IIITB COMET FOUNDATION

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1 SECTION A

1. Find the value of k for which the roots of a quadratic equation (k-5)x2 + 2(k-5)x + 2 = 0 are equal.
2. Find the value of y for which the distance between the points (2,-3) and (10,y) is 10 units.
3. Write whether the rational number 13/3125 has a decimal expansion which is terminating or non-terminating repeating.
4. Write the nth term of the A.P 1/k , (1+k)/k , (1+2k)/k , ...
5. If sin + cos = 2 cos(90°), find the value of cot.
6. DE is drawn parallel to the base BC of triangle ABC, meeting AB at D and AC at E. If AB/CD = 4 and CE = 2 cm, find AE.

2 SECTION B

1. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is three times that of the red ball, find the number of blue balls in the bag.
2. The 5th and 15th terms of an A.P are 13 and 17 respectively. Find the sum of first 21 terms of the A.P.
3. Using Euclid's Division Algorithm, find the HCF of 225 and 867.
4. If the point (0,2) is equidistant from the points (3,k) and (k,5), find the value of k.
5. Find the value of a for which the pair of linear equations 2x + 3y = 7 and 4x + ay = 14 has infinitely many solutions.

3 SECTION C

1. Show that any positive odd integer is of the form 4q + 1 or 4q + 3 for some integer q.
2. The ten's digit of a number is twice its unit's digit. The number obtained by interchanging the digits is 36 less than the original number. Find the original number.
3. (i) The line segment joining the points A(2,1) and B(5,8) is trisected at the points P and Q, where P is nearer to A. If P lies on the line 2x y + k = 0, find the value of k.

   OR

   (ii) The x-coordinate of a point P is twice its y-coordinate. If P is equidistant from the point Q(2,5) and R(3,6), find the coordinates.
4. Show that 1, 1/2 and 2 are the zeroes of the polynomial 2x3 + x2 5x + 2.
5. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre.
6. S and T are points on the sides PR and QR of triangle PQR such that angle P = angle RTS. Show that triangle RPQ is similar to triangle RTS.