MATHS

BOOKS - NIKITA MATHS (HINGLISH)

QUESTION PAPER MHT-CET 2016

Mcqs

1. Let $X \sim B(n, p)$, if E(X)=5,Var(X) $= 2.5$ then $P(X < 1)$ is equal to

A. $\left(\frac{1}{2}\right)^{11}$

B. $\left(\frac{1}{2}\right)^{10}$

C. $\left(\frac{1}{2}\right)^{6}$

D. $\left(\frac{1}{2}\right)^{9}$

Answer: B

Watch Video Solution

2. Derivative of $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right)$ with respect to $\sin^{-1}\left(3x-4x^3\right)$ is

A. $\frac{1}{\sqrt{1-x^2}}$

B. $\frac{3}{\sqrt{1-x^2}}$

C. 3

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

Answer: D

Watch Video Solution

3. Form the differential equation of the family of circles touching the y-axis at origin.

A. $\left(x^2+y^2\right)\frac{dy}{dx}-2xy=0$

B. $x^2-y^2\frac{dy}{dx}+2xy=0$

C. $\left(x^2-y^2\right)\frac{dy}{dx}-2xy=0$

D. $\left(x^2+y^2\right)\frac{dy}{dx}+2xy=0$

Answer: B

Watch Video Solution

4. If $A=\begin{bmatrix}1&1&0\\2&1&5\\1&2&1\end{bmatrix}$ then $a_{11}A_{21}+a_{12}A_{22}+a_{13}A_{23}$ is equal to

A. 1

B. 0

C. -1

D. 2

Answer: B

Watch Video Solution

5. If the Rolle's theorem for $f(x) = e^x(\sin x - \cos x)$ is verified on $\left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$ then the value of C is

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

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

C. $\frac{3\pi}{4}$

D. π

Answer: D

Watch Video Solution

6. The joint equation of lines passing through the origin and trisecting the first quadrant is

A. $x^2 + \sqrt{3}xy - y^2 = 0$

B. $x^2 - \sqrt{3}xy - y^2 = 0$

C. $\sqrt{3}x^2 - 4xy + \sqrt{3}y^2 = 0$

D. $3x^2 - y^2 = 0$

Answer: C

Watch Video Solution

7. If $2\tan^{-1}(\cos x) = \tan^{-1}(2\cos ecx)$, then sinx +cosx is equal to

A. $2\sqrt{2}$

B. $\sqrt{2}$

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

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

Answer: B

Watch Video Solution

8. Direction cosines of the line $\frac{x+2}{2} = \frac{2y-5}{3}, z = -1$ are

A. $\frac{4}{5}, \frac{3}{5}, 0$

B. $\frac{3}{5}, \frac{4}{5}, \frac{1}{5}$

C. $\frac{-3}{5}, \frac{4}{5}, 0$

D. $\frac{4}{5}, \frac{-2}{5}, \frac{1}{5}$

Answer: A

Watch Video Solution

9. $\int \frac{dx}{\sqrt{8+2x-x^2}}$

A. $\frac{1}{3}\sin^{-1}\left(\frac{x-1}{3}\right)+c$

B. $\sin^{-1}\left(\frac{x-1}{3}\right)+c$

C. $\frac{1}{3}\sin^{-1}\left(\frac{x+1}{3}\right)+c$

D. $\sin^{-1}\left(\frac{x+1}{3}\right)+c$

Answer: D

Watch Video Solution

10. The approximate value of $f(X)=x^3+5x^2-7x+9$ at x= 1.1 is

A. 8.6

B. 8.5

C. 8.4

D. 8.3

Answer: A

Watch Video Solution

11. IF r.v X : waiting time in minutes for bus and p.d.f of X is given by

$$f(x) = \begin{cases} \frac{1}{5} & 0 \leq x \leq 5 \\ 0 & \text{otherwise}, \end{cases}$$

then probabaility of waiting time not more than 4 minutes is

A. 0.3

B. 0.8

C. 0.2

D. 0.5

Answer: B

Watch Video Solution

12. In ΔABC, $(a-b)^2\cos^2\frac{C}{2}+(a+b)^2\sin^2\frac{C}{2}$ is equal to

A. b^2

B. c^2

C. a^2

D. $a^2+b^2+c^2$

Answer: B

Watch Video Solution

13. Derivative of $\log(\sec\theta+\tan\theta)$ with respect to $\sec\theta$ at $\theta=\frac{\pi}{4}$

A. 0

B. 1

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

D. $\sqrt{2}$

Answer: B

Watch Video Solution

14. The joint equation of bisectors of angles between lines $x = 5$ and $y = 3$ is

A. $(x - 5)(y - 3) = 0$

B. $x^2 - y^2 - 10x + 6y + 16 = 0$

C. $xy = 0$

D. $xy - 5x - 3y + 15 = 0$

Answer: B

Watch Video Solution

15. A particle moves along the curve $6y = x^3 + 2$. Find the points on the curve at which y-co-ordinate is changing 8 times as fast as the x-co-ordinate.

