RAJA RAVI VARMA GIRLS HIGHER SECONDARY SCHOOL , KILIMANOOR

FIRST YEAR HIGHER SECONDARY PRE MODEL EXAM 2023

MATHEMATICS

Maximum : 60 Scores

Time: 2 Hours

RRV GIRLS KILIMANOOR

Cool off time : 15 Minutes

Answer any 6 questions from 1- 8. Each carries 3 marks. **(6*3=18)**

1. Let A = {x: x is a prime number and 1< x < 6}
   B = {x: x is a natural number and 6 < x < 10}

   (a) Write A and B in roster form (2)

   (b) Find n(A∩B) (1)

2. Let A = { 1,2,3,5 } and B = { 4,6,9]

   a) Find the number of relations from A to B. (1)

   b) Let R = { (x,y) : the difference between x and y is odd, x ∈ A, y ∈ B }.

   Write R in roster form. (2)

3. (a) Solve $(5-2x)/3 \leq (x/6)-5$ (2)

   (b) Show the graph of the solution on the number line. (1)

4. Find the value of n, if $2nC_3 : nC_3 = 11:1$ (3)

5. (a) The equation of a circle with centre at the origin and radius 3 units is _____ (1)

   (b) Find the centre and radius of the circle $x^2+y^2-4x-8y-45 = 0$ (2)

6. Show that the points A (-2,3,5), B (1,2,3) and C(7, 0, - 1) are collinear. (3)

7. Evaluate $\lim_{x\to 0} \cos 2x-1 / \cos x-1$ (3)

8. One card is drawn from a well-shaffled. pack of 52 cards. Calculate the probability that the card will be
   (a) not an ace (1)
   (b) a black card (1)
   (c) a diamond. (1)

Answer any 6 questions from 9-16. Each carries 4 marks. **(6*4=24)**

9. Let U = {a, b, c, d, e, f, g, h, i, j}, A = {a, b, d, g, h}, B = {a, g, h, i, j}. Find
   (a) A' and B' (1)
   (b) (A ∩ B)' (2)
   (c) Verify (A ∩ B)' = A' U B' (1)

(10) Let f(x) =√x and g(x) = x be two functions defined over the set of non-negative real numbers. Find
   a) (f + g)(x)
   b) (f – g)(x)

c) (f.g)(x)
d) (f/g)(x) (4)

11. (a) Express z = 5+√2i/1-√2i in the form a+ib (2)
(b) Find the multiplicative inverse of z (2)

12. Find the number of different 11-letter arrangements that can be made from the letters of the word ARRANGEMENT so that
(a) All vowels do not occur together (3)
(b) The words start with 'G' (1)

13. (a) Find $(a + b)^4$ = ____ (1)
(b) Find $(102)^4$ (3)

14. (a) If r>1 ,the sum to n terms of a GP with first term 'a' is Sn = _____ (1)
(b) Find the sum to n terms of 6,66,666,…. (3)

15. Find the coordinates of the foci, vertices, length of the major axis, minor axis, latus rectum and the eccentricity of the ellipse, $36x^2+4y^2 = 144$ (4)

16. If E and F are events such that P(E) = 1/4 , P(F) = 1/2 and P(E and F) = 1/8, Find
(a) P(E or F) (2)
(b) P(not E and not F) (1)
(c) P(E but not F) (1)

Answer any three questions from 17-20. Each carries 6 marks (3*6=18)

17. (a) sin(x-y) = _____ (1)
(b) Find the value of sin 15° (2)
(c) Prove that $\sin^2 6x-\sin^2 4x = \sin 2x.\sin 10x$ (3)

18. Consider the line x+3y = 7
(a) Find the equation of a line perpendicular to the above line and passes through the point (3,8) (3)
(b) Find the coordinates of the foot of the perpendicular from (3,8) to the line x+3y = 7 (3)

19. (a) Find the derivative of y = x+cosx/tanx (3)
(b) Find the derivative of √x from first principle (3)

20. Find the mean, variance and standard deviation for the following data (6)

x_i	6	10	14	18	24	28	30
f_i	2	4	7	12	8	4	3

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