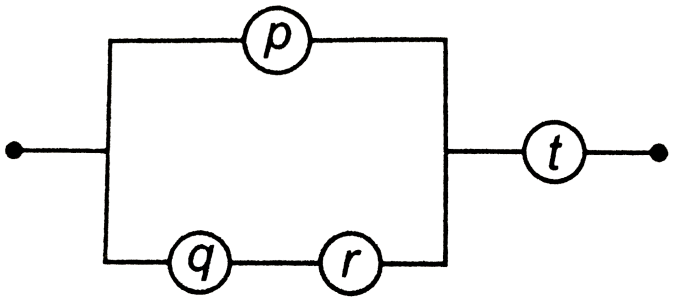
MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 24

Paper 2 Mathmatics

1. The switching function for the following network is



A. $(p + q \cdot r) + r$

B. $(p + q \cdot r) \cdot t$

C. $p \cdot r + q \cdot r$

D. None of these

Answer: b

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2. Find the incentre of the triangle with vertices $(1, \sqrt{3}), (0, 0)$ and $(2, 0)$

A. $\left(1, \frac{\sqrt{3}}{2}\right)$

B. $\left(\frac{2}{3}, \frac{1}{\sqrt{3}}\right)$

C. $\left(\frac{2}{3}, \frac{\sqrt{3}}{2}\right)$

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

Answer: d

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3. Find the length of the latus rectum of the parabola

$$169\left\{(x-1)^2+(y-3)^2\right\}=(5x-12y+17)^2$$

.

A. $\frac{14}{13}$

B. $\frac{26}{13}$

C. $\frac{12}{13}$

D. None of these

Answer: b

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4. The solution set of the inequation $2x + y > 5$ is

A. half plane that contains the origin

B. open half plane not containing the origin

C. whole xy-plane except the points typing on the line 2x + y = 5

D. None of these

Answer: b

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5. Let A and B be two events such that $P(A) = 0.3$ and $P(A \cup B) = 0.8$. If A and B are independent events, then $P(B) =$

A. $\frac{5}{7}$

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

C. 1

D. None of these

Answer: a

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6. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$, then $\frac{dy}{dx}$ is equal to

A. $\frac{x}{y}$

B. $-\frac{x}{y}$

C. $\frac{y}{x}$

D. $-\frac{y}{x}$

Answer: b

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7. $\int \frac{\left(\tan^{-1} x\right)^3}{1+x^2} dx$ is equal to

A. $3\left(\tan^{-1} x\right)^2 + c$

B. $\frac{\left(\tan^{-1} x\right)^4}{4} + c$

C. $\left(\tan^{-1} x\right)^4 + c$

D. None of these

Answer: b

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8. The solution of $\frac{dy}{dx} = 2^{y-x}$ is

A. $2^x + 2^y$

B. $2^x - 2^y$

C. $\frac{1}{2^x} - \frac{1}{2^y} = c$

D. $\frac{1}{2^x} + \frac{1}{2^y} = c$

Answer: c

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9. If the line y = 7x - 25 meets the circle $x^2 + y^2 = 25$ in the points A,B then the distance between A and B is

A. $\sqrt{10}$

B. 10

C. $5\sqrt{2}$

D. 5

Answer: c

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10. Dual of $x \cdot (y + x) = x$ is

A. $x + (y \cdot x) = x$

B. $x \cdot (y \cdot x) = x$

C. $(x + y) \cdot (x + x) = x$

D. None of these

Answer: a

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11. The angle between the tangents drawn at the points $(5, 12)$ and $(12, -5)$ to the circle $x^2 + y^2 = 169$ is:

A. 45°

B. 60°

C. 30°

D. 90°

Answer: d

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12. Equation of radical axis of the circles $x^2 + y^2 - 3x - 4y + 5 = 0$ and $2x^2 + 2y^2 - 10x - 12y + 12 = 0$ is

A. 2x + 2y - 1 = 0

B. 2x + 2y + 1 = 0

C. x + y + 7 = 0

D. x + y -7 = 0

Answer: a

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13. Given two vectors are $\hat{i}-\hat{j}$ and $\hat{i}+2\hat{j}$. The unit vector coplanar with the two vectors nad perpendicular to first is (A) $\frac{1}{\sqrt{2}}\left(\hat{i}+\hat{j}\right)$ (B) $\frac{1}{\sqrt{5}}\left(2\hat{i}+\hat{j}\right)$ (C) $\pm\frac{1}{\sqrt{2}}\left(\hat{i}+\hat{j}\right)$ (D) none of these

A. $\frac{1}{\sqrt{2}}\left(\hat{i}+\hat{k}\right)$

B. $\frac{1}{\sqrt{5}}\left(2\hat{i}+\hat{j}\right)$

C. $\pm\frac{1}{\sqrt{2}}\left(\hat{i}+\hat{j}\right)$

D. None of these

Answer: c

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14. The value of $\lim_{x \to 7} \left(\frac{2 - \sqrt{x - 3}}{x^2 - 49} \right)$ is