Watch Video Solution

16. If the function $f(x)$ defined by $f(x) = \begin{cases} x\sin\left(\frac{1}{x}\right) & \text{for} x \neq 0 \\ k & \text{for} x = 0 \end{cases}$ is continous at $x = 0$, then $k =$

A. 0

B. 1

C. -1

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

Answer: A

Watch Video Solution

17. If $y = e^m \sin^{-1} x$ and $(1 - x^2)\left(\frac{dy}{dx}\right)^2 = At^2$, then A is equal to

A. m

B. $-m$

C. m^2

D. $-m^2$

Answer: C

Watch Video Solution

18. $\int\left(\frac{4e^x - 25}{2e^x - 5}\right)dx = Ax + B\frac{\log}{2e^x} - \frac{5}{+c}$ then

A. $A = 5, B = 3$

B. $A = 5, B = -3$

C. $A = -5, B = 5$

D. $A = -5, B - 3$

Answer: B

Watch Video Solution

19. $\frac{\tan^{-1}\left(\sqrt{3}\right) - \sec^{-1}(-2)}{\cos ec^{-1}\left(-\sqrt{2}\right) + \cos^{-1}\left(-\frac{1}{2}\right)}$ is equal to

A. $\frac{4}{5}$

B. $\frac{-4}{5}$

C. $\frac{3}{5}$

D. 0

Answer: B

Watch Video Solution

20. For what value of k, the function defined by

$$f(x) = \begin{cases} \frac{\log(1+2x)\sin x^{\circ}}{x^2}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$$

is continuous at x = 0 ?

A. 2

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

C. $\frac{\pi}{90}$

D. $\frac{90}{\pi}$

Answer: C

Watch Video Solution

21. If $\log_{10}\left(\frac{x^2-y^2}{x^2+y^2}\right) = 2$, then $\frac{dy}{dx} =$

A. $\frac{-99x}{101y}$

B. $\frac{99x}{101y}$

C. $\frac{-99y}{101x}$

D. $\frac{99y}{101x}$

Answer: A

Watch Video Solution

22. Evaluate the following :

$$\int_{-\pi/2}^{\pi/2} \log\left(\frac{2-\sin x}{2+\sin x}\right) dx$$

A. 1

B. 3

C. 2

D. 0

Answer: D

Watch Video Solution

23. $\int\left(\frac{\left(x^2+2\right)a^{\left(x+\tan^{-1}x\right)}}{x^2+1}\right)dx =$

A. $(\log a)a^{x+\tan^{-1}}+c$

B. $\frac{x+\tan^{-1}}{\log a}+c$

C. $\frac{a^{x+\tan^{-1}x}}{\log a}+c$

D.

Answer: C

Watch Video Solution

24. The degree and order of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^3\right]^{\frac{7}{3}}=7\left(\frac{d^2y}{dx^2}\right)$ respectively are

A. 3 and 7

B. 3 and 2

C. 7 and 3

D. 2 and 3

Answer: B

Watch Video Solution

25. the acute angle between the line $\bar{y} = \left(\hat{i} + 2\hat{j} + \hat{k}\right) + \lambda\left(\hat{i} + \hat{j} + \hat{k}\right)$ and the plane $\bar{y}.\left(2\hat{i} - \hat{j} + \hat{k}\right) = 5$ is

A. $\cos^{-1}\left(\frac{\sqrt{2}}{3}\right)$

B. $\sin^{-1}\left(\frac{\sqrt{2}}{3}\right)$

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

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

Answer: B

Watch Video Solution

26. The area of the region bounded by the curve $y = 2x - x^2$ and X-axis is

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

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

C. $\frac{5}{3}$ sq.units

D. $\frac{8}{3}$ sq.units

Answer: B

View Text Solution

27. If $\int \frac{f(x)}{\log(\sin x)} dx = \log[\log \sin x] + c$, then f(x) is equal to

A. $\cot x$

B. $\tan x$

C. $\sec x$

D. $\cos ecx$

Answer: A

Watch Video Solution

28. If A and B are foot of perpendicular drawn from point Q(a,b,c) to the planes yz and zx, then equation of plane through the point A,B, and O is

