COURSE: ALLIED CORE **TIME: 90 Minutes**
PAPER: MATHEMATICS FOR CHEMISTRY - II **MAX.MARKS: 50**

SECTION –A
Answer all questions ($3 \times 2 = 6$)

1. Find $L(te^{-5t})$.

2. State two merits of rank correlation coefficient.

3. Define a normal subgroup.

SECTION –B

Answer any three questions ($3 \times 8 = 24$)

4. Find $L(t^2 cosat)$.

5. Find inverse Laplace transform of $\frac{1}{(s+1)(s-2)(s+5)}$.

6. (a) For the permutations σ and τ defined on the set $S = \{1,2,3\}$ find the product
$\sigma\tau$ for $\sigma = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 2 \end{pmatrix}$ and $\tau = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{pmatrix}$.
   (b) If H and K are subgroups of a group G then prove that $H \cap K$ is also a
   subgroup of G. (4+4)

7. Find Karl Pearson's coefficient of correlation from the following data.

Wages	100	101	102	102	100	99	97	98	96	95
Cost of living	98	99	99	97	95	92	95	94	90	91

SECTION -C
Answer any one question ($1 \times 20 = 20$)

8. Expand e^x as a Fourier series in the range $(0, 2\pi)$.

9. (a) A random sample of 5 college students is selected and their grades in Mathematics
   and Statistics are found to be:

	1	2	3	4	5
Mathematics	85	60	73	40	90
Statistics	93	75	65	50	80

   Calculate Pearman's rank correlation coefficient.
   (b) State Euler's theorem and Fermat's theorem. Prove that if H and K are two finite
   subgroups of a group G and if $O(H)$ and $O(K)$ are relatively prime, show that
   $H \cap K = \{e\}$. (10 +10)