[This question paper contains 4 printed pages.]

Your Roll No.....

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Sr. No. of Question Paper : 2035

Unique Paper Code : 62355604

Name of the Paper : General Mathematics – II

Name of the Course : **B.A. (Prog.)/B.Com. (Prog.)**

Semester : VI

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 directed question-wise.

SECTION-I

1. Write a short note on the life and contributions of any three of the following mathematicians. Each part carries five marks.

   (a) Bhargava

   (b) Euler

P.T.O.

(c) Galois

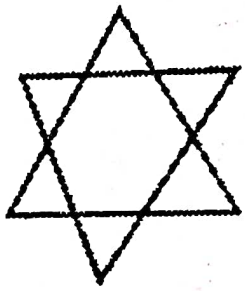
(d) Hardy

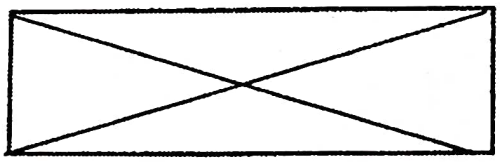
(e) Ramanujan

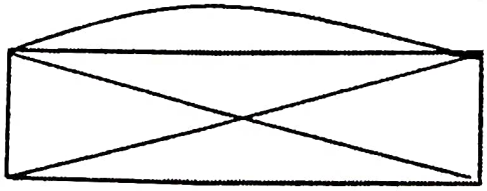
SECTION-II

2. Attempt any **six** parts. Each part carries **five** marks.

(a) Define Euler's formula for Networks. Using Euler's argument, explain which of the figures below can be drawn without lifting the pen and without repeating lines?

(i) 

(ii) 

(iii) 

(b) Give a similarity and a difference between the Mobius strip and the Klein bottle?

(c) Define an even function and an odd function. Also determine which of the following functions is even, odd or neither.

(i) $\sin^2 x - \cos x$ (ii) $\cos^2 x - \sin x$.

(d) If $\tan \theta = \frac{-7}{24}$, then find $\sin \theta$, $\cos \theta$ and $\cot \theta$.

(e) Find the equation of the line with slope $m = \frac{-1}{5}$ and passing through the point (-6, 9). Further find its x-intercept and y-intercept.

(f) Discuss all possible symmetries of a rectangle.

(g) Define Golden ratio and Golden triangle.

(h) What is a snowflake curve? Find the area of a snowflake curve at 2^{nd} stage by taking its side to be 'a'.

SECTION-III

3. Attempt any **five** parts. Each part carries **six** marks.

(a) Check whether the following system of linear equations is consistent or not

$$3x - 6y + 3w = 40$$
$$-2x + 4y + 2z - w = -11$$
$$4x - 8y + 6z + 7w = -5$$

using row echelon form.

(b) Determine the inverse of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 2 \end{bmatrix}$

using row reduction.

(c) Without row reduction compute A^{-1} and A^{-3} for the given matrix

$$A = \begin{bmatrix} 5 & 4 \\ -3 & 2 \end{bmatrix}.$$

(d) Solve the following system of linear equations using Gauss Jordan method.

$$3x + y - 2z = 8$$
$$4x - z = -1$$
$$2x - 3y + 5z = -32.$$

(e) Write the complete solution set for the following homogeneous system of linear equations

$$2x + y + 3z = 0$$
$$3x + 2y + w = 0$$
$$2x + 12z - 5w = 0.$$

(f) Find the rank of the matrix $A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & -1 & 4 \\ -2 & 8 & 2 \end{bmatrix}$.