A. $\frac{x}{a} + \frac{y}{b} - \frac{z}{c} = 0$

B. $\frac{x}{a} - \frac{y}{b} + \frac{z}{c} = 0$

C. $\frac{x}{a}-\frac{y}{b}-\frac{z}{c}=0$

D. $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=0$

Answer: A

Watch Video Solution

29. If $\bar{a}=\hat{i}+\hat{j}-2\hat{k}, \bar{b}=2\hat{i}-\hat{j}+\hat{k}$ and $\bar{c}=m\bar{a}+n\bar{b},$ then m+n =

A. 0

B. 1

C. 2

D. -1

Answer: C

View Text Solution

30. $\int_0^{\frac{\pi}{2}} \left(\frac{\sqrt[n]{\sec x}}{\sqrt[n]{\sec x} + \sqrt[n]{\operatorname{cosec} x}} \right) dx$ is equal to

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

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

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

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

Answer: C

Watch Video Solution

31. If the p.d.f. of a r.v. X is given as

x_i	-2	-1	0	1	2
$P(X = x_i)$	0.2	0.3	0.15	0.25	0.1

then F(0)=

A. $P(X < 0)$

B. $P(X > 0)$

C. $1 - P(X > 0)$

D. $1 - P(X < 0)$

Answer: C

Watch Video Solution

32. The particular solution of the differential equation $y(1 + \log x)\frac{dx}{dy} - \log x = 0, \quad \text{when} x = e, y = e^2$ is

A. $y = ex \log x$

B. $ey = ex \log x$

C. $xy = e \log x$

D. $y \log x = ex$

Answer: A

Watch Video Solution

33. M and N are mid-point of the diagnols AC and BD respectivley of quadrilateral ABCD, then $\overline{AB} + \overline{AD} + \overline{CB} + \overline{CD}$=

A. $2\overline{MN}$

B. $2\overline{NM}$

C. $4\overline{MN}$

D. $4\overline{NM}$

Answer: C

Watch Video Solution

34. IF $\sin x$ is the integerating factor (I.F) of the linear differential equation $\frac{dy}{dx} + py = Q$ then P is

A. $\log \sin x$

B. $\cos x$

C. $\tan x$

D. $\cot x$

Answer: D

Watch Video Solution

35. Which of the following equation does not represent a pair of lines ?

A. $x^2 - x = 0$

B. $xy - x = 0$

C. $y^2 - x + 1 = 0$

D. $xy + x + y + 1 = 0$

Answer: C

Watch Video Solution

36. Probability of guessing correctly atleast 7 out of 10 answers in a 'True' or 'False' test is equal to

A. $\frac{11}{64}$

B. $\frac{11}{32}$

C. $\frac{11}{16}$

D. $\frac{27}{32}$

Answer: A

Watch Video Solution

37. Priencipal solutions of the equation $\sin 2x + \cos 2x = 0$. Where $\pi < x < 2\pi$ are

A. $\frac{7\pi}{8}, \frac{11\pi}{8}$

B. $\frac{9\pi}{8}, \frac{13\pi}{8}$

C. $\frac{11\pi}{8}, \frac{15\pi}{8}$

D. $\frac{15\pi}{8}, \frac{19\pi}{8}$

Answer: C

Watch Video Solution

38. If line joining points A and B having position vectors $6\bar{a} - 4\bar{b} + 4\bar{c}$ and $-4\bar{c}$ respectively, and the line joining the points C and D having position vectors $-\bar{a} - 2\bar{b} - 3\bar{c}$ and $\bar{a} + 2\bar{b} - 5\bar{c}$ intersect, then their point of intersection is (A) B (B) C (C) D (D) A

A. B

B. C

C. D

D. A

Answer: A

Watch Video Solution

39. If $A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}, B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then $\left(B^{-1}A^{-1}\right)^{-1}$ is equal to

A. $\begin{vmatrix} 2 & -2 \\ 2 & 3 \end{vmatrix}$

B. $\begin{vmatrix} 2 & 2 \\ -2 & 3 \end{vmatrix}$

C. $\begin{vmatrix} 2 & -3 \\ 2 & 2 \end{vmatrix}$

D. $\begin{vmatrix} 1 & -1 \\ -2 & 3 \end{vmatrix}$

Answer: A

Watch Video Solution

40. If p : Every square is a rectangle.

q : Every rhombus is a kite, then truth values of $p \rightarrow q$ and $p \leftrightarrow q$ are

_____ and _____ respectively.

A. F,F

B. T,F

C. F,T

D. T,T

Answer: D

Watch Video Solution

41. If $G(\bar{g}), H(\bar{h})$ and $P(\bar{p})$ are centroid, orthocenter and circumcenter of a triangle and $x\bar{p} + y\bar{h} + z\bar{g} = 0$ then $(x, y, z) =$

