



MATHS

BOOKS - OSWAAL PUBLICATION MATHS (KANNADA ENGLISH)

II PUC JULY -2016

Part A | Answer All The Question

1. An operation $*$ on z^+ (the set of all non-negative integers) is defined as

$a \cdot b = |a - b|, \forall a, b \in \mathbb{Z}^+$. Is $*$ a binary operation on \mathbb{Z}^+ ?



[Watch Video Solution](#)

2. The domain of $\sin^{-1} x$ is



[Watch Video Solution](#)

3. Define a scalar matrix.



[Watch Video Solution](#)

4. Evaluate the determinants in questions 1 and 2

:

Find the values of x , if

$$(i) \begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$$

$$(ii) \begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$$



[Watch Video Solution](#)

5. $y=2x+3$ then $\frac{dy}{dx} = ?$



[Watch Video Solution](#)

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



[Watch Video Solution](#)

7. Find a unit vector in 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 $P\left(\frac{A}{B}\right)$.



[Watch Video Solution](#)

Part B | Answer Any Ten Questions

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

Show that $\text{gof} \neq \text{fog}$.



Watch Video Solution

2. Prove that:

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



Watch Video Solution

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

 [Watch Video Solution](#)

4. Find the area of the triangle whose vertices are (3,8), (-4,2) and (5, -1).

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

6. Find $\frac{dy}{dx}$, when:

$$y = x^{\sin x}$$



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



Watch Video Solution

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



Watch Video Solution

10. Find the degree of the differential equation

$$\left(\frac{d^2y}{dx^3}\right) + 2\left(\frac{d^2y}{dx^2}\right) + \frac{dy}{dx} + y = 0.$$



Watch Video Solution

11. Find $\left| \vec{a} - \vec{b} \right|$, if two vectors \vec{a} and \vec{b} are such that $|\vec{a}|=2, |\vec{b}|=3$ and $\vec{a} \cdot \vec{b}=4$.



[Watch Video Solution](#)

12. Find the area of the parallelogram whose adjacent sides are given 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 $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ are perpendicular to each other.



[Watch Video Solution](#)

14. Find the probability distribution of X ; the number of heads in two tosses of a coin (or a simultaneous toss of two coins).



[Watch Video Solution](#)

Part C Iii Answer Any Ten Questions

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



[Watch Video Solution](#)

2. Q. solve for x , $\tan^{-1}(2x) + \tan^{-1}(3x) = \frac{\pi}{4}$



[Watch Video Solution](#)

3. Using elementary transformations, find the inverse of the matrix [1327]



[Watch Video Solution](#)

4. If $x = a(\theta - \sin \theta)$ and $y = a(1 + \cos \theta)$,

then prove that $\frac{dy}{dx} = -\cot\left(\frac{\theta}{2}\right)$.



[Watch Video Solution](#)

5. Differentiate w.r.t. x , the following function: (i)

$$\sqrt{3x+2} + \frac{1}{\sqrt{2x^2+4}} \quad \text{(ii)}$$

$$e^{\sec^{-1}(2x)} + 3 \cos^{-1} x \quad \text{(iii)} \quad (\log)_7(\log x)$$



[Watch Video Solution](#)

6. Using differentials, find the approximate value

$$\text{of } 25^{1/3}$$



[Watch Video Solution](#)

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



[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 $y^2 = 9x$, $x = 2$, $x = 4$ 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 at least once.



[Watch Video Solution](#)

Part D Iv Answer Any Ten Questions

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



[Watch Video Solution](#)

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

$$3x - 2y + 3z = 8$$

$$2x + y - z = 1$$

$$4x - 3y + 2z = 4$$



Watch Video Solution

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



Watch Video Solution

5. A ladder 5 m long is leaning against a wall. The bottom of the ladder is pulled along the ground, away from the wall, at the rate of 2 cm/s. How fast is its height on the wall

decreasing when the foot of the ladder is 4 m 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 (ii) at least six heads (iii) at most six heads

 [Watch Video Solution](#)

Part E V Answer Any Ten Questions

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. For what value of 'k' the function

$$\begin{cases} kx^2, & x \leq 2 \\ 3, & x > 2 \end{cases} \text{ is continuous at } x=2$$



Watch Video Solution

3. Prove that:

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



Watch Video Solution