MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

SUPPLEMENTARY EXAM QUESTION PAPER (WITH ANSWERS) JUNE 2016

Part A

1. An operation * on z^+ (the set of all non-negative integers) is defined as $a \cdot b = |a - b|$, $\forall q, b \in z^+$.Is * a binary operation on z^+?

Watch Video Solution

2. Write the domain of $f(x) = \sin^{-1} x$

Watch Video Solution

3. Define a scalar matrix.

Watch Video Solution

4. Find the value of x for which $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$

Watch Video Solution

5. If $\tan(2x + 3)$, find $\frac{dy}{dx}$.

Watch Video Solution

6. Find : $\int (2x^2 + e^x)\,dx$.

Watch Video Solution

7. Find unit vector in which the direction of vector $\vec{a} = 2\hat{i} + 3\hat{j} + \hat{k}$.

Watch Video Solution

8. Write the direction cosines of z-axis.

Watch Video Solution

9. Define optimal solution in linear programming problem.

Watch Video Solution

10. If $P(A) = \frac{7}{13}, P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$, find $P(A/B)$

Watch Video Solution

Part B

1. Find gof and fog if $f: R \to R$ and $g: R \to R$ are given by $f(x) = \cos x$ and $g(x) = 3x^2$

Watch Video Solution

2. Prove the following:

$\sin^{-1}(3x - 4x^3) = 3\sin^{-1} x, x \varepsilon \left[-\frac{1}{2}, \frac{1}{2}\right]$

Watch Video Solution

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

Watch Video Solution

4. Find the area of the triangle with vertices, (3,8), (-4,2) and (5,1) using determinants.

Watch Video Solution

5. $y = \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right), 0 < x < 1.$

Watch Video Solution

6. Find $\frac{dy}{dx}$, if $y = x^{\sin x}, x > 0.$

Watch Video Solution

7. Find the interval in which the function f given by $f(x) = 2x^2 - 3x$ is strictly increasing.

Watch Video Solution

8. $\int x^2 \log x dx.$

Watch Video Solution

9. Evaluate: $\int_0^1 \frac{dx}{\sqrt{1-x^2}}$

Watch Video Solution

10. Find the order and degree of the differential equation $d^3\frac{y}{dx^3} + 2d^2\frac{y}{dx^2} + \frac{dy}{dx} = 0$

Watch Video Solution

11. If two vectors $\vec{a}$ and $\vec{b}$ such that $\left|\vec{a}\right| = 2, \left|\vec{b}\right| = 3$ and $\vec{a}.\vec{b} = 4$, find $\left|\vec{a} - \vec{b}\right|$

Watch Video Solution

12. Find the area of the parallelogram whose adjacent sides are determined by the vectors $\vec{a} = \hat{i} - \hat{j} + 3\hat{k}$ and $\vec{b} = 2\hat{i} - 7\hat{j} + \hat{k}$

Watch Video Solution

13. Show that the lines $\frac{x-5}{7}=\frac{y+2}{-5}=\frac{z}{1}$ and $\frac{x}{1}=\frac{y}{2}=\frac{x}{3}$ are perpendicular to each other.

Watch Video Solution

14. Find the probability distribution of

number of heads in two tosses of a coin .

Watch Video Solution

Part C

1. Show that the relation R in the set A={1,2,3,4,5} given by R= {(a,b) : |a-b| is even}, is an equivalence relation.

Watch Video Solution

2. Solve $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$

Watch Video Solution

3. By using elementary transformations, find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$

Watch Video Solution

4. If $x = a(\theta - \sin\theta)$ and $y = a(1 + \cos\theta)$, then proe that $\frac{dy}{dx} = -\cot\left(\frac{\theta}{2}\right)$.

Watch Video Solution

5. Verify Mean Value Theorem for the function $f(x) = x^2$ in the interval [2,4].

Watch Video Solution

6. Using differentials, find the approximate value of $(25)^{\frac{1}{3}}$.

Watch Video Solution

7. Evaluate : $\int e^x \left(\frac{1 + \sin x}{1 + \cos x}\right) dx$

Watch Video Solution

8. Evaluate: $\int \frac{x}{(x+1)(x+2)} dx$

Watch Video Solution

9. Find the area of the region bounded by the curve $y^2 = 9x, x = 2, x = 4$ and the x-axis in the first quadrant.

Watch Video Solution

10. Form the differential equation representing family of curve $\frac{x}{a} + \frac{y}{b}$ =1 where a and b are arbitrary constants .

Watch Video Solution

11. Prove that $\left[\vec{a}+\vec{b}, \vec{b}+\vec{c}, \vec{c}+\vec{a}\right]=2\left[\vec{a}, \vec{b}, \vec{c}\right]$.

Watch Video Solution

12. Show that the position vector of the point P, which divides the line joining the points A and B having position vectors $\vec{a}$ and $\vec{b}$ internally in the ratio $m: n$ is $\frac{m\vec{b}+n\vec{a}}{m+n}$

Watch Video Solution

13. Find the vector equation of the line, passing through the points (-1,0,2) and (3,4,6)

Watch Video Solution

14. A die is tossed thrice. Find the probability of getting an odd number tieast once.

Watch Video Solution

Part D

1. Let R+ be the set of all non-negative real numbers. Show that the function $f: R+ \to [4, \infty]$ given by $f(x) = x^2 + 4$ is invertible and write the inverse of f.

Watch Video Solution

2. If $A = \begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$

Calculate AC, BC and (A+B)C. Also verify that (A+B)C=AC+BC.

Watch Video Solution

3. Solve the following system of linear equations by matrix method:

$3x - 2y + 3z + 8, 2x + y - z = 1, 4x - 3y + 2z = 4$

Watch Video Solution

4. If y=3 cos(log x)+4 sin(log x), show that $x^2y_2 + xy_1 + y = 0$

Watch Video Solution

5. 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?

Watch Video Solution

6. Find the integral of $\sqrt{a^2 - x^2}$ with respect to x and hence evaluate $\int \sqrt{5 - x^2 + 2x}\, dx$.

Watch Video Solution

7. Find the area of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} - 1, (a > b)$ by the method of integration and hence find the area of the ellipse $\frac{x^2}{16} + \frac{y^2}{19} = 1.$

Watch Video Solution

8. Find the general solution of the differential equation $x\frac{dy}{dx} + 2y = x^2, (x \neq 0)$

Watch Video Solution

9. Derive the equation of a plane in normal form both in the vector and Cartesian form .

Watch Video Solution

10. If a fair coin is tossed 10 times, find the probability of.

(i) exactly six heads and (ii) atleast six heads.

Watch Video Solution

Part E

1. Prove that $\int_0^a f(x)dx = \int_0^a f(a-x)dx$ and hence evaluate the following:

(c) $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}dx$

Watch Video Solution

2. $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3.$

Watch Video Solution