MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

MOCK TEST PAPER -IV

Select The Correct Answer

1. From 50 students taking examinations in mathematics ,physics and chemistry ,37 passed mathematics, 24 physics and 43 chemistry. At most 19 passed mathematics and physics, at most 29 Mathematics and Chemistry and at most 20 Physics and Chemistry. The largest possible number that could have passed all three examinations is:

A. 9

B. 10

C. 12

D. none of these

Answer: D

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2. If two sets a and b have 99 elements in common then the number of elements common to the sets A x B and B xA is

A. 2^{99}

B. 99^2

C. 100

D. 18

Answer: B

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3. If a set A has 4 elements then total number of proper subsets of set A is

A. 16

B. 14

C. 15

D. 17

Answer: C

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4. If 3x=5 (mod 7) then

A. x=2(mod 7)

B. x=3 (mod 7)

C. x=4 (mod 7)

D. none of these

Answer: C

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5. If f(x)=e^x and g(x)=$\log^{e^x}$ then which of the following is TRUE

A. $f\{g(x)\}$ne$g(f(x)\}$

B. $f\{g(x)\} = g(f(x)\}$

C. $f\{g(x)\} + g(f(x)\}$

D. $f\{g(x)\} - g(f(x)\}$

Answer: B

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6. The number of bijective functions from the set A to itself if a contains 108 elements is

A. 108

B. (108)!

C. $(108)^2$

D. 2^{108}

Answer: B

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7. If $2x = -1 + \sqrt{3}i$, then the value of $(1 - x^2 + x)^6 - (1 - x + x^2)^6 =$

A. 32

B. -64

C. 64

D. 0

Answer: D

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8. If a, b,c , d are the roots of the equation :

$x^4 + 2x^3 + 3x^2 + 4x + 5 = 0$,

then $1 + a^2 + b^2 + c^2 + d^2$ is equal to :

A. -2

B. -1

C. 1

D. 1

Answer: B

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9. The expression :

$$\frac{1}{\sqrt{(3x+1)}}\left(\left\{\left(\frac{1+\sqrt{3x+1}}{2}\right)^7-\left(\frac{1-\sqrt{3x+1}}{2}\right)^7\right\}\right)$$

is a polynomial in x of degree is :

A. 7

B. 5

C. 4

D. 3

Answer: D

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10. The number of triangles in a complete graph with 10 non collinear vertices is

A. 360

B. 240

C. 120

D. 60

Answer: C

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11. If x^r occurs in the expansions of $\left(x+\frac{1}{x}\right)^n$ then its coefficient is

A. $\frac{n!}{(r!)^2}$

B. $\frac{n!}{r+1}!(r-1)!$

C. $\frac{n!}{\frac{n+r}{2}!\frac{n-r}{2}!}$

D. $\frac{n!}{\left[\frac{r}{2}!\right]^2}$

Answer: C

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12. If in the expansion of $(1+x)^m(1-x)^n$ the coefficients of x and x^2 are 3 and -6 respective then m is

A. 6

B. 9

C. 12

D. 24

Answer: C

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13. If the straight line ax +by+c=0 always passes through (1,-2) then a,b,c are in

A. H.P

B. A.P

C. G.P

D. none of these

Answer: B

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14. A straight line through P(1,2) is such that the intercept between the axes is bisected at p then the equation of the straight line is

A. $x+y=1$

B. $x+y=3$

C. $x+2y=5$

D. $2x+y=4$

Answer: D

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15. If the line through A=(4,-5) is inclined at an anlge 45° with the positive of the x axis then the co ordinates of the two points on opposite sides of a at a distance $3\sqrt{2}$ are

A. (7,2),(1,8)

B. (7,2),(1,-8)

C. (7,-2),(1,-8)

D. (7,2),(-1,8)

Answer: C

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16. The mean and variance for the data 6,7,10,12,13,4,8,12 respectively are

A. $8, \sqrt{26.25}$

B. $9, \sqrt{9.25}$

C. $8, 26.25$

D. $9, 9.25$

Answer: D

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17. If $\tan(x+y)=33$, and $x=\tan^{-1}3$, then: y=

A. $\frac{3}{10}$

B. $\frac{33}{10}$

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

D. $\frac{\tan^{-1} 3}{10}$

Answer: D

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18. Prove that: $\frac{\sin x - \sin 3x}{\sin^2 x - \cos^2 x} = 2 \sin x$

