MATHS

BOOKS - CAREER POINT

MOCK TEST 1

Part C Maths

1. Tangents AB and AC are drawn to the circle $x^2 + y^2 - 2x + 4y + 1 = 0$ from $A(0.1)$ then equation of circle passing through $A, B \text{ and } C$ is

A. $x^2 + y^2 + x + y - 2 = 0$

B. $x^2 + y^2 - x + y - 2 = 0$

C. $x^2 + y^2 + x - y - 2 = 0$

D. None of these

Answer: B

Watch Video Solution

2. If two tangents drawn from the point (α, β) to the parabola $y^2 = 4x$ are such that the slope of one tangent is double of the other, then prove that $\alpha = \frac{2}{9}\beta^2$.

A. $9\beta = 2\alpha^2$

B. $9\alpha = 2\beta^2$

C. $2\alpha = 9\beta^2$

D. None of these

Answer: B

Watch Video Solution

3. The equation of common tangent of the curve $x^2 + 4y^2 = 8$ and $y^2 = 4x$ are

A. x-2y + 4 = 0 , x + 2y + 4 = 0

B. 2x-y + 4 = 0 , 2x + y + 4 = 0

C. 2x-y +2 = 0 , 2x + y + 2 = 0

D. None of these

Answer: A

Watch Video Solution

4. If truth values of p and q are T , F then truth value of $-p \to (p \wedge -q)$ is -

A. T

B. F

C. can not say

D. Not possible

Answer: A

Watch Video Solution

5. The value of $\sum_{r=0}^{40} rC(40, r)C(30, r)$

A. $40.^{69} C_{29}$

B. $40.^{70} C_{30}$

C. $^{69}C_{29}$

D. $^{70}C_{30}$

Answer: A

Watch Video Solution

6. A natural number is chosen at random from the first 100 natural numbers. The probability that $x + \frac{100}{x} > 50$ is $1/10$ b. $11/50$ c. $11/20$ d. none of these

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

B. $\frac{11}{50}$

C. $\frac{11}{20}$

D. None

Answer: C

Watch Video Solution

7. Four boys picked 30 apples. The number of ways in which they can divide then if all the apples are identical is

A. 5630

B. 4260

C. 5456

D. None

Answer: C

Watch Video Solution

8. If $e^{-\pi/2} < \theta < \pi/2$,then =

A. cos (log θ) $>$ log (cos θ)

B. cos (log θ) $<$ log (cos θ)

C. cos (log θ) = log (cos θ)

D. None of these

Answer: A

Watch Video Solution

9. In the quadratic equation $ax^2 + bx + c = 0$, if $\Delta = b^2 - 4ac$ and $\alpha + \beta, \alpha^2 + \beta^2, \alpha^3 + \beta^3$ are in GP. where α, β are the roots of $ax^2 + bx + c = 0$, then

A. $\Delta \neq 0$

B. $b\Delta = 0$

C. $cb \neq 0$

D. $c\Delta = 0$

Answer: D

Watch Video Solution

10. If $\left|\frac{z-25}{z-1}\right| = 5$, the value of $|z|$ is -

A. 3

B. 4

C. 5

D. 6

Answer: C

Watch Video Solution

11. If $a-1, a_2, , a_n$ are positive real numbers whose product is a fixed number c, then the minimum value of $a_1 + a_2 + + a_{n-1} + 2a_n$ is $a_{n-1} + 2a_n$ is b. $(n+1)c^{1/n}$ $2nc^{1/n}$ $(n+1)(2c)^{1/n}$

A. $n(2c)^{1/n}$

B. $(n+1)c^{1/n}$

C. $2nc^{1/n}$

D. $(n+1)(2c)^{1/n}$

Answer: A

Watch Video Solution

12. $\int_0^{\pi/4} \sin x d(x - [x])$ is equal to , where [x] denotes greatest integer function-

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

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

C. 1

D. None of these

Answer: B

Watch Video Solution

13. The solution of the primitive integral equation $\left(x^2+y^2\right)dy=xydx$ is $y=y(x)$. If $y(1)=1$ and $y(x_0)=e$, then x_0 is (a) $(b)(c)2\sqrt{(d)(e)\Big((f)(g)(h)e^{(i)2(j)}(k)-1(l)\Big)(m)(n)(o)}$ (p) (b) $(q)(r)2\sqrt{(s)(t)\Big((u)(v)(w)e^{(x)2(y)}(z)+1(aa)\Big)(bb)(cc)(dd)}$ (ee) (c) $(d)(e)\sqrt{(f)3(g)}(h)e(i)$ (j) (d) $(k)(l)\sqrt{(m)(n)(o)\dfrac{(p)(q)e^{(r)2(s)}(t)+1}{u}2(v)(w)(x)(y)(z)}$ (aa)

