of a variable x is 15, if each value of the variable is divided by (-3), then the standard deviation of the new set of 50 values of x will be

A. 15

B. -5

C. 5

D. -15

Answer: C

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42. If $f(x) = \begin{cases} \frac{\sin\{\cos x\}}{x - \frac{\pi}{2}} & x \neq \frac{\pi}{2} \\ 1 & x = \frac{\pi}{2} \end{cases}$, where {k} represents the fractional park of k, then:

A. f(x) is continuous at $x = \pi/2$

B. $\lim_{x \to \pi/2} f(x)$ exists, but f is not continuous at $x = \pi/2$

C. $\lim_{x \to \pi/2} f(x)$ does not exist

D. $\lim_{x \to \pi/2} f(x) = -1$

Answer: C

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43. The value of $\cos\left[2\dfrac{\tan^{-1}(1+x)}{1-x}+\dfrac{\sin^{-1}(1-x^2)}{1+x^2}\right]$ is

A. $\sqrt{2}$

B. 1

C. 0

D. -1

Answer: D

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44. The differential coefficient of $f(\log_e x) w.r.t. x,$ where $f(x)=\log_e x,$ is (i) $\dfrac{x}{\ln x}$ (ii) $\dfrac{\ln x}{x}$ (iii) $\dfrac{1}{x\ln x}$ (iv) $x\ln x$

A. $\dfrac{x}{\log_e x}$

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

C. $\dfrac{\log_e x}{x}$

D. $x \log_e x$

Answer: B

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45. if $\left|\vec{a}\right| = 4, \left|\vec{b}\right| = 2$ and the angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$ then $\left(\vec{a} \times \vec{b}\right)^2$ is equal to

A. 48

B. 16

C. 0

D. 3

Answer: B

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46. Solution of the differential equation $\frac{dy}{dx}\tan y = \sin(x+y) + \sin(x-y)$ is

A. $\sec y - 2\cos x = c$

B. $\sec y + 2\cos x = c$

C. $\cos y - 2\sin x = c$

D. $\sec y + 2\sin x = c$

Answer: B

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47. The cartesian co-ordinates of a point are $(1, -1)$, its polar co - ordinates are

A. $\left(\sqrt{2}, \frac{\pi}{4}\right)$

B. $\left(\sqrt{2}, \frac{3\pi}{4}\right)$

C. $\left(\sqrt{2}, \frac{5\pi}{4}\right)$

D. $\left(\sqrt{2}, \frac{7\pi}{4}\right)$

Answer: D

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48. If the sum of the squares of the deviations of 25 observations taken from the mean 40 is 900, then the coefficient of variation is

A. 20%

B. 12.5%

C. 15%

D. 18%

Answer: C

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49. Two sides of a rhombus are along the lines, $x - y + 1 = 0$ and $7x - y - 5 = 0$. If its diagonals intersect at $(-1, -2)$, then which one of the following is a vertex of this rhombus ? (1) $(-3, -9)$ (2) $(-3, -8)$ (3) $\left(\frac{1}{3}, -\frac{8}{3}\right)$ (4) $\left(-\frac{10}{3}, -\frac{7}{3}\right)$

A. $(-3, -9)$

B. $(-3, -8)$

C. $\left(\frac{1}{3}, -\frac{8}{3}\right)$

D. $\left(-\frac{1}{3}, -\frac{7}{3}\right)$

Answer: C

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50. If 5^{40} is divided by 11, then remainder is

A. 2

B. 3

C. 5

D. 1

Answer: D

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Category 2 Single Option Correct Type

1. An ellipse has eccentricity $\frac{1}{2}$ and one focus at the point $P\left(\frac{1}{2}, 1\right)$. Its one directrix is the comionand tangent nearer to the point the P to the hyperbolaof $x^2 - y^2 = 1$ and the circle $x^2 + y^2 = 1$.Find the equation of the ellipse.

