[This question paper contains 4 printed pages.]

677 *Your Roll No.* .....

B.Com. (Hons.) / II / NS **C**

Paper XV – MATHEMATICS

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.)/ B.Com. (Hons.). These marks will, however, be scaled down proportionately in respect of the students of regular colleges, at the time of posting of awards for compilation of result.

All *questions are compulsory.*

1. Attempt any **three** parts.

(a) Find parametric equations for the line passing through $P_1(-1, 3, 5)$ and $P_2(-1, 3, 2)$. (5)

(b) Determine whether the set

$$S = \{(1, -1, 1), (1, 2, -1), (2, 1, 0)\}$$

of vectors spans $\mathbb{R}^3$? (5)

P.T.O.

(c) If $T : \mathbb{R}^3 \to \mathbb{R}^2$ be a linear transformation for which $T(1, 0, 0) = (2, -1)$, $T(0, 1, 0) = (3, 1)$ and $T(0, 0, 1) = (-1, 2)$. Find $T(-3, 4, 2)$. (5)

(d) Find the eigenvalues and corresponding eigenvectors for the matrix

$$\begin{bmatrix} +5 & 0 \\ 2 & 1 \end{bmatrix} \quad (5)$$

2. Attempt any **three** parts :

(a) Write the general term for the following sequences :

(i) $1, -\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \text{--------}$

(ii) $\frac{1}{2}, \frac{3}{4}, \frac{5}{6}, \frac{7}{8}, \text{--------}$

(iii) $1, -r, r^2, -r^3 \text{--------}$ (5)

(b) Determine whether the following series converges ?

(i) $\sum_{K=1}^{\infty} 3^{2K}\, 5^{1-K}$

(ii) $\sum_{K=0}^{\infty} x^K$ (5)

(c) State the integral test for the convergence of a series and test the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ using it. (5)

(d) Use the limit comparison test to determine whether the series $\sum_{n=1}^{\infty} \frac{3n^3 - 2n^2 + 4}{n^5 - n^3 + 2}$ converges or diverges. (5)

3. Attempt any **two** parts :

(a) Find the greatest common divisor of the pair

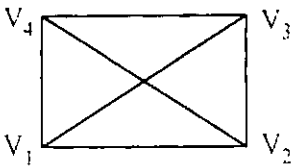
(58, 264) (3½)

(b) Show that $f(n) = 74n^5 - 18n^3 + 6n^2 - 5$ is big oh of n^5. (3½)

(c) Write a SPARKS program which prints out the integer values of three variables x, y, z in increasing order. (3½)

4. Attempt any **two** parts :

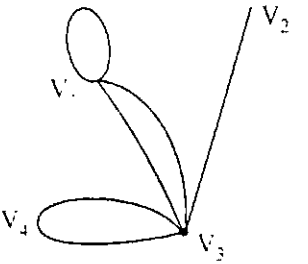
(a) Find all spanning trees of the graph



(4)

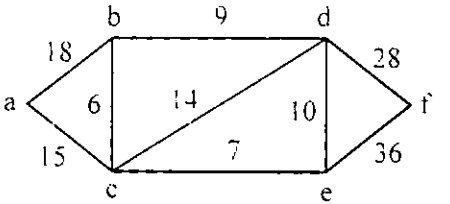
P.T.O.

(b) Find the adjacency matrix of the graph given below :



(4)

(c) Find the shortest path from a to f :



(4)

5. A and B play game in which each has three coins, a 5p, 10p and a 20p. Each selects a coin without the knowledge of the other's choice. If the sum of the coins is an odd amount A win B's coin. If the sum is even B win A's coin. Find the best strategy for each player and the value of the game.

OR

Use dominance property to solve the following game :

	Player B			
	3	2	4	0
Player A	3	4	2	4
	4	2	4	0
	0	4	0	8

(5)

(700)