A. $\sqrt{2\left(e^2-1\right)}$

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

C. $\sqrt{3}e$

D. $\sqrt{\dfrac{1}{2}\left(e^2+1\right)}$

Answer: C

Watch Video Solution

14. Find the area of the smaller part of the circle $x^2 + y^2 = a^2$cut off by the line $x = \frac{a}{\sqrt{2}}$

A. $\frac{a^2}{2}\left(\frac{\pi}{2} + 1\right)$

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

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

D. None of these

Answer: B

Watch Video Solution

15. The number of real solution of the equation $\tan^{-1}\sqrt{x^2 - 3x + 7} + \cos^{-1}\sqrt{4x^2 - x + 3} = \pi$ is

A. One

B. Two

C. Zero

D. Infinite

Answer: C

Watch Video Solution

16. Let $h(x)$ be differentiable for all x and let $f(x) = (kx + e^x)h(x)$, where k is some constant. If $h(0) = 5, h'(0) = -2, and f'(0) = 18,$ then the value of k is 5 (b) 4 (c) 3 (d) 2.2.

A. 5

B. 4

C. 3

D. 2.2

Answer: C

Watch Video Solution

17. if $f(x) = (x^2 - 4)|(x^3 - 6x^2 + 11x - 6)| + \frac{x}{1 + |x|}$ then set of points at which the function if non differentiable is

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

B. $\{-2, 0, 3\}$

C. $\{-2, 2, 0\}$

D. {1 , 3}

Answer: D

Watch Video Solution

18. Vectors $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j} + 4\hat{k}$ are so placed that the end point of one vector is the starting point of the

next vector. Then the vectors are

A. not coplanar

B. coplanar but cannot form a triangle

C. coplanar and form triangle

D. coplanar and can form a right - angled triangle

Answer: C

Watch Video Solution

19. The distance of point $A(-2, 3, 1)$ from the line PQ through $P(-3, 5, 2)$, which makes equal angles with the axes is a. $2/\sqrt{3}$ b. $14/\sqrt{3}$ c. $16/\sqrt{3}$ d. $5/\sqrt{3}$

A. $2/\sqrt{3}$

B. $\sqrt{14/3}$

C. $16/\sqrt{3}$

D. $5/\sqrt{3}$

Answer: B

Watch Video Solution

20. If $a \neq b \neq c,$ If $ax + by + c = 0, bx + cy + a = 0$ and $cx + ay + b = 0$ are concurrent. Then the value of $2^{a^2b^{-1}c^{-1}}2^{b^2c^{-1}a^{-1}}2^{c^2a^{-1}b^{-1}}$

A. 8

B. 0

C. 2

D. None of these

Answer: A

Watch Video Solution

21. The number of values of x for which $\sin^{-1}\left(x^2-\frac{x^4}{3}+\frac{x^6}{9}\right)+\cos^{-1}\left(x^4-\left(\frac{x^8}{3}+\frac{x^{12}}{9}..\right)=\frac{\pi}{2},$ where `0lt=|x|

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

22. If the point $(1, a)$ lies in between the lines $x+y=1$ and $2(x+y)=3$ then a lies in (i)$(-\infty, 0)\cup(1, \infty)$ (ii)$\left(0, \frac{1}{2}\right)$ (iii) $(-\infty, 0)\cup\left(\frac{1}{2}, \infty\right)$ (iv) none of these

A. $(-\infty, 0)\cup(1, \infty)$

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

C. $(-\infty, 0) \cup \left(\frac{1}{2}, \infty\right)$

D. None of these

Answer: B

Watch Video Solution

23. A line L is perpendicular to the curve $y = \frac{x^2}{4} - 2$ at its point p and passes through $(0, -1)$. The coordinates of the point p are

A. $(2, -1)$

B. (6 , 7)

C. $(0, -2)$

D. (4 , 2)

Answer: D

Watch Video Solution

24. If g (x) = $\int_0^x \ln\left(\sec t \tan t - \sec^2 t + 1\right)$ dt , then set of value of x in $\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$ for which g(x) is increasing , is

A. $\left(-\frac{\pi}{6}, \frac{\pi}{6}\right)$

B. $\left(0, \frac{\pi}{2}\right)$

C. $\left(-\frac{\pi}{2}, 0\right)$

D. ϕ

Answer: D

Watch Video Solution

25. $f(x) = |ax - b| + c|x| \forall x \in (-\infty, \infty)$, where $a > 0, b > 0, c > 0$. Find the condition if $f(x)$ attains the minimum value only at one point.

