Solved Short Questions

Write the short answers of the following :

Q.1: Define Laplace Transformation.

Q.2: What is the main use of Laplace Transformation?

Q.3: Find Laplace transformation of a constant K.

Q.4: What is Laplace transformation of t^n?

Q.5: Prove that $L\{u'(t)\} = S\,L\,\{u(t)\} - u(0)$

Q.6: Write the formula for $L\{u''(t)\}$

Q.7: Write Laplace transformation of e^{at}.

Q.8: If $L\{t^n\} = \frac{n!}{S^{n+1}}$ then what will be $L\{t^7\}$

Q.9: Write Laplace transformation of $t\,e^{at}$

Q.10: Find Laplace transformation of t.

Q.11: What is Laplace transformation of Sin (7t)?

Q.12: If $L\{e^{at}\} = \frac{1}{S-a}$ then what will be the Laplace transformation of (i) e^{-4t} (ii) $e^{t/2}$

Q.13: What is Laplace transformation of Cos (6t)?

Q.14: Define inverse Laplace transformation.

Q.15: What is the most important method to find the inverse Laplace transformation of function?

Q.16: What is the inverse Laplace transformation of (i) $\frac{1}{S^n}$ (ii) $\frac{1}{s+a}$?

Q.17: What is inverse Laplace transformation of the function $\frac{4}{S^2+16}$?

Q.18: Find $L^{-1}\left\{\frac{1}{s-a} - \frac{1}{s+a}\right\}$

Q.19: What is inverse Laplace transformation of $\frac{2}{S^3}$?

Answers

Q1. $L\{U(t)\} = \int_0^\infty e^{-st}\,u(t)\,dt$

Q2. The Laplace transformation is used to solve differential equations. It is more useful than classical methods.

Q3. $\frac{K}{S}$

Q4. $\frac{n!}{S^{n+1}}$ Q6. $L\{u''(t)\} = S^2 L\{u(t)\} - S\,u(o) - u'(o)$

Q7. $\frac{1}{s-a}$ Q8. $\frac{5040}{S^8}$ Q9. $\frac{1}{(S-a)^2}$

Q10. $\frac{1}{S^2}$ Q11. $\frac{7}{S^2+49}$

Q12. (i) $\frac{1}{S+4}$ (ii) $\frac{2}{2S-1}$ Q13. $\frac{S}{S^2+36}$

Q14. u(t) is called inverse Laplace transformation of F(S)and written as,
$u(t) = L^{-1}\{F(S\}$

Q15. The partial fraction method is most important method to find inverse Laplace transformation.

Q16. (i) $\frac{t^{n-1}}{(n-1)!}$ (ii) e^{-at}

Q17. Sin (4t) Q18. $e^{at} - e^{-at}$ Q19. t^2