MATHS

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

MARCH - 2016 (ANDHRA PRADESH)

Section A Very Short Answer Type Questions

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

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2. If $f: Q \to Q$ is defined by $f(x) = 5x + 4$, find f^{-1}.

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3. if $A = [(I, 0)(0, -i)]$ then show that $A^2 = -1(i^2 = -1)$.

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4. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 5 & 6 \\ 3 & x & 7 \end{bmatrix}$ is symmetric, find value of x.

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5. If $\vec{a} = 2\vec{i} + 5\vec{j} + \vec{k}$ and $\vec{b} = 4\vec{i} + m\vec{j} + n\vec{k}$ are collinear vectors, then find the m and n

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6. Find the vector equation of the line passing through the points $2\bar{i} + \bar{j} + 3\bar{k}$ and $-4\bar{i} + 3\bar{j} - \bar{k}$.

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7. If $\tan 20^\circ = \lambda$ then show that $\frac{\tan 160^\circ - \tan 110^\circ}{1 + \tan 160^\circ . \tan 110^\circ} = \frac{1 - \lambda^2}{2\lambda}$.

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8. Find a sine function whose period is $2/3$.

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9. If $\cosh x = 5/2$, then find the values of

$\cosh(2x)$

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10. If $\cosh x = 5/2$, then find the values of

$\sinh(2x)$

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Section B Short Answer Type Questions

1. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ then show that $A^2 - 4A - 5I = O$.

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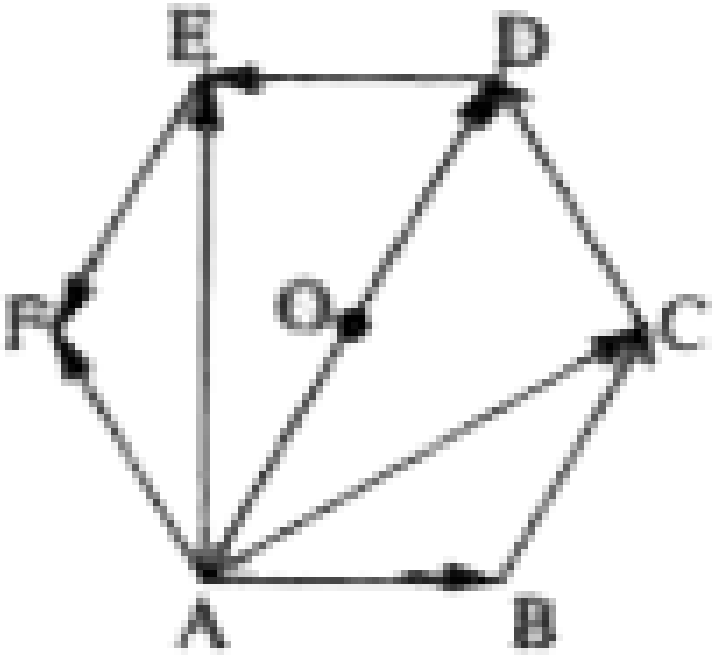
2. ABCDEF is a regular hexagon with point O as centre. Find the value of $\overrightarrow{AB} + \overrightarrow{AC} + \overrightarrow{AD} + \overrightarrow{AE} + \overrightarrow{AF}$



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3. The vector area of the triangle formed by the points $\vec{i} - \vec{j} + \vec{k}, 2\vec{i} + \vec{j} - 2\vec{k}$ and $3\vec{i} + \vec{j} + 2\vec{k}$ is

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4. Show that $\frac{1}{\sin 10^\circ} - \frac{\sqrt{3}}{\cos 10^\circ} = 4.$

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5. Prvoe that $\sin^{-1}\frac{3}{5} + \cos^{-1}\frac{12}{13} = \cos^{-1}\frac{33}{65}.$

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6. If $\sin\theta = \frac{a}{b+c}$ then show that $\cos\theta = \frac{2\sqrt{bc}}{b+c}\cos\left(\frac{A}{2}\right)$

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Section C Long Answer Type Questions

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

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2. Using the principle of finite Mathematical Induction prove that

$$1^2 + \left(1^2 + 2^2\right) + \left(1^2 + 2^2 + 3^2\right) + \text{n terms} = \frac{n(n+1)^2(n+2)}{12}, \forall n \in N$$

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

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4. Solve the following system of equations by using Cramer's rule.

$2x - y + 3z = 9, x + y + z = 6, x - y + z = 2.$

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5.

$\vec{a} = 2\vec{i} + \vec{j} - \vec{k}, \vec{b} = -\vec{i} + 2\vec{j} - 4\vec{k}$ and $\vec{c} = \vec{i} + \vec{j} + \vec{k}$, then find $\left(\vec{a} \times \vec{b}\right).\left(\vec{b} \times \vec{c}\right).$

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6. If A, B, C are angles of a triangle, then $P.T \sin^2.\frac{A}{2} + \sin^2.\frac{B}{2} - \sin^2.\frac{C}{2} = 1 - 2\cos.\frac{A}{2}\cos.\frac{B}{2}\sin.\frac{C}{2}$

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7. In a

ΔABC if $a = 13, b = 14, c = 15$ then show that $R = \frac{65}{8}, r = 4, r_1 =$

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