[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : **5233**   D   Your Roll No...............

Unique Paper Code   : 235354

Name of the Course   : **B.A. (Hons.)**

Name of the Paper   : Mathematical Awareness

Semester   : III

Duration : 3 Hours   Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. Attempt **all** questions as per directed questionwise.

1. Do any **three** parts :

    (a)   (i) What is the full name of Ramanujan ?

            (ii) When was Ramanujan born and where ?

            (iii) Name two mathematicians who coloborated with Ramanujan ?

            (iv) What is Ramanujan number ?   (4)

    (b)   (i) What was full name of Rienmann ?

            (ii) Name the four professors at Berlin who had great influence on him ?

            (iii) In which academy, Riemann was elected as a corresponding member ?

            (iv) What was Riemann's doctoral thesis ?   (4)

    (c) Tick the correct answer :

            (i) $\sqrt{2}$ is an irrational number was proved by

                (a) Ramanujan   (b) Euclid   (c) Riemann

(ii) India Post Office issued a stamp to celebrate 75th birth anniversary of :

   (a) Euclid   (b) Emy Noether   (c) Ramanujan

(iii) Issac Newton was born on :

   (a) 26th January 1642   (b) 15th August 1642

   (c) Christmas Day 1642

(iv) 'Warm Lika a loaf of bread, weyl wrote about :

   (a) Riemann   (b) Ramanujan   (c) Emy Noether   (4)

(d) Fill in the blanks :

   (i) Emmy Noether was born in .... and died in ....

   (ii) Ramanujan was born in .... and died in ....

   (iii) Issac Newton was born in .... and died in ....

   (iv) Leibniz was born in .... and died in ....   (4)

2. Do any **three** parts :

   (a)   (i) What are incomposite numbers ? Give examples.   (3)

           (ii) Define Fermat numbers & Give examples. Which fermat number proved the formula wrong ?   (4)

   (b)   (i) Define Mersenne numbers. Give examples.   (3)

           (ii) What is the fundamental theoreon of Arthmatic ?   (4)

   (c)   (i) What are perfect and Amiable numbers ? Give example.   (4)

           (ii) What in Goldbach conjecture ?   (3)

(d)   (i) Construct a magic square with magic sum 15.   (4)

       (ii) What are Algebraic number ? Give examples.   (3)

3. Do any **three** parts :

    (a) Write short notes on

        (i) Durer Magic square.   (3)

        (ii) Four color problem.   (3)

        (iii) Konigberg Bridge problem.   (3)

    (b)   (i) What is a chromatic number   (3)

           (ii) Sketch graph of the function   (3)

                $$f(x) = 1 - x^2$$

           What are its domain and range ?

           (iii) What is Pythagorean number theorem. How to obtain Pythagorean triplet from a number 11.   (3)

    (c)   (i) Define even and odd functions.   (3)

           (ii) Discuss Golden ratio and Golden Triangle   (3)

           (iii) What are Fractles   (3)

    (d) Write short notes on :

        (i) Tiling   (3)

        (ii) One sided surfaces   (3)

        (iii) Fermat's last theorem   (3)

        (iv) Fire Altars   (3)

4. (a)   (i) Use the graphical method to solve the following linear programming problem.

Max Z = 2X + 5Y

Subject to

$$3X + Y = 21$$

$$X + 4Y = 24$$

$$X + Y = 9$$

$$X, Y = 0$$

OR

Max Z = X − Y

Subject to

$$X + Y = 1$$

$$2X + Y = 3$$

$$X, Y = 0$$ (5)

(ii) Find the mean of first n odd natural numbers.

OR

The mean of the first three terms of a series is 14 and mean of next two terms is 18. Find the mean of all 5 terms.   (5)

(iii) Two unbiased dice are thrown. Find the probability that neither a double nor a total of 10 will appear.

OR

In a group of students, there are 3 boys & 3 girls. Four students are to be selected at random from the group. Find the probability that either 3 boys and 1 girl or 3 girls and 1 boy are selected.   (5)

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