FIRST YEAR HIGHER SECONDARY EXAMINATION
MATHEMATICS - SCIENCE

Max Mark: 60   Max Time: 2 hrs   Cool off Time: 15 min

Answer any 6 questions from 1 to 8 each carry 3 marks.

1.i) If A is any set, then AUA' = ………….

        a) A   b) Φ   c) A'   d) U   (1)

  ii) A= $\{x : x \text{ is a prime number} < 6\}$

        a) Write A in roster form
        b) Find the number of subsets of A containing only 2 elements.   (2)

2. Let A={1,2} and B ={3,4}

     i) Find the number of relations from A to B

     ii) Find AXB and BXA   (3)

3. Solve $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$ and represent it in number line   (3)

4. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these:

    a) Four cards are of the same suit

    b) Four cards belongs to 4 different suits   (3)

5. i) Focus of the parabola y^2 = 8x is ……………

    a) (4,0)   b)(0,2)   c) (0,-1)   d) (2,0)   (1)

  ii) find the centre and radius of the circle $x^2 + y^2$ +6x-4y-3=0   (2)

6) i) Name the octant in which the point (4,-2,3) lie   (1)

  ii) find the distance between (2,3,5) and (4,3,1)   (2)

7. Evaluate the following limits

  i) $\lim\limits_{x \to 0} \frac{sin6x}{x}$

  ii) $\lim\limits_{x \to 4} \frac{4x+3}{x-2}$

  iii) $\lim\limits_{x \to 2} \frac{x^3-8}{x-2}$ (3)

8. If A and B are two events such that P(A)= 0.42, P(B)= 0.48 and P(A and B)= 0.16 determine

  i) P(not A)

ii) P(not B)

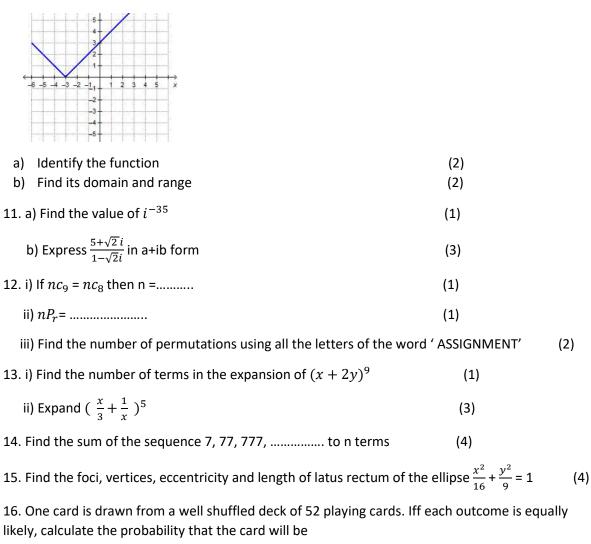iii) P(A or B)   (3)

Answer any questions from 9 to 16, each carry 4 mark:-

9. Which of the following is equal to $\{x \in R : -3 \leq x \leq 7\}$

  a) $\{-3, -2, -1, 0, 1, 2, 3\}$ b) [-3,7) c) (-3,7] d) {-3,7}   (1)

  b) Let U= {1,2,3,4,5,6}, A={2,3} and B= {3,4,5} then show that $(AUB)^I$=A'∩B'   (3)

10.

  a)   Identify the function   (2)
  b)   Find its domain and range   (2)

11. a) Find the value of i^{-35} (1)

  b) Express $\frac{5+\sqrt{2}\,i}{1-\sqrt{2}i}$ in a+ib form   (3)

12. i) If $nc_9 = nc_8$ then n =………..   (1)

  ii) nP_r= …………………..   (1)

  iii) Find the number of permutations using all the letters of the word ' ASSIGNMENT'   (2)

13. i) Find the number of terms in the expansion of $(x + 2y)^9$ (1)

  ii) Expand $(\frac{x}{3} + \frac{1}{x})^5$ (3)

14. Find the sum of the sequence 7, 77, 777, ……………. to n terms   (4)

15. Find the foci, vertices, eccentricity and length of latus rectum of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ (4)

16. One card is drawn from a well shuffled deck of 52 playing cards. Iff each outcome is equally likely, calculate the probability that the card will be

  i) a diamond

  ii) a black card

  iii) not an ace

  iv) not a diamond   (4)

Answer any 3 questions from 17 to 20 , each carry 6 mark :-

17. a) Prove that $\frac{cos7x+cos5x}{sin7x-sin5x}$ = cotx   (3)

   b) If cosx = -3/5, x lies in the third quadrant find the values of other trigonometric functions (3)

18. i) If the angle between two lines is π/4 and slope of one of the lines 1/2 , find the slope of the other line.   (3)

   ii) Find the equation of the line passing through (-3,5) and perpendicular to the line through the points (2,5) and (-3,6)   (3)

19. i) Find the derivative of sinx using first principle.   (3)

   ii) Find the derivative of $\frac{x^2}{3x-1}$ (3)

20. Consider the following table

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
frequency	3	7	12	15	8	3	2

   i)   Find the Mean   (2)
   ii)   Find the Variance   (2)
   iii)   Calculate the Standard deviation   (1)

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