

[This question paper contains 4 printed pages.]

433

Your Roll No. ....

Concurrent Course for B.A. (Hons.) Prog. E

MATHEMATICAL AWARENESS

Interdisciplinary

Time : 2 Hours

Maximum Marks : 50

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

*Attempt all questions as per  
directed questionnaire.*

1. Do any two parts:

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

(b) Answer in one or two words.

(i) What was the topic of Noether's dissertation.

(ii) Why did Riemann adopt the analytical approach?

(iii) Name the book of Newton published in 1687.

P.T.O.

(iv) Who said these words 'there is no royal and to geometry'. (4)

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

(i) Euclid proved that the fifth Fermat number cannot be factorized.

(ii) Emmy Noether's main contribution was in the field of graph theory.

(iii) Riemann died in 1986.

(iv) Ramanujan was born on Christmas Day. (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) In how many ways can the starting order be posted in an eight member relay cross country skiing team if

(i) all eight members will take part in a race.

(ii) Only four members chosen from the eight members will take part. (5)

- (c) (i) Define algebraic and transcendental numbers. Are algebraic and transcendental numbers irrational, rational or both. (3)
- (ii) Define Fermat and Mersenne numbers. Give examples. (2)
- (d) (i) Find the least integer remainder of  $(4789\ 3264\ 9867)/7$  (2)
- (ii) State the Euclidean Algorithm. Using the above algorithm find greatest common divisor of 6237 and 2520. (3)

3. Do any three parts:

- (a) Make a comparative study of the following:
- (i) Mobius Strip and Klein Bottle.
- (ii) Euler Path and Hamilton Path. (5)
- (b) Explain Konigsberg bridge problem and how it led to the discovery of Euler's formula. (5)
- (c) State Four Colour Map Theorem. What is a chromatic number? Give chromatic number for a plane and Klein Bottle. (5)

- (d) Find graphically the maximum, minimum and inflection point of the function.

$$f(x) = \sin x, x \in [0, 2\pi]. \quad (5)$$

4. Do any three parts:

- (a) In a moderately symmetrical distribution, the mode and mean are 32.1 and 35.4 respectively. Find the value of median. (4)

- (b) State the addition theorem of probability. A bag contains 8 white and 4 red balls. Five balls are drawn at random. What is the probability that 2 of them are red and 3 white? (4)

- (c) Use graphical method to solve the LP problem:

$$\text{Max } Z = 3x + 5y$$

subject to

$$5x + y \geq 10$$

$$x + y \geq 6$$

$$x + 4y \geq 12$$

$$x, y \geq 0$$

Also indicate the feasible region. (4)

- (d) Explain the meaning of skewness. What are the objectives of measuring it? (4)