MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE:MAY-2017[TS]

Section A Vsaq

1. If $A = \left\{0, \dfrac{\pi}{6}, \dfrac{\pi}{4}, \dfrac{\pi}{3}, \dfrac{\pi}{2}\right\}$ and $f : A \to B$ is a surjection defined by $f(x) = \cos x$ then find B.

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2. If $f : R \to R, g : R \to R$ are defined by $f(x) = 3x - 1, g(x) = x^2 + 1$ then find

(i) $(fog)(2)$

3. If $f: R \to R, g: R \to R$ are defined by $f(x) = 3x - 1$ and $g(x) = x^2 + 1$, then find $(\text{gof})(2a - 3)$

4. Define symmetric & skew symmetric matrix and give and example to each.

5. If $A = \begin{vmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{vmatrix}$, then find A^4

6. Show that the points whose P,V are $-2\bar{a} + 3\bar{b} + 5\bar{c}$, $\bar{a} + 2\bar{b} + 3\bar{c}$, $7\bar{a} - \bar{c}$ are collinear, where $\bar{a}$, $\bar{b}$, $\bar{c}$ are non-coplanar vectors.

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7. Find unit vector in the direction of vector $\bar{a} = \left(2\bar{i} + 3\bar{j} + \bar{k}\right)$

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8. Find the area of the parallelogram whose diagonals are $3\bar{i} + \bar{j} - 2\bar{k}$ and $\bar{i} - 3\bar{j} + 4\bar{k}$

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9. Find the period of $f(x) = \cos(3x + 5) + 7$

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10. If $\sin = \dfrac{1}{\sqrt{10}}$, $\sin\beta = \dfrac{1}{\sqrt{5}}$ and α, β are acute, show that $\alpha + \beta = \pi/4$

11. IF $\cosh x = 5/2$, then find the value of (i) cosh(2x) and (ii) sinh(2x)

Section B Saqs

1. $\theta - \varphi = \dfrac{\pi}{2}$ then show that

$$\begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix} \begin{bmatrix} \cos^2\phi & \cos\phi\sin\phi \\ \cos\phi\sin\phi & \sin^2\phi \end{bmatrix} = O$$

2. If ABCDEF is a regular hexagon with centre O , then P.T

$$\overline{AB} + \overline{AC} + \overline{AD} + \overline{AE} + \overline{AF} = 3\overline{AD} = 6\overline{AO}$$

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3. If $\bar{a} = 2\bar{i} + 3\bar{j} + 4\bar{k}, \bar{b} = \bar{i} + \bar{j} - \bar{k}, \bar{c} = \bar{i} - \bar{j} + \bar{k}$, compute $\bar{a}x\left(\bar{b}x\bar{c}\right)$

and verify that it is perpendicular to $\bar{a}$.

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4. S.Tcot. $\dfrac{\pi}{16}$. cot. $\dfrac{2\pi}{16}$. cot. $\dfrac{3\pi}{16}$..... . cot. $\dfrac{7\pi}{16} = 1$

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5. $\sqrt{3}\sin\theta - \cos\theta = \sqrt{2}$

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6. यदि $\tan^{-1}x + \tan^{-1}y + \tan^{-1}z = \pi$ तो सिद्ध कीजिए कि

$x + y + z = xyz$

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7. Show that $\dfrac{\cos A}{a} + \dfrac{\cos B}{b} + \dfrac{\cos C}{c} = \dfrac{a^2 + b^2 + c^2}{2abc}$

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Section C Laqs

1. If $f: A \to B$, $g: B \to C$ are two bijective functions then prove that $gof: A \to C$ is also a bijective function.

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2. By using mathematical induction show that

$$\frac{1}{1.4} + \frac{1}{4.7} + \frac{1}{7.10} + \ldots\ldots (upto'n'terms) = \frac{n}{3n+1}, \quad \forall n \in N$$

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

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4. Solve the system of equations $x + y + z = 3, 2x + 2y - z = 3, x + y - z = 1$ by Gauss Jordan method.

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5. Find the shortest distance between the skew lines .

$\bar{r} = (6\bar{i} + 2\bar{j} + 2\bar{k}) + t(\bar{i} - 2\bar{j} + 2\bar{k})$ and $\bar{r} = (-4\bar{i} - \bar{k}) + s(3\bar{i} - 2\bar{j} -$

6. If $A + B + C = \pi$, then prove that

$$\cos^2\left(\frac{A}{2}\right) + \cos^2\left(\frac{B}{2}\right) + \cos^2\left(\frac{C}{2}\right) = 2\left(1 + \sin.\frac{A}{2}\sin.\frac{B}{2}\sin.\frac{C}{2}\right)$$

7. In a $\triangle ABC$ if $a = 13, b = 14, c = 15$ then S.T

$R = \frac{65}{8}, r = 4, r_1 = \frac{21}{2}, r_2 = 12, r_3 = 14.$