A. $(1, 1, -2)$

B. $(2, 1, -3)$

C. $(1, 3, -4)$

D. $(2, 3, -5)$

Answer: B

Watch Video Solution

42. Which of the following quantified statement is ture ?

A. The square of every real number is positive

B. There exists a real number whose square is negative

C. There exists a real number whose square is not negative

D. Every real number is rational

Answer: C

Watch Video Solution

43. The general solution of the equation $\tan^2 x = 1$ is

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

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

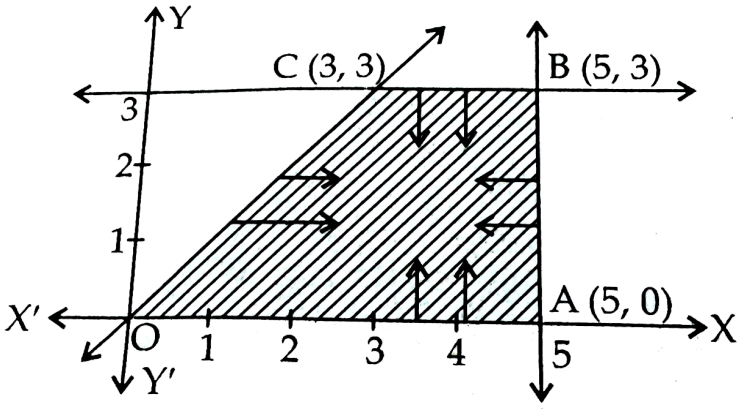
C. $n\pi \pm \frac{\pi}{4}, n \in Z$

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

Answer: C

Watch Video Solution

44. The shaded part of the given figure indicates the feasible region



Then the constraints are

A. $x, y \geq 0, x + y \geq 0, x \geq 5, y \leq 3$

B. $x, y \geq 0, x - y \geq 0, x \leq 5, y \leq 3$

C. $x, y \geq 0, x - y \geq 0, x \leq 5, y \geq 3$

D. $x, y \geq 0, x - y \leq 0, x \leq 5, y \leq 3$

Answer: B

Watch Video Solution

45. Direction rations of the line which is perpendicular to the lines with direction ratios $-1, 2, 2$ and $0, 2, 1$ are

A. $1, 1, 2$

B. $2, -1, 2$

C. $-2, 1, 2$

D. $2, 1, -2$

Answer: B

Watch Video Solution

46. If matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ such that $Ax = I$ then x=

A. $\frac{1}{5}\begin{vmatrix} 1 & 3 \\ 2 & -1 \end{vmatrix}$

B. $\frac{1}{5}\begin{vmatrix} 4 & 2 \\ 4 & -1 \end{vmatrix}$

C. $\frac{1}{5}\begin{vmatrix} -3 & 2 \\ 4 & -1 \end{vmatrix}$

D. $\frac{1}{5}\begin{vmatrix} -1 & 2 \\ -1 & 4 \end{vmatrix}$

Answer: C

Watch Video Solution

47. If $\bar{a} = \hat{i} + \hat{j} + \hat{k}, \bar{b} = 2\hat{i} + \lambda\hat{j} + \hat{k}, \bar{c} = \hat{i} - \hat{j} + 4\hat{k}$ and $\bar{a}.\left(\bar{b} \times \bar{c}\right) = 10$, then λ is equal to

A. 6

B. 7

C. 9

D. 10

Answer: A

Watch Video Solution

48. If $r.v.\ X \sim B\left(n=5, P=\frac{1}{3}\right)$ then $P(2<X<4)=$

A. $\frac{80}{243}$

B. $\frac{40}{243}$

C. $\frac{40}{343}$

D. $\frac{80}{343}$

Answer: B

Watch Video Solution

49. The objective function $z=x_1+x_2$, subject to $x_1+x_2 \leq 10, -2x_1+3x_2 \leq 15, x_1 \leq 6, x_1, x_2 \leq 0$ has maximum value of the feasible region.

A. at only one point

B. at only two points

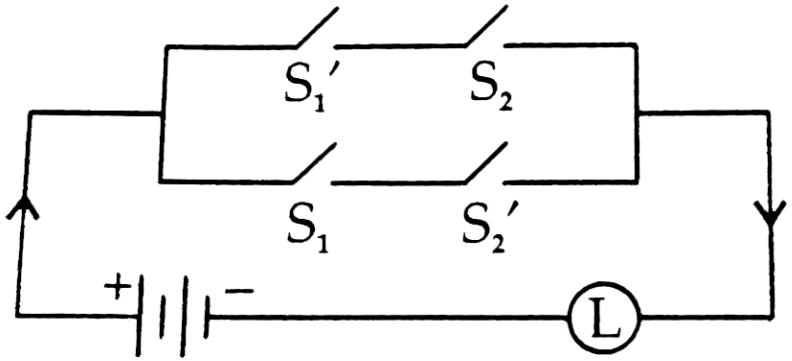
C. at every point of the segment joining to points

D. at every point of the line joining two points

Answer: C

Watch Video Solution

50.



Symbolic form of the given switching circuit is equivalent to

A. $p \vee \sim q$

B. $p \wedge \sim q$

C. $p \leftrightarrow q$

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

Answer: D

Watch Video Solution