A. $9\left(x - \frac{1}{3}\right)^2 + 12(y - 1)^2 = 1$

B. $12\left(x - \frac{1}{3}\right)^2 + 9(y - 1)^2 = 1$

C. $\left(x - \frac{1}{2}\right)^2 + \frac{(y - 2)^2}{9} = 1$

D. $3\left(x + \frac{1}{2}\right)^2 + 4(y - 1)^2 = 1$

Answer: A

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2. AB is a chord of the parabola $y^2 = 4ax$ with its vertex at A. BC is drawn perpendicular to AB meeting the axis at C.The projecton of BC on the axis of the parabola is

A. a

B. 2a

C. 4a

D. 8a

Answer: C

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3. If $\frac{1+3p}{4}, \frac{1-p}{3}, \frac{1-3p}{2}$ are the probabilities of three mutually exclusive events, then the set of all values of p is

A. $\left[-\frac{1}{3}, \frac{1}{3}\right]$

B. $\left[-\frac{1}{3}, 1\right]$

C. $\left[\frac{1}{13}, 1\right]$

D. $\left[\frac{1}{13}, \frac{1}{3}\right]$

Answer: D

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4. $f(x) = \begin{cases} 3[x] - \frac{5|x|}{x}, & x \neq 0 \\ 2, & x = 0 \end{cases}$. Then $\int_{-3/2}^{2} f(x)dx =$

$([\cdot])$

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5. Number 1, 2, 3,...,2n (n in N) are printed on 2n cards. The probability of drawing a number r is proportional to r. Then the probability of drawing an even number in one draw is

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

B. $\frac{n+1}{n+3}$

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

D. $\frac{n+1}{2n+1}$

Answer: D

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6. if $f(x) = \begin{vmatrix} \sin x & 1 & 0 \\ 1 & 2\sin x & 1 \\ 0 & 1 & 2\sin x \end{vmatrix}$ then $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} f(x)dx$ equals

A. 0

B. -1

C. 1

D. $\frac{3\pi}{2}$

Answer: A

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7. Let $f(x) = e^{c}0s^{(-1)}\left\{\sin\left(x+\frac{\pi}{3}\right)\right\}$. Then, $f\left(\frac{8\pi}{9}\right) = e^{5\pi/18}$ (b) $e^{13\pi/18}$ (c) $e^{-2\pi/18}$ (d) none of these

A. $e^{\frac{7\pi}{12}}$

B. $e^{\frac{13\pi}{18}}$

C. $e^{\frac{5\pi}{18}}$

D. $e^{\frac{\pi}{12}}$

Answer: B

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8. If $e^y + xy = e, \quad \text{then:} \quad \left[\frac{d^2y}{dx^2}\right]_{x=0}$ is equal to

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

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

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

D. none of these

Answer: C

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9. The value of $\left|\vec{a} \times \hat{i}\right|^2 + \left|\vec{a} \times \hat{j}\right|^2 + \left|\vec{a} \times \hat{k}\right|^2$ is

A. $\left|\vec{a}\right|^2$

B. $3\left|\vec{a}\right|^2$

C. $4\left|\vec{a}\right|^2$

D. $2\left|\vec{a}\right|^2$

Answer: D

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10. Let

$\vec{a} = \hat{i} - \hat{k}, \vec{b} = x\hat{i} + \hat{j} + (1-x)\hat{k}$ and $\vec{c} = y\hat{i} + x\hat{j} + (1+x-y)\hat{k}$. T

[veca vecb vecc]` depends on (A) only x (B) only y (C) neither x nor y (D) both x and y

A. x only

B. y only

C. neither x nor y

D. both x and y

Answer: C

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11. A spherical iron ball 10 cm in radius is coated with a layer of ice of uniform thickness that melts at a rate of $50cm^3 / \min$. When the thickness of ice is 5 cm, then the rate at which the thickness of ice decreases, is:

A. $\frac{1}{18\pi}cm / \min$

B. $\frac{1}{36\pi}cm / \min$

C. $\frac{5}{6\pi}cm / \min$

D. $\frac{1}{54\pi}cm / \min$

Answer: A

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12. $\int \left\{ \frac{\log x - 1}{1 + (\log x)^2} \right\}^2$ dx is equal to

A. $\frac{x}{x^2 + 1} + C$

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

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

D. $\frac{xe^x}{1 + x^2} + C$

Answer: C

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13. If P and Q are the points of intersection of the circles $x^2 + y^2 + 3x + 7y + 2p5 = 0$ and $x^2 + y^2 + 2x + 2yp^2 = 0$, then there is a circle passing through P, Q and $(1, 1)$ for (1) all values of p (2) all except one value of p (3) all except two values of p (4) exactly one value of p

A. all except one value of p

B. all except two values of p

C. exactly one value of p

D. all values of p

Answer: A

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14. If $\frac{4^n}{n+1} < \frac{(2n)!}{(n!)^2}$ then $P(n)$ is true for

