MODEL QUESTION PAPER IN
MATHEMATICS (BRIDGE COURSE)

FIRST YEAR Bi.P.C. STUDENTS

TIME: 3 Hrs. MAX.MARKS: 75

NOTE: This Question paper consists of Sections A and B

SECTION – A

Short Answer Type Questions.
Answer ALL Questions. **10×3=30**
Each Question carries THREE marks.

1. Prove that $7\log\frac{16}{15}+5\log\frac{25}{24}+3\log\frac{81}{80}=\log 2.$
2. Find the centroid of the triangle with vertices

   $A(\bar{i}+2\bar{j}+3\bar{k}), B(2\bar{i}-\bar{j}-\bar{k})$ and $C(i-2\bar{j}+4\bar{k}).$
3. If $1\bar{a}+\bar{b}1=1\bar{a}-\bar{b}1,$ show that $\bar{a}\perp r$ to $\bar{b}$
4. Prove: $\cot\frac{\Pi}{20}\cot\frac{3\Pi}{20}\cot\frac{5\Pi}{20}\cot\frac{7\Pi}{20}\cot\frac{9\Pi}{20}=1.$
5. Simplify: $\cos^2 45°-\sin^2 15°.$
6. Find the equation of the line passing through the point (-4, -3) and parallel to the line joining the points (1,3) and (5,1).
7. Find the acute angle between the lines $3x+5y=7; 2x-y+4=o.$
8. Evaluate : $\lim_{x\to o}\frac{\sin 5x}{\tan 6x}$
9. Differentiate with respect to x : $\log(x^2+x+1).$
10. If $u=x^2+y^2+z^2,$ then show that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}+z\frac{\partial u}{\partial z}=2u.$

SECTION – B

Long Answer Type Questions.
Answer any THREE Questions. **3×15=45**
Each question carries FIFTEEN marks.

11. a) Solve: $a^{3-x}b^{5x} = a^{3x}b^{x+5}$ (8 M)

b) If $\frac{\log a}{b-c} = \frac{\log b}{c-a} = \frac{\log c}{a-b}$ show that $a^a, b^b, c^c = 1.$ (7 M)

12. a) If $\bar{a}, \bar{b}, \bar{c}$ are non – coplanar vectors, show that the vectors (8 M)
$\bar{a} + 2\bar{b} + 3\bar{c}, -2\bar{a} + 3\bar{b} + 5\bar{c}, 7\bar{a} - \bar{c}$ are coplanar.

b) Find the angles of the triangle formed by the points whose position (7 M)
vectors are $\bar{i} + \bar{j} - \bar{k}, \quad 3\bar{i} + 4\bar{j} - 2\bar{k}, \quad 2\bar{i} - \bar{j} - \bar{k}.$

13. a) If $A + B = 45°,$ then show that (1+tanA) (1+tanB) = 2 (8 M)
Hence deduce the value of $\tan 22\frac{1}{2}°.$

b) If $\frac{a}{\cos \propto} = \frac{b}{\sin \propto},$ then show that $a\cos 2 \propto + b\sin 2 \propto = a.$ (7 M)

14. a) Find the orthocentre of the triangle formed by the points (8 M)
(4,1), (7,4), (5,-2).

b) Find the area of the triangle formed by the lines (7 M)
$y = m_1 x + c_1; \quad y = m_2 x + c_2; \quad x = o$

15. a) Differentiate with respect to x: $x^{\sin x} + (\sin x)^{\log x}$ (8 M)

b) Show that the crwoes $y^2 = 4(x+1)$ and $y^2 = 36(9-x)$ (7 M)
interest each other orthogonally.

@ @ @