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

B. $-\frac{2}{49}$

C. $-\frac{1}{56}$

D. $-\frac{1}{59}$

Answer: c

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15. If $4x^2 + py^2 = 45$ and $x^2 - 4y^2 = 5$ cut orthogonally, then the value of p is

A. $\frac{1}{9}$

B. 9

C. 3

D. 18

Answer: b

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16. $\int_0^{\pi} e^{\sin^2 x} \cos^3 x dx$

A. -1

B. 0

C. 1

D. π

Answer: b

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17. If the sum of 12th and 22nd terms of an AP is 100 then the sum of the first 33 terms of an AP is

A. 1700

B. 1650

C. 3300

D. 3400

Answer: b

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18. The negation of the statement $''2+3=5$ and $8<10$ is-

A. $2+3 \neq 5$and <10

B. 2 + 3 = 5 = and $8<10$

C. 2 + 3 ne 5 or $8<10$

D. None of these

Answer: c

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19. If $\begin{bmatrix} 2+x & 3 & 4 \\ 1 & -1 & 2 \\ x & 1 & -5 \end{bmatrix}$ is a singular matrix then x is

A. $\frac{13}{25}$

B. $-\frac{25}{13}$

C. $\frac{5}{13}$

D. $\frac{25}{13}$

Answer: b

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20. A straight line through $P(1, 2)$ is such that its intercept between the axes is bisected at P its equation :

A. x + y = -1

B. x + y = 3

C. x + 2y = 5

D. 2x + y = 4

Answer: d

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21. The eccentricity of an ellipse with its centre at the origin is $\frac{1}{2}$. If one of the directrices is x = 4 , then the equation of ellipse is

A. $3x^2 + 4y^2 = 1$

B. $3x^2 + 4y^2 = 12$

C. $4x^2 + 3y^2 = 12$

D. $4x^2 + 3y^2 = 1$

Answer: b

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22. The diection cosines of two lines are proportional to $(2, 3, -6)$ and $(3, -4, 5)$, then the acute angle between them is (A) $\cos^{-1}\left\{\frac{49}{36}\right\}$ (B) $\cos^{-1}\left\{\frac{18\sqrt{2}}{35}\right\}$ (C) 96^0 (D) $\cos^{-1}\left(\frac{18}{35}\right)$

A. $\cos^{-1}\left(\frac{49}{36}\right)$

B. $\cos^{-1}\left(\frac{18\sqrt{2}}{35}\right)$

C. 96°

D. $\cos^{-1}\left(\frac{18}{35}\right)$

Answer: b

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23. Find the probability that a leap year will have 53 Friday or 53 Saturdays.

A. $2/7$

B. $3/7$

C. $4/7$

D. $1/7$

Answer: b

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24. If $f(x) = \sqrt{1 + \cos^2(x^2)}, then f'\left(\frac{\sqrt{\pi}}{2}\right)$ is $\frac{\sqrt{\pi}}{6}$ (b) $-\sqrt{\pi/6}\, 1/\sqrt{6}$ (d) $\pi/\sqrt{6}$

A. $\frac{\sqrt{\pi}}{6}$

B. $-\sqrt{\frac{\pi}{6}}$

C. $\frac{1}{\sqrt{6}}$

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

Answer: b

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25. The sum of the series $1^3 + 2^3 + 3^3 + \ldots + 15^3$ is

A. 22000

B. 10000

C. 14400

D. 15000

Answer: c

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26. Degree of the differential equation $e^{\frac{dy}{dx}} = x$ is

A. 1

B. 2

C. 3

D. None of these

Answer: a

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27. In a Boolean Algebra B, for all x in B. 1' is equal to

A. 0

B. 1

C. x - 1

D. None of these

Answer: a

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28. A survey shows that 63% of the Americans like cheese 4 whereas 76% like apples. If x% of the Americans likes both cheese and apples, find the value of x.$(39 \leq x \leq 63)$

A. x = 39

B. x = 63

C. $39 \leq x \leq 63$

D. None of these

Answer: c

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29. Circle $x^2 + y^2 - 2x - \lambda x - 1 = 0$ passes through to fixed points, coordinates of the points are

A. (0 ± 1)

B. $(\pm 1, 0)$

C. (0,1) and (0,2)

D. (0,-1) and (0,-2)

Answer: a

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30. If $|a| = 3, |b| = 4$, then a value of λ for which $a + \lambda b$ is perpendicular to $a - \lambda b$ is

A. $\frac{9}{16}$

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

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

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

Answer: b

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31. The minimum value of P = 6x + 16y subject to constraints $x \leq 40, y \leq 20$ and $x, y \geq 0$ is

A. 240

B. 320

C. 0

D. None of these

Answer: c

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32. If a dice is thrown twice, the probability of occurrence of 4 atleast once is

A. $\frac{11}{36}$

B. $\frac{7}{12}$

C. $\frac{35}{36}$

D. None of these

Answer: a

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33. If $y = \tan^{-1}(\sec x - \tan x)$, then $\frac{dy}{dx}$ is equal to

A. 2

B. -2

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

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

Answer: d

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34. $\int_0^8 |x-5|dx = 17$

A. 17

B. 12

C. 9

D. 18

Answer: a

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35. Let A = {1, 2, 3, 4) and R be the relation on A defined by {(a, b) : a, be A, a Ã— b is an even number}, then the range of R is

A. {1,2,3,4}

B. {2,4}

C. {2,3,4}

D. {1,2,4}

Answer: b

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36. Which of the following is not a statement ?

