

Model Paper 2014 Mathematics

Inter 1st Year

Time: 3 hours

Max. Marks: 75

Note: This Question paper consists of three sections A, B and C

SECTION - A

10 x 2 = 20 Marks

I. Very Short Answer Questions:

(i) Answer All Questions

(ii) Each Question carries Two marks.

1. If $A = \left\{0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}\right\}$ and $f : A \rightarrow B$ is a surjection defined by $f(x) = \cos x$ then find B.
2. Find the domain of the real-valued function $\frac{1}{\log(2-x)}$.
3. A certain bookshop has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs. 80, Rs. 60 and Rs. 40 each respectively. Find the total amount the bookshop will receive by selling all the books, using matrix algebra.
4. If $A = \begin{bmatrix} 2 & -4 \\ -5 & 3 \end{bmatrix}$, then find $A + A'$ and AA' .
5. Show that the points whose position vectors 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 when $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors.
6. Let $\bar{a} = 2\bar{i} + 4\bar{j} - 5\bar{k}$, $\bar{b} = \bar{i} + \bar{j} + \bar{k}$ and $\bar{c} = \bar{j} + 2\bar{k}$. Find unit vector in the opposite direction of $\bar{a} + \bar{b} + \bar{c}$.
7. If $\bar{a} = \bar{i} + 2\bar{j} - 3\bar{k}$ and $\bar{b} = 3\bar{i} - 2\bar{j} + 2\bar{k}$ then show that $\bar{a} + \bar{b}$ and $\bar{a} - \bar{b}$ are perpendicular to each other.
8. Prove that $\frac{\cos 9^\circ + \sin 9^\circ}{\cos 9^\circ - \sin 9^\circ} = \cot 36^\circ$.
9. Find the period of the function defined by $f(x) = \tan(x + 4x + 9x + \dots + n^2x)$.
10. If $\sinh x = 3$ then show that $x = \log_e(3 + \sqrt{10})$.