A. $-2 \sin x$

B. $\frac{2}{\sin x}$

C. $\frac{1}{\sin x}$

D. 2 sin x

Answer: D

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19. The number of solution of the eqution $|\cot x| = \cot x + \frac{1}{\sin x}(0 \le x \le 2\pi)$ is

A. 0

B. 1

C. -1

D. none of these

Answer: B

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20. The number of solution of the eqution $|\cot x| = \cot x + \frac{1}{\sin x} (0 \leq x \leq 2\pi)$ is

A. 0

B. 1

C. 2

D. 3

Answer: B

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21. $\cot^{-1}(21) + \cot^{-1}(13) + co^{-1}(8) =$

A. 0

B. $\cot^{-1} 26$

C. π

D. none of these

Answer: A

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22. $\tan\left(\frac{\cos^{-1}(1)}{5\sqrt{2}} - \frac{\sin^{-1}(4)}{\sqrt{17}}\right)$ is

A. $\frac{\sqrt{29}}{3}$

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

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

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

Answer: D

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23. If a,b,c are A.P then the value of the determinant

$$\begin{vmatrix} x+2 & x+3 & x+2a \\ x+3 & x+4 & x+2b \\ x+4 & x+5 & x+2c \end{vmatrix}$$

A. 0

B. 1

C. x

D. 2x

Answer: C

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24. If $A = \begin{bmatrix} \alpha & 2 \\ 2 & \alpha \end{bmatrix}$ and $A^3 = 27$ then $\alpha =$ ________

A. ± 1

B. ± 2

C. $\pm \sqrt{7}$

D. $\pm \sqrt{5}$

Answer: C

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25. If A = $\begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and A^8 =aA+bI , then (a,b) =

A. (8,7)

B. (-7,8)

C. (8,-7)

D. (-8,-7)

Answer: C

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26. If A = $\begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$ then det (Adj A) is

A. a^{27}

B. a^{5}

C. a^{6}

D. a^2

Answer: C

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27. $\lim_{x \to \infty} \left(\sqrt{a^2x^2 + bx + c} - ax\right) =$

A. $\frac{b}{2a}$

B. $\frac{b}{a}$

C. 0

D. $\frac{2b}{a}$

Answer: A

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28. If y = log $1-\frac{x^{x^2}}{1+x^2}$ then $\frac{dy}{dx}$ is equal to

A. $\frac{-4x}{1-x^4}$

B. $\frac{4x^3}{1-x^4}$

C. $\frac{1}{4-x^4}$

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

Answer: A

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29. If f(x)=$\log_{x^2}(\log x)$, then f(x) at x=e is

A. 0

B. 1

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

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

Answer: D

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30. The slant height of a cone is fixed at 7 cm if the rate of increase of its height is 0.3 cm / sec then the rate of increase of its volume when its heights is 4 cm is

A. $\frac{\pi}{2}$ cm/sec

B. π cm/sec

C. $\frac{\pi}{5}$ cm/ sec

D. $\frac{\pi}{10}$ cm/sec

Answer: D

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31. If $S^2 = at^2 + 2bt + c$ then the acceleration is

A. directly proportional to s

B. inversely proportional to s

C. directly proportional to s^2

D. inversely proportional to s^3

Answer: D

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32. The value of 'c' in lagrange 's theorem for the function f(x)=log (sin x) in the interval $\left[\frac{\pi}{6}, \frac{5\pi}{6}\right]$ is

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

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

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

D. none of these

Answer: B

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33. A ladder 5 m long is leaning against a well. The bottom of the ladder is pulled along the ground, away from the well, at the rate of 2 m/s. How fat is its height on the wall decreasing when the foot of the ladder is 4m away from the wall?