A. $a \neq b$

B. $a \neq c$

C. $b \neq c$

D. a = b = c

Answer: B

Watch Video Solution

26. $I = \int \frac{dx}{e^x + 4.\, e^{-x}} dx =$

A. $\log\left(e^x + 4.\, e^x\right) + c$

B. log `(e^(2x) + 4) + c

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

D. None of these

Answer: C

Watch Video Solution

27. Let U be the universal set and $A \cup B \cup C = U$. Then $\{(A - B) \cup (B - C) \cup (C - A)\}$ is equal to -

A. $A \cup B \cup C$

B. $A \cup (B \cap C)$

C. $A \cap B \cap C$

D. $A \cap (B \cup C)$

Answer: C

Watch Video Solution

28. If $\Delta(x) = \begin{vmatrix} x & 1+x^2 & x^3 \\ \log(1+x^2) & e^x & \sin x \\ \cos x & \tan x & \sin^2 x \end{vmatrix}$, then-

A. $\Delta(x)$ is divisible by x

B. $\Delta(x) = 0$

C. $\Delta'(x) = 0$

D. None of these

Answer: A

Watch Video Solution

29. If $\overline{X}_1$ and $\overline{X}_2$ are the means of two series such that $\overline{X}_1 < \overline{X}_2$ and $\overline{X}$ is the mean of the combined series, then

A. $\overline{X} < \overline{X}_1$

B. $\overline{X} > \overline{X}_2$

C. $\overline{X} = \frac{\overline{X}_1 + \overline{X}_2}{2}$

D. $\overline{X}_1 < \overline{X} < \overline{X}_2$

Answer: D

Watch Video Solution

30. The mean age of a combined group of men and women is 25 yrs . If mean age of men is 26 and that of women is 21 , then percentage of men and women in the group , is ,

A. 60 , 40

B. 80 , 20

C. 20 , 80

D. 30 , 70

Answer: B

Watch Video Solution

31. If the joining the points (0,3) and (5,-2) is a tangent to the curve $y = \frac{c}{X+1}$, then value of c is -

A. 1

B. -2

C. 4

D. -4

Answer: 3

View Text Solution

32. The interval in which the function f(x)=sin x-cos x -ax +b decreases for all real values of x is given by

A. $a \geq \sqrt{2}$

B. $a \geq 1$

C. $a < \sqrt{2}$

D. $a < 1$

Answer: 1

Watch Video Solution

33. Set of values of b for which local extrema of the function f(x) are positive where $f(x) = \frac{2}{3}a^2x^3 - \frac{5a}{2}x^2 + 3x + b$ and maximum occurs at $x = \frac{1}{3}$ is -

A. $(-4, \infty)$

B. $(-3/8, \infty)$

C. $(-10, 3/8)$

D. None of these

Answer: 2

Watch Video Solution

34. If $z = \left(\frac{1+i\sqrt{3}}{1+i}\right)^{25}$, then arg(z) is equal to

A. $\frac{\pi}{12}$

B. $-\frac{\pi}{12}$

C. $\frac{7\pi}{12}$

D. $\frac{3\pi}{12}$

Answer: 1

Watch Video Solution

35. In which of the following is false

A. (A'OB)=AOB

B. (A'capA)=U

C. (AOB)=AOB

D. None of these

Answer: 4

View Text Solution

36. The number of real roots of $(x-1)^4+(x+1)^4=16$ is

A. 0

B. 1

C. 2

D. 3

Answer: 3

Watch Video Solution

37. The differential equation $\frac{dy}{dx} + Py = Qy^n,\ n > 2$ can be reduced to linear form y substituting $z = y^{n-1}$ b. $z = y^n$ c. $z = y^{n+1}$ d. $z = y^{1-n}$

A. $z = y^{n-1}$

B. $z = y^n$

C. $z = y^{n+1}$

D. $z = y^{1-n}$

Answer: 4

Watch Video Solution

38. Two tangents are drawn to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ such that product of their slope is c^2 . the locus of the point of intersection is