A. Roses are red

B. New Delhi is in India

C. Every square is a rectangle

D. Alas ! I have failed

Answer: d

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37. The number of point at which the function $f(x) = |x-1| + [x-2] + \cos x,$ where $x \in [0, 4]$ is not continuous, is $([.]$ denotes greatest intergest function}

A. 1

B. 2

C. 3

D. 0

Answer: d

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38. The radius of a cylinder is increasing at the rate of $3ms^{-1}$ and its altitude is decreasing at the rate of $4ms^{-1}$. The rate of change of

volume when radius is $4m$ and altitude is 6m is

A. $80\pi m^3 / s$

B. $144\pi m^3 / s$

C. $80m^3 / s$

D. $64m^3 / s$

Answer: a

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39. Integrating factor of differential equation $\cos x \frac{dy}{dx} + y \sin x = 1$ is (a) $(b)(c)\cos x(d)$ (e) (b) $(f)(g)\tan x(h)$ (i) (c) $(d)(e)\sec x(f)$ (g) (d) $(h)(i)\sin x(j)$ (k)

A. sec x

B. tan x

C. sin x

D. cot x

Answer: a

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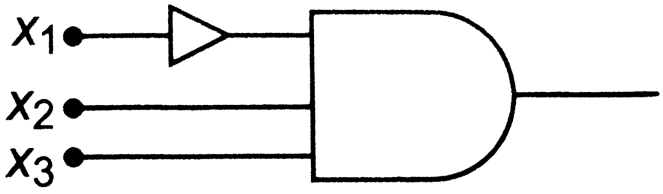
40. Find the output for the given input for the given circuit



A. $x_1 \cdot x_2 \cdot x_3$

B. x'_1, x'_2, x'_3

C. $x_1 \cdot x_2 x_3$

D. $x_1 + x_2 x_3$

Answer: c

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41. Let S be set of all real numbers and let R be relation on s , defined by $aRb \Leftrightarrow |a-b| \leq 1.$ then R is

A. symmetric and transitive but not reflexive

B. reflexive and transitive but not symmetric

C. reflexive and symmetric but not transitive

D. an equivalence relation

Answer: c

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42. If e and e' are the eccentricities of the ellipse $5x^2 + 9y^2 = 45$ and the hyperbola $5x^2 - 4y^2 = 45$ respectively , then ee' is equal to

A. 9

B. 4

C. 5

D. 1

Answer: d

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43. If O is origin and C is the mid - point of A (2, -1) and B (-4, 3) . Then value of OC is

A. $\hat{i} + \hat{j}$

B. $\hat{i} - \hat{j}$

C. $-\hat{i} + \hat{j}$

D. $-\hat{i} - \hat{j}$

Answer: c

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44. A letter is taken out at random from 'ASSISTANT and another is taken out from

'STATISTICS. The probability that they are the same letters, is

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

B. $\frac{13}{90}$

C. $\frac{19}{90}$

D. None of these

Answer: c

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45. IF t is a parameter, then $x = a\left(t + \frac{1}{t}\right)$ and $y = b\left(t - \frac{1}{t}\right)$ represents

A. an ellipse

B. a circle

C. a pair of straight lines

D. a hyperbola

Answer: d

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46. $\int \frac{x^2-1}{x^4+x^2+1}dx$ is equal to

A. $\log\left(x^4+x^2+1\right)+c$

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

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

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

Answer: c

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47. $\int_{-1}^{0} \frac{dx}{x^2+2x+2}$ is equal to

A. 0

B. $\pi/4$

C. $\pi/2$

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

Answer: b

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48. The number of normals drawn to the parabola $y^2 = 4x$ from the point $(1, 0)$ is

A. 0

B. 1

C. 2

D. 3

Answer: b

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49. If A, B, C are the vertices of a triangle whose position vectros are $\vec{a}, \vec{b}, \vec{c}$ and G is the centroid of the ΔABC, then $\overline{GA} + \overline{GB} + \overline{GC} =$

A. 0

B. A+B+C

C. $\frac{a+b+c}{3}$

D. $\frac{a-b-c}{3}$

Answer: a

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50. If $y = \sec\left(\tan^{-1} x\right)$, then $\frac{dy}{dx}$ at $x = 1$ is equal to: $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) 1 (d) $\sqrt{2}$

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

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

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

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

Answer: d

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