A. $\frac{3}{8}$ m/sec

B. $\frac{8}{3}$ m/sec

C. $\frac{5}{3}$ m/sec

D. $\frac{2}{3}$ m/sec

Answer: B

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34. The angle between the curves $y^2 = 4ax$ and $ay = 2x^2$ is

A. $\dfrac{\tan^{-1} 3}{4}$

B. $\dfrac{\tan^{-1} 3}{5}$

C. $\dfrac{\tan^{-1} 4}{3}$

D. $\dfrac{\tan^{-1} 5}{3}$

Answer: B

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35. The maximum area in squre units of an isosceles triangle inscribed in an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ with its vertex at one end of the major axis is

A. $\sqrt{3}ab$

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

C. $\frac{5\sqrt{3}}{4}$ ab

D. none of these

Answer: B

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36. $\in \frac{x^3-1}{x^3+x}dx =$

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

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

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

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

Answer: B

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37. If $\in \frac{\cos 8x + 1}{\tan 2x - \cot 2x} dx = a \cos 8x + c$ then a=

A. $-\frac{1}{16}$

B. $\frac{1}{8}$

C. $\frac{1}{16}$

D. $-\frac{1}{8}$

Answer: C

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38. $\int_{-1}^{1} x^{27} \cos x + e^{x} \, dx =$

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

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

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

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

Answer: C

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39. The value of the integral $\int_{0}^{\pi} \frac{x \sin^{2n} x}{\sin^{2x} x + \cos^{2n} x}$ dx is

A. π^2

B. $2\pi^2$

C. $\frac{\pi^2}{4}$

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

Answer: C

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40. $\int_0^{\pi} x f(\sin x) dx = A \int_0^{\pi/2} f(\sin x) dx$ then A is

A. 0

B. 2π

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

D. π

Answer: D

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41. $\int_1^e \log x \, dx =$

A. 1

B. e-1

C. e+1

D. 0

Answer: A

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42. The area of the region bounded by the curves $y = x^2$ and $y = 4x - x^2$ in sq units is

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

B. $\frac{16}{3}$

C. $\frac{8}{3}$

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

Answer: C

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43. The area bounded by the curves y = cos x y = sin x between the ordinates x =0 and $x = \frac{3}{2}\pi$ is

A. $4\sqrt{2} - 2$

B. $4\sqrt{2} + 2$

C. $4\sqrt{2} - 1$

D. $4\sqrt{2} + 1$

Answer: A

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44. The area of the region enclosed by the curves y=x , x =e y=$\frac{1}{x}$ and the positive x axis is

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

B. 1 square unit

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

D. $\frac{5}{2}$ square units

Answer: C

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45. Let the straight line x =b divide the area enclosed by $y=(1-x)^2$ y=0 and x=0 in to parts $R_1(0 \leq x \leq b)$ and $R_2(b \leq x \leq 1)$ such that $R_1 - R_2 = \frac{1}{4}$ then b equals

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

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

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

D. $\frac{1}{4}$

Answer: B

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46. The differential equation of the family of parabolas $y^2 = 4ax$ where a is parameter is

A. $\frac{dy}{dx} = \frac{y}{2x}$

B. $\frac{dy}{dx} = -\frac{y}{2x}$

C. $\frac{dy}{dx} = -\frac{2y}{x}$

D. $\frac{dy}{dx} = \frac{2y}{x}$

Answer: A

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47. If $\frac{dy}{dx} = \frac{y + x\frac{\tan(y)}{x}}{x}$ then $\frac{\sin(y)}{x} =$

A. cx^2

B. cx

C. cx^3

D. log x

Answer: B

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48. The product of the degree and order of the D.E

$\left(\frac{d^2y}{dx^2}\right)^2 - \left(\frac{dy}{dx}\right)^3 = y^3$ is

A. 4

B. 6

C. 2

D. 3

Answer: A

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49. The general solution of the D.E

f$\frac{dy}{dx} + yg(x).\ g(x)$ where g(x) is a function of x is

A. g(x)+log(1+y+g(x))=0

B. g(x)+log(1+y-g(x))=0

C. g(x)-log(1+y-g(x))=0

D. g(x)-log(1-y+g(x))=0

Answer: B

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50. The directio ratios of the line which is perpendicular to the lines $\frac{x-7}{2}=\frac{y+17}{-3}=\frac{z-6}{1}$ and $\frac{x+5}{1}=\frac{y+3}{2}=\frac{z-4}{-2}$ are

A. $<4, 5, 7>$

B. $<4, -5, 7>$

C. $< 4, \ -5, \ -7 >$

D. $< \ -4, 5, 7 >$

Answer: A

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51. A line making anlges 45° and 60° with the positive direction of the axis of x and y makes with the positive direction of z axis angle of

A. 60°

B. 120°

C. 60° and 120°

D. none of these

Answer: C

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52. The shortest distance between the lines