A. $x^2 - a^2 = c^2\left(y^2 + b^2\right)$

B. $x^2 + a^2 = c^2\left(y^2 - b^2\right)$

C. $y^2 + b^2 = c^2\left(x^2 - a^2\right)$

D. None of these

Answer: 3

Watch Video Solution

39. The value of $\int 2^{mx}.3^{nx}dx$ (when m, $n \in N$) is equal to:

A. $\frac{2^{mx} + 3^{nx}}{m\ln 2 + n\ln 3} + C$

B. $\frac{e^{(m\ln 2 + n\ln 3)x}}{m\ln 2 + n\ln 3} + C$

C. $\frac{2^{mx}.3^{nx}}{\ln(2^m.3^n)}+C$

D. None

Answer: 3

Watch Video Solution

40. $\int_{-10}^{0}\left|\frac{\frac{2[x]}{3x-[x]}}{\frac{2[x]}{3x-[x]}}\right| dx$ is

equal to ([.] is g.i.f.)

A. 10

B. $\frac{28}{3}$

C. $\frac{29}{3}$

D. None of these

Answer: 2

Watch Video Solution

41. if $y = \tan^{-1} x + \tan^{-1} \frac{1}{x} + \sec^{-1} x, then \quad y \in$

A. $\left[\frac{\pi}{2}, \pi\right) \cup \left(\pi, \frac{3\pi}{2}\right]$

B. $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$

C. (o, π)

D. $\left[o, \frac{\pi}{2}\right) \cup \left[\frac{\pi}{2}, \pi\right)$

Answer: 3

Watch Video Solution

42. A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is

A. 346

B. 140

C. 196

D. 280

Answer: 3

Watch Video Solution

43. One of the roots of the equation $8x^3 - 6x + 1 = 0$ is

A. $\cos 10^\circ$

B. $\cos 80^\circ$

C. $\cos 30^\circ$

D. $\sin 30^\circ$

Answer: 2

Watch Video Solution

44. In the interval $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ the equation $\log_{\sin\theta}(\cos 2\theta) = 2$ has

A. no solution

B. a unique solution

C. two solution

D. infinitely many solutions

Answer: 2

Watch Video Solution

45. Let

$f(x) = \left(x^2 - 3x + 2\right)\left(x^3 - 6x^2 + 11x - 6\right)| + |\sin\left(x + \frac{\pi}{4}\right)|$ The set of points at which the function f(x) is not differentiable in $[0, 2\pi]$ is

A. $\left\{1, 2, 3, \frac{3\pi}{4}, \frac{7\pi}{4}\right\}$

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

C. $\left\{3, \frac{3\pi}{4}, \frac{7\pi}{4}\right\}$

D. $\left\{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}\right\}$

Answer: 3

Watch Video Solution

46. Let p : price increases q : Demand falls The symbolic statements fo 'if demand does not fall then price does not increases' is

A. $q \to p$

B. $\sim q \to p$

C. $\sim q \rightarrow \sim p$

D. $\sim q \leftrightarrow \sim p$

Answer: 3

Watch Video Solution

47. Angle of elevation of top of a tower from a point 'A' due $E30^\circ N$ of tower on the ground is 45°. While angle of elevation of top of tower from a point 'B' due $N60^\circ W$ of tower is 30° where AB=50 m, then height of tower is

A. $\frac{50}{\sqrt{4-\sqrt{3}m}}$

B. $50\sqrt{4-\sqrt{3}m}$

C. $\frac{50}{\sqrt{4+\sqrt{3}m}}$

D. None of these

Answer: 3

View Text Solution

48. In an experiment with 15 observations of x the following results were available $\sum x^2 = 2830 \sum x = 170$ one observation that was 20 was found to be wrong and it was replaced by its correct value of 30 Then the corrected variance is (1) 8.33 (2) 78 (3) 188.66 (4) 177.33

A. 78.0

B. 188.66

C. 177.33

D. 8.33

Answer: 1

Watch Video Solution

49. The shortest distance between line $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4} is$

A. $\sqrt{30}$

B. $2\sqrt{30}$

C. $5\sqrt{30}$

D. $3\sqrt{30}$

Answer: 4

Watch Video Solution

50. Ratio of volumes of tetrahedrons having coterminus edees $\bar{a}+\bar{b}, \bar{b}+\bar{c}, \bar{c}+\bar{a}$ and $\bar{a}, \bar{b}, \bar{c}$ respectively is equal to

