This question paper contains 3 printed pages. *Your Roll No. .....*

Sl. No. of Ques. Paper	**: 5925**	**F**
Unique Paper Code	**: 235154**	
Name of Paper	**: Mathematical Awareness**	
Name of Course	**: B.A. (H) I, French, German, Italian and Social Work**	
Semester	**: I**	
Duration	**: 3 hours**	
Maximum Marks	**: 100**	

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

1. Do any *three* parts:

(a) Fill in the following blanks:
(i) Emmy Noether's doctoral students were called _____.
(ii) In 1915, at Cambridge, Ramanujan published nine papers, a long paper on highly composite numbers was published in the proceedings of the _____.
(iii) The fifth postulate, among the five postulates is known as _____. 6

(b) State whether the following statements are true or false. If false, then give the correct answer.
(i) It is a credit to Newton's contribution to mathematics in general and abstract algebra in particular that both Max and Fritz are now referred to as Newton's father and brother respectively.
(ii) Riemann made a significant contribution to differential and integral calculus.
(iii) Ramanujan died at the age of 53 in London. 6

(c) (i) Name two areas in which Riemann made significant contributions.
(ii) Who is best remembered for his axioms and postulates related specially to Geometry?
(iii) When was Isaac Newton elected as fellow of Royal Society? 6

(d) (i) Name the goddess whom Ramanujan believed that has bestowed mathematical *gifts on him.*
(ii) Who wrote the book "Pricipia I" and "Principia II"?
(iii) Name two people who helped Ramanujan at Madras Port Trust to contact mathematicians in England. 6

P.T.O

2. Do any *three* parts :

(a) (i) Define "e". Who proved for the first time that e is irrational; when and who proved that it is transcendental? 5

(ii) It is 5'o clock now. What would have been the time 46 hours ago? Use modular arithmetic to support your answer. 5

(b) (i) Define Mersene numbers. Give example of four Mersene primes. 5

(ii) Evaluate $2^{50} \ mod\ 7$.

(c) (i) Show that every square integer is of the form $4k$ or $4k+1$ where k is an integer. 5

(ii) Using the above result to show that no number in the sequence

11, 111, 1111, 11111,

is a square. 5

(d) (i) Define perfect numbers and Goldbach conjectures. Give examples for each. 5

(ii) Write a magic square of order 7. What is its sum? 5

3: Do any three parts:

(a)(i) Explain how theKonigsberg Bridge Problem led to the discovery of Euler's Formula.

(ii) Explain how snowflake curve is formed? What can be said about its perimeter and area?

(5+5)

(b) (i)Give any two differences and two similarities between the Mobius strip and the Klein Bottle.

(ii) Find the interval in which the function is increasing or decreasing:

$$f(x)=\begin{cases} -x; & x<-3 \\ 3; & -3\le x\le 3 \\ x; & x>3 \end{cases}$$

Show it by Graph. (5+5)

(c) (i) Explain the difference in paintings before and after the development of perspective geometry.

(ii) Give the set of symmetries of an isosceles triangle. Show that it forms a group. (5+5)

(d) (i) Briefly Explain:

1. Platonic Solids

2. Symmetry used in TajMahal. 10

3. Basic Tiling.

4. Do any three parts:

(a). In a class of 50 students, 10 have failed and their average marks is 2.5.The total marks secured by the entire class were 281.Find the average marks of those who have passed. (11)

(b).Under what conditions would you use the median rather than the mean as a measure of central tendency? Why? (11)

(c) (i). Explain the meaning of skewness. What are the objectives of measuring it?

(ii)The income of a person in a particular week is Rs. 550 per day. Find mean deviation of his income for the week. (6+5)

(d).(i) Solve the following problem by graphical method:

Max $Z= 4x+6y$

Subject to $x+y=5$

$x \geq 2$

$y \leq 4$

$x,y \geq 0.$

(ii) Write a note on (i) redundant constraint (ii) unbounded Solution (5+6)