

- c. Find the Laplace Transform of the Periodic function defined by $f(t) = \frac{Kt}{T}$, $0 < t < T$,
 $f(t + T) = f(t)$. (07 Marks)

OR

- 6 a. Find Laplace Transform of $[(3t + 4)^3 + 5^t]$. (06 Marks)
 b. Find $L[t \cos at]$. (07 Marks)
 c. Express the following function in terms of Unit step function and hence find its Laplace Transform, where

$$f(t) = \begin{cases} t & , 0 < t < 4 \\ 5 & , t > 4 \end{cases} \quad (07 \text{ Marks})$$

Module-4

- 7 a. i) Find $L^{-1} \left[\frac{s}{s^2 - 16} \right]$ ii) Find $L^{-1} \left[\frac{(s+2)^3}{s^6} \right]$. (06 Marks)
 b. Find $L^{-1} \left[\frac{2s^2 + 5s - 4}{s(s-1)(s+2)} \right]$. (07 Marks)
 c. Find $L^{-1} \left[\frac{2s-1}{s^2 + 4s + 29} \right]$. (07 Marks)

OR

- 8 a. Find $L^{-1} \left[\frac{3}{s^2} + 2 \frac{e^{-s}}{s^3} - 3 \frac{e^{-2s}}{s} \right]$. (06 Marks)
 b. Find $L^{-1} \left[\frac{3s+2}{(s-2)(s+1)} \right]$. (07 Marks)
 c. Solve by using Laplace Transform, $\frac{d^2y}{dt^2} + k^2y = 0$, given that $y(0) = 2$, $y'(0) = 0$. (07 Marks)

Module-5

- 9 a. State and prove Addition Theorem of probability
 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$. (06 Marks)
 b. The probability that an integrated circuit chip will have defective etching is 0.12. The probability that it will have a crack defect is 0.29 and the probability that it will have both defects is 0.07. What is the probability that a newly manufactured chip will have
 i) an etching of crack defect? ii) neither defect? (07 Marks)
 c. If A and B are events with $P(A \cup B) = \frac{7}{8}$, $P(A \cap B) = \frac{1}{4}$, $P(A \cap \bar{B}) = \frac{1}{3}$. Find $P(A)$, $P(B)$ and $P(\bar{A} \cap B)$. (07 Marks)

OR

- 10 a. State and prove Baye's Theorem. (06 Marks)
 b. In a certain college 4% of Men students and 1% of Women students are taller than 1.8m. Further more 60% of the students are Women. If a student is selected at random and is found taller than 1.8m, what is the probability that the student is a Women? (07 Marks)
 c. The probability that a communication system will have high fidelity is 0.81 and the probability that it will have high fidelity and high selectivity is 0.18. Find the probability that a system will have high selectivity, given it has high fidelity. (07 Marks)