A. $n \geq 1$

B. $n > 0$

C. $n < 0$

D. $n \geq 2$

Answer: D

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15. $\alpha, \beta$are the roots of the equation $k(x^2 - x) + x + 5 = 0$.if$k_1, k_2$are two values of $k$for which the roots $\alpha, \beta$are connected by the relation $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{4}{5}$.find the value of $\frac{k_1}{k_2} + \frac{k_2}{k_1}$

A. 254

B. 0

C. 245

D. -254

Answer: A

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Category 3 One Or More Than One Option Correct Type

1. In a $\Delta ABC, \tan A$ and $\tan B$ are the roots of the equation $ab(x^2+1)=c^2x$, where a, b and c are the sides of the triangle. Then

A. $\tan(A-B)=\frac{a^2-b^2}{2ab}$

B. $\cot C=0$

C. $\sin^2 A+\sin^2 B=1$

D. none of these

Answer: A::B::C

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2. If $nC_4,^n C_5$ and $^nC_6$ are in AP, then n is

A. 8

B. 9

C. 14

D. 7

Answer: C::D

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3. The value of $\left(\frac{\cos\alpha+\cos\beta}{\sin\alpha-\sin\beta}\right)^n+\left(\frac{\sin\alpha+\sin\beta}{\cos\alpha-\cos\beta}\right)^n$ (where n is a whole number) is equal to

A. 0, when n is odd

B. $2\frac{\tan^n(\alpha-\beta)}{2}, \forall n$

C. $2\cot^n\frac{\alpha-\beta}{2}$, when n is even

D. $2\cot^n\frac{\alpha+\beta}{2}$, when n is even

Answer: A::C

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4. The 6^{th} term of expansion $\left[\sqrt{2^{\log_{10}(10-3^x)}}+\sqrt[5]{2^{(x-2)\log_{10}3}}\right]^m$ is 21 and the coefficient of $2^{nd}, 3^{rd}$ and 4^{th} terms of it are respectively $1^{st}, 3^{rd}$ and 5^{th} term of an A.P. Find x.

A. 0

B. 1

C. 2

D. 3

Answer: A::C

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5. A focus of the hyperbola $25x^2 - 36y^2 = 225$ is

A. $(\sqrt{16}, 0)$

B. $\left(\frac{1}{2}\sqrt{61}, 0\right)$

C. $(-\sqrt{61}, 0)$

D. $\left(-\frac{1}{2}\sqrt{61}, 0\right)$

Answer: B::D

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6. Let $f(n) = \begin{vmatrix} n & n+1 & n+2 \\ .^n P_n & .^{n+1} P_{n+1} & .^{n+2} P_{n+2} \\ .^n C_n & .^{n+1} C_{n+1} & .^{n+2} C_{n+2} \end{vmatrix}$ where the sysmbols have their usual neanings .then f(n) is divisible by

A. n^2+n+1

B. $(n+1)!$

C. $n!$

D. none of these

Answer: A::C

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7. Point R divides line joining $A(-5, 1)$ and $B(3, 5)$ in the ratio $\lambda : 1$. The co - ordinates of P and Q are (1, 5) and (7, 2) respectively. If the area of the triangle PQR be 2 sq. units, then the value of λ is

A. $\frac{19}{5}$

B. $\frac{31}{9}$

C. 23

D. 19

Answer: A::C

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8. If the conjugate of $(x+iy)(1-2i)$ be $1+i$, then

A. $x=\frac{1}{5}$

B. $x+iy=\frac{1}{5}(3+i)$

C. $x-iy=\frac{1}{5}(3+i)$

D. $x+iy=\frac{1-i}{1+2i}$

Answer: B

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9. Let $f:R\rightarrow R$ be given by $f(x)=[x]^2+[x+1]-3$, where $[x]$ denotes the greatest integer less than or equal to x . Then, $f(x)$ is (a) many-one and onto (b) many-one and into (c) one-one and into (d) one-one and onto

A. f(x) is many - one and into function

B. f(x) = 0 for infinite number of values of x

C. f(x) = 0 for only two real values of x

D. none of these

Answer: A::B

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10. If $A = \int_0^{\pi} \frac{\sin x}{\sin x + \cos x} dx,\ B = \int_0^{\pi} \frac{\sin x}{\sin x - \cos x} dx$, then

A. $A + B = 0$

B. $A = B$

C. $A = B = \pi/2$

D. $A = -B = \pi$

Answer: B::C

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