MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

ANNUAL EXAMINATION QUESTION PAPER JUN-2017

S

1. Find the identify element for the binary operation *, defined on the set of Q of rational number, by $a \cdot b = \frac{ab}{4}$

Watch Video Solution

Part A

1. Write the values of x for which $\tan^{-1}\frac{1}{x} = \cot^{-1} x$, holds.

Watch Video Solution

2. Construct a 2×2 matrix, $A = [a_{ij}]$, whose elements are given by $a_{ij} = \frac{i}{j}$

Watch Video Solution

3. Find the value of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$

Watch Video Solution

4. Find $\frac{dy}{dx}$ if $y = \sin(x^2)$

Watch Video Solution

5. Find $\int \cos 3x dx$

Watch Video Solution

6. Find unit vector in the direction of vector $\hat{i} + \hat{j} + 2\hat{k}$

Watch Video Solution

7. Write the direction consines of y-axis.

Watch Video Solution

8. Define optimal solution in linear programming problem.

Watch Video Solution

9. If $P(A) = 0.8$ and $P(B/A) = 0.4$ then find $P(A \cap B)$

Watch Video Solution

Part B

1. Show that if $f: A \to B$ and $g: B \to C$ are onto, then $gofA \to C$ is also onto.

Watch Video Solution

2. Prove the following:

$$2\tan^{-1} x = \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right), x \geq 0$$

Watch Video Solution

3. Simplify the following:

$\sin^{-1}\left(\sin\frac{3\pi}{5}\right)$

Watch Video Solution

4. Using determinant method, find the area of the triangle whose vertices are (1,0),(6,0) and (4,3).

Watch Video Solution

5. Differentiate $(\sin x)^x$ with respect to x.

Watch Video Solution

6. Find $\frac{dy}{dx}$, if $2x + 3y = \sin y$

Watch Video Solution

7. Find the point on the curve $\frac{x^2}{4}+\frac{y^2}{25}=1$ at which the tangents are parallel to x-axis.

Watch Video Solution

8. Evaluate: $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx.$

Watch Video Solution

9. Evaluate: $\int \frac{x-3}{(x-1)^3} e^x dx$

Watch Video Solution

10. Find the order and degree, it defined of the differential equation $\frac{d^4y}{dx^4}+\frac{\sin\left(d^3y\right)}{dx^3}=0$

Watch Video Solution

11. If $\vec{a}$ is a unit vector and $\left(\vec{x}-\vec{a}\right).\left(\vec{x}+\vec{a}\right)=8$, then find $\left|\vec{x}\right|$

Watch Video Solution

12. Find the area of the parallelogram whose adjacent sides are given by the vectors $\vec{a}=3\hat{i}+\hat{j}+4\hat{k}$ and $b=\hat{i}-\hat{j}+\hat{k}$.

Watch Video Solution

13. Find the angle between the pair of lines given by $\vec{r}=2\hat{i}-5\hat{j}+\hat{k}+\lambda\left(3\hat{i}+2\hat{j}+6\hat{k}\right), \vec{r}=7\hat{i}-6\hat{k}+\mu\left(\hat{i}+2\hat{j}+2\hat{k}\right)$

Watch Video Solution

14. If A and B are two adjacent events, then prove that the probability of occurance of atleast one of A and B is given by $1 - P(A')P(B')$

Watch Video Solution

Part C

1. Check whether the relation R defined in the set {1,2,3,4,5,6} as R{(a,b): b=a+1)} is reflecxive or symmetric.

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 $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

Watch Video Solution

4. Find $\frac{dy}{dx}$, if $x = a\left(\cos t + \log \tan \frac{t}{2}\right), y = a \sin t.$

Watch Video Solution

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

Watch Video Solution

6. Find two positive number whose sum is 15 and the sum of whose squares is minium.

Watch Video Solution

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

Watch Video Solution

8. Evaluate $\int \frac{x \cos^{-1} x}{\sqrt{1-x^2} dx}$

Watch Video Solution

9. Find the area bounded by the curve y=cos x between x=0- and $x = 2\pi$

Watch Video Solution

10. Find the equation of a curve passing through the point (-2,3), given that slope of the tangent to the curve at any point (x,y) is $\frac{2x}{y^2}$

Watch Video Solution

11. 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

12. Find x such that the four point A(3,2,1),B(4,x,5),C(4,2,-2) and D(6,5,-1) are coplanar.

Watch Video Solution

13. Find the vector and cartesian equation of the plane which passe3s throught the points (5,2,-4) and perpendicular to the line with direction ratios 2,3,-1.

Watch Video Solution

14. A man is known to speak trugth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a xsix.

Watch Video Solution

Part D

1. Prove that the funciton $f: R \to R$ defined by f(x)=4x+3 is invertible and find 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 equations by matrix method.

$x + y + z = 6$

$y + 3z = 11$

$x - 2y + z = 0$

Watch Video Solution

4. If y=3 cos(log x)+4 sin(log x), show that $x^2 y_2 + x y_1 + y = 0$

Watch Video Solution

5. Sand is pouring from a pipe at the rate of $12 cm^3 / s$. The falling sand forms a cone on the top of ground in such a way that the height of the cone is always one-sixth of the radius of the base. How fast is the height of the sand cone increasing when the height is 4cm?

Watch Video Solution

6. Find the integral of $\sqrt{a^2+x^2}$ with respect to x and hence evaluate $\int\sqrt{1+x^2}dx$

Watch Video Solution

7. Using the method of integration, find the smaller area enclosed by the circle $x^2+y^2=4$ and the line x+y=2.

Watch Video Solution

8. Find the general solution of the differential equation $ydx-\left(x+2y^2\right)dy=0$

Watch Video Solution

9. Derive the equation of a line in space passing through two given plots both in 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. Minimize z=-3x+4u subject to the constraints

$x + 2y \leq 8$

$3x + 2y \leq 12$

$x \geq 0, y \geq 0$ by graphical method.

Watch Video Solution

2. Prove that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

Watch Video Solution

3. Prove that $\int_{-a}^{a} f(x)dx = \begin{cases} 2\int_{0}^{a} f(x)dx & \text{if f(x) is an even function} \\ 0 & \text{if f(x) is an odd function} \end{cases}$ and hence evaluate $\int_{-\pi/2}^{\pi/2} (x^3 + x\cos x)dx.$

Watch Video Solution

4. for what value of k is the funcation .

$$f(x) = \begin{cases} k(x^2 - 2x), & \text{if} \quad x \leq 0 \\ 4x + 1, & \text{if} \quad x > 0 \end{cases}$$

(i) continuous at x=0? (ii) continuous at x= 1 ?

(iii) continuous at x = -1?

Watch Video Solution