[This question paper contains 4 printed pages.]

1111 *Your Roll No. .....*

Concurrent Courses for B.A. (Hons.) Prog. C

MATHEMATICAL AWARENESS

(Qualifying)

Time : 2 Hours *Maximum Marks : 50*

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

Note : *The maximum marks printed on the question paper are applicable for the candidates registered with the School of Open Learning for the B.A. (Hons). These marks will, however, be scaled down proportionately in respect of the students of regular colleges, at time of posting of awards for compilation of result.*

Attempt **all** *questions as per directions questionwise.*

1. Do any **two** parts :

   (a) Write a brief introduction to the life and information on the works of either Euclid or Riemann. (4)

P.T.O.

(b) Answer in **one** or **two** words.

(i) Which are the most important years in Newton's mathematical development ?

(ii) When did Riemann die ?

(iii) Name the first woman mathematician.

(iv) Who said these words 'an equation has no meaning for me unless it expresses a thought of God' ? (4)

(c) State whether the following statements are true or false.

(i) In the spring of 1917 Ramanujan became seriously ill.

(ii) Emmy Noether began producing her most powerful and creative work at the age of twenty.

(iii) Riemann had a great admiration for Dirichlet.

(iv) Riemann was born on 10th April 1888. (4)

2. Do any **three** parts :

(a) What is a perfect number ? Give Euclid's formula of perfect number. Is 28 a perfect number ? Show it. (5)

(b) What is casting out nines ? Show by examples of addition, subtraction and multiplication. (5)

(c) Give four characteristics of Benjamin Franklin 8^{th} order magic square. (5)

(d) (i) Find the least integer remainder of (4789 3264 9867)/7. (3)

(ii) What is the total number of matches in a tennis tournament with thirteen contestants ? (2)

3. Do any **three** parts :

(a) (i) What is the Konigsberg Bridge problem ? (3)

(ii) Give any two basic differences between the Mobius strip and the Klein Bottle. (2)

(b) (i) Draw the graph of the function $f(x) = |x^3|$ in the interval $[-1, 1]$. Find the regions of $[-1,1]$ in which the function f is increasing or decreasing. Give its points of maxima and minima. (3)

(ii) State the four color map theorem. (2)

(c) Write a short note on the following :

(i) Regular Polyhedra. (2)

P.T.O.

(ii) Symmetry Groups (2)

(iii) Fractals in nature (1)

(d) (i) Give the set of symmetries of an equilateral triangle. Show that it forms a group. (3)

(ii) How did perspective geometry bring a change in the paintings after the Renaissance period ? (2)

4. Do any **three** parts :

(a) Compute the mean, median and mode for the following set of scores.

34, 54, 17, 26, 34, 25, 14, 24, 25, 23 (4)

(b) What is the probability of picking a card that was red or black ? (4)

(c) Solve the following problem by graphical method :

Max $z = 4x + 6y$

s.t. $2x + y \leq 6$

$x \geq 1$

$y \geq 4$

$x, y \geq 0$ (4)

(d) Find two numbers whose arithmetic mean is 10 and geometric mean is 8. (4)