A. $1:1$

B. $2:1$

C. $3:1$

D. $4:1$

Answer: 2

Watch Video Solution

51. Table

$$If \Delta_r = \begin{vmatrix} (2r) & x & N(N+1) \\ (6r^2-1) & y & N^2(2N+3) \\ (4r^3-2Nr) & z & N^3(N+1) \end{vmatrix}$$

where N $\in$ natural numbers. Then $\sum_{r=1}^{N} \Delta_r$ is

A. N

B. N^2

C. Zero

D. None of these

Answer: 3

Watch Video Solution

52. If $x = a\cos\theta, y = b\sin\theta,$ then $\frac{d^3y}{dx^3}$ is equal to

A. $\frac{-3b}{a^3}\cos ec^4\theta\cot^4\theta$

B. $\frac{3b}{a^3}\cos ec^4\theta\cot\theta$

C. $\frac{-3b}{a^3}\cos ec^4\theta\cot\theta$

D. None of these

Answer: 3

Watch Video Solution

53. The circles $ax^2+ay^2+2g_1x+2f_1y+c_1=0$ and $bx^2+by^2+2g_2x+2f_2y+c_2=$ $(a\neq 0 \text{ and } b\neq 0)$ cut orthogonally, if

A. $g_1g_2+f_1f_2=ac_1+bc_2$

B. $2(g_1g_2+f_1f_2)=bc_1+ac_2$

C. $bg_1g_2+af_1f_2=bc_1+ac_2$

D. $g_1g_2+af_1f_2=c_1+c_2$

Answer: 2

Watch Video Solution

54. If AB is a focal chord of $x^2 - 2x + y - 2 = 0$ whose focus is S and $AS = l_1$, then find BS.

A. $\frac{l_1}{2l_1 - 1}$

B. $\frac{l_1}{4l_1 - 1}$

C. $\frac{l_1}{2l_1 + 1}$

D. None of these

Answer: 2

Watch Video Solution

55. If $y = y(x)$ and $\frac{2 + \sin x}{y + 1}\left(\frac{dy}{dx}\right) = -\cos x, y(0) = 1,$ then $y\left(\frac{\pi}{2}\right)$ equals (a) $(b)(c)(d)\frac{1}{e}3(f)(g)(h)$ (i) (b) $(j)(k)(l)\frac{2}{m}3(n)(o)(p)$ (q) (c)

$(r)(s) - (t)\frac{1}{u}3(v)(w)(x)$ (y) (d) 1

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

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

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

D. 1

Answer: 1

Watch Video Solution

56. The area bounded by the curve $y = \left[\frac{x^2}{64} + 2\right], y = x - 1, y = x - 1$ and $x = 0$ above the x-axis will be-(Where [] represents greatest integer function)

A. 2

B. 3

C. 4

D. non of these

Answer: 3

Watch Video Solution

57. If the function $f(x) = x^3 + 3(1-7)x^2 + 3\left(a^2 - 9\right)x - 1$ has a positive point Maximum , then

A. $a \in (3, \infty) \cup (-\infty, -3)$

B. $a \in (-\infty, -3) \cup (3, 29/7)$

C. $(-\infty, 7)$

D. $(-\infty, 29/7)$

Answer: 2

Watch Video Solution

58. The range of $f(x) = [1 + \sin x] + \left[2 + s \in \frac{2}{x}\right] + \left[3 + s \in \frac{x}{3}\right] + + \left[n + s \in \frac{x}{n}\right] \forall x$, where [.] denotes the greatest integer function, is,

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

$\left\{\frac{n^2 + n - 2^{\square}}{2}, \frac{n(n+1)}{2}\frac{n^2 + n + 2}{2}\right\}$ $\left[\frac{n(n+1)}{2}, \frac{n^2 + n + 2}{2}\right]$

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

B. $\left\{\frac{n(n+1)}{2}\right\}$

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

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

Answer: 4

Watch Video Solution

59. If sum $\frac{1}{7} + \frac{1.3}{7.9} + \frac{1.3.5}{7.9.11} + \ldots.$ up to 20 terms is equal to $\frac{m}{n}$, proper fraction, then n - 4m =

A. 1

B. 2

C. 3

D. 4

Answer: 1

View Text Solution

60. A and B toss a coin alternately till one of them gets a head and wins the game. If A starts the game, find the probability that B will win the game.

A. $1/2$

B. $1/3$

C. $1/4$

D. $1/5$

Answer: 2

Watch Video Solution