$\frac{x-3}{3}=\frac{y-8}{-1}=\frac{z-3}{1}$ 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: D

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53. Given two vectors $\hat{i}-\hat{j}$ and $\hat{i}+2\hat{j}$ the unit vector coplanar with the two given vectors and perpendicular to $\left(\hat{i}-\hat{j}\right)$ 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

Answer: A

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54. If $\vec{a}, \vec{b}, \vec{c}$ are three non zero vectors such that each one of then is perpendicular to the sum of the other two vectors then the value of $\left|\vec{a}+\vec{b}+\vec{c}\right|^2$ is

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

B. $\left|\vec{a}\right|+\left|\vec{b}+\right|+\left|\vec{c}\right|$

C. $2\left(\left|\vec{a}\right|^2+\left|\vec{b}+\right|^2+\left|\vec{c}\right|^2\right)$

D. $\frac{1}{2}\left(\left|\vec{a}\right|^2+\left|\vec{b}+\right|^2+\left|\vec{c}\right|^2\right)$

Answer: A

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55. If the vectors $a\hat{i}+\hat{j}+\hat{k}$, $\hat{i}+b\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}+c\hat{k}$ are coplanar $(a\neq b\neq c\neq 1)$, then the value of $abc-(a+b+c)=$

A. 2

B. 0

C. -1

D. -2

Answer: D

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56. Let $\overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c}$ be three non zero vectors which are pair wise non collinear and $\overrightarrow{a} + \overrightarrow{3} b$ is colinear with $\overrightarrow{c}$ and $\overrightarrow{b} + \overrightarrow{2} c$ is colinear with $\overrightarrow{a}$ then $\overrightarrow{a} + 3b + 6\overrightarrow{c}$ is

A. $\overrightarrow{a}$

B. $\overrightarrow{b}$

C. $\overrightarrow{0}$

D. $\overrightarrow{a} + \overrightarrow{c}$

Answer: C

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57. Let $\vec{a}$ and $\vec{b}$ be two unit vectors if the vectors $\vec{c} = \hat{a} + \hat{2}b$ and $\vec{d} = 5\hat{a} - 4\hat{b}$ are perpendicular to each other then the angle between $\hat{a}$ and $\hat{b}$ is

A. $\dfrac{\pi}{6}$

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

C. $\dfrac{\pi}{3}$

D. $\dfrac{\pi}{4}$

Answer: C

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58. Let ABCD be a parallelogram such that and $\angle BAD$ be an acute angle if $\overrightarrow{r}$ is the vector that coincides with the altitude directed from the vertex B to the side AD then $\overrightarrow{r}$ is given by

A. $\overrightarrow{r} = 3\overrightarrow{q} - \frac{3\left(\overrightarrow{p}.\overrightarrow{q}\right)}{\left(\overrightarrow{p}.\overrightarrow{p}\right)}\overrightarrow{p}$

B. $\overrightarrow{r} = -\overrightarrow{q} + \frac{\left(\overrightarrow{p}.\overrightarrow{q}\right)}{\left(\overrightarrow{p}.\overrightarrow{p}\right)}\overrightarrow{p}$

C. $\overrightarrow{r} = \overrightarrow{q} - \frac{\left(\overrightarrow{p}.\overrightarrow{q}\right)}{\left(\overrightarrow{p}.\overrightarrow{p}\right)}\overrightarrow{p}$

D. $\overrightarrow{r} = -3\overrightarrow{q} + \frac{3\left(\overrightarrow{p}.\overrightarrow{q}\right)}{\left(\overrightarrow{p}.\overrightarrow{p}\right)}\overrightarrow{p}$

Answer: B

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59. Three numbers are closen at random without replcement from {1,2,3 ....8} the probability that their minimum is 3 given that their maximum is 6 is

A. $\frac{3}{8}$

B. $\frac{1}{5}$

C. $\frac{1}{4}$

D. $\frac{2}{5}$

Answer: B

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60. Four fair dice D_1, D_2, D_3 and D_4 each having six faces numbered 1,2,3,4,5 and 6 are rolled simultaneously the probability that D_4 shows a number appearing on one of D_1 and D_3 is

A. $\frac{91}{216}$

B. $\frac{108}{216}$

C. $\frac{125}{216}$

D. $\frac{127}{216}$

Answer: A

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