



Module-1

1. Evaluate $\int_0^\infty e^{-t} \int_0^t \frac{e^{-2u} \sin u}{u} du dt$
2. Prove that $\int_0^\infty \frac{e^{-t} \sin^2 t}{t} dt = \frac{1}{4} \log 5$
3. Find $L[t^4 \sinh 2t \cosh 2t]$
4. Obtain $L\left[\int_0^t e^t \frac{\sin t}{t} du\right]$
5. Find $L\left[\frac{e^{-2t} \sin 2t \cosh t}{t}\right]$.
6. If $f(t) = \begin{cases} t+1 & , \quad 0 \leq t \leq 2 \\ 3 & , \quad t > 2 \end{cases}$ then find $L[f'(t)]$.
7. Find the Laplace Transform of $\sin^5 t$.

Module-2

8. Find $L^{-1}\left\{\frac{1}{(s^2+9)(s^2+1)}\right\}$ using convolution theorem
9. Find $L^{-1}\left\{\frac{1}{(s+9)(s^2+1)}\right\}$ using convolution theorem.
10. Find $L^{-1}\left[\frac{1}{(s-4)^4(s+3)}\right]$ using convolution
11. Find $L^{-1}\left[\frac{1}{(s^2+4s+13)^2}\right]$ using convolution
12. Find $L^{-1}\left\{\frac{5s^2+8s-1}{(s+3)(s^2+1)}\right\}$ using method of partial fraction
13. Find $L^{-1}\left\{\frac{6s-4}{s^2-4s+20}\right\}$ using Shifting
14. Find $L^{-1}\left\{\frac{3s-7}{s^2-6s+8}\right\}$ using method of partial fraction.
15. Find L^{-1} transform of $\frac{s^2+2s+3}{(s^2+2s+2)(s^2+2s+5)}$ using method of partial fraction.

Module-05

16. Find the number of pairs of observation from the following data.
 $r = 0.5, \sum(x - \bar{x})(y - \bar{y}) = 200, \sigma_x = 10$ and $\sum(y - \bar{y})^2 = 100$
17. The coefficient of rank correlation of marks obtained by 10 students in math's and science was found to be 0.8. It was later discovered that the differences in ranks obtained by one of the students was wrongly recorded as 6 instead of 8. Find correct coefficient of rank correlation
18. Calculate Spearman's coefficient of rank correlation from the following data.

X	10	12	18	18	15	40
Y	12	18	25	25	50	25

19. Obtain the equation of the line of regression of cost on age from the following table giving the age of a car of certain make and the annual maintenance cost. Also find maintenance cost if age of the car is 9 years.

Age of car (in years):x	2	4	6	8
Maintenance cost: y(in thousands)	5	7	8.5	11



20. The regression lines of a sample are $3x + 2y = 26$ and $6x + y = 31$. Find the sample means and correlation coefficient between x and y . If the variance of y is 4, find the standard deviation of x .

21. Fit a second-degree curve to the following data.

x	1	2	3	4	5	6	7	8	9
y	2	6	7	8	10	11	11	10	9

22. Find equation of line of regression of Y on X for the following data.

X	5	6	7	8	9	10	11
Y	11	14	14	15	12	17	16

23. Fit Straight line

Year (X)	1951	1961	1971	1981	1991
Production (Y) (1000 tons)	10	12	8	10	13

Also estimate the production in 1987.