Z -Transform
Question Bank
Engineering Mathematics-IV

1. If $Z[f(n)] = f(z) then : Z[a^n f(n)] = ¿$ ……….. [B.Tech May/June 2012]

2. For $n \geq 0, Z[e^{-2n} \cos 3n] = ¿$ ………… [B.Tech May/June 2012]

3. For $n \geq 0, Z[e^{3n} \sin hn]$ =……….. [B.Tech May/June 2012]

4. Solve: $y_{n+2} - 7y_{n+1} + 6y_n = 3^n, y(0) = 0, y(1) = 3$ [B.Tech May/June 2012]

5. Find: $z\left[\dfrac{5^n + 7^n}{n}\right], n \geq 1$ [B.Tech May/June 2012]

6. For $n \geq 0, Z[n^2] = ¿$ ……… [B.Tech(old) May/June 2012]

7. $z[e^{-an} f(n)] = ¿$ ……….. [B.Tech(old) May/June 2012]

8. For $n \geq 0, Z[3^n e^{3n}] = ¿$ ……….. [B.Tech(old) May/June 2012]

9. Solve: $f(n+2) + 6f(n+1) + 9f(n) = 2^n, with f(0) = 0, f(1) = 0 using$

   Z-transform.. [B.Tech(old) May/June 2012]

10. Solve: $y_{n+1} - y_n = 3n, y(0) = 0$ [B.Tech(old) May/June 2012]

11. For $k \geq 0, Z[\sin(\alpha + k)] = ¿$ ……….. [S.E. Oct Nov 2008]

12. For $k \geq 0, Z[k 3^k] = ¿$ ……….. [S.E. Oct Nov 2008]

13. For $k \geq 0, Z[a^k sin3k] = ¿$ ……….. [S.E. Oct Nov 2008]

14. Solve: $f(k+2) + 4f(k+1) + 3f(k) = 0, k \geq 0 if f(0) = 0, f(1) = 1$

    [S.E. Oct Nov 2008]

15. Solve: $12f(k+2) - 7f(k+1) + f(k) = 0, k \geq 0. Given that f(0) = 0, f(1) = 3$

    [S.E. Oct Nov 2008]

16. For $k \geq 0, Z[e^{-3k} \sin 2k] = ¿$ ……….. [B.Tech Nov/Dec 2011]

17. For $k \geq 0, Z[e^k sinkw] = ¿$ ……….. [B.Tech Nov/Dec 2011]

18. For $k \geq 0, Z[2^k \sin h 3k] = ¿$ ……….. [B.Tech Nov/Dec 2011]

19. Solve: $y_{k+1}+\dfrac{1}{3}y_k=\left(\dfrac{1}{3}\right)^k,\quad k\geq 0, if\ y(0)=0$. [B.Tech Nov/Dec 2011]

20. Solve: $f(k+2)-2\cos\alpha\,f(k+1)-f(k)=0\ if\ f(0)=0, f(1)=1$

21. For $k\geq 0, Z[e^{3k}\sin 2k]=¿$ ……….. [B.Tech Nov/Dec 2011]

22. For $n\geq 0, Z[2^n e^{-3n}]=¿$ ……….. [B.Tech(old) Nov/Dec 2011]

23. For $n\geq 0, Z[n e^{an}]=¿$ ……….. [B.Tech(old) Nov/Dec 2011]

24. Solve: $f(n+1)-2f(n)=2^n, n\geq 0, f(0)=0$ [B.Tech(old) Nov/Dec 2011]

25. If Z[f(n)]=f(z) , $n\geq 0\ then\ Z\left[e^{an}f(n)\right]=¿$ ……… [B.Tech Nov/Dec 2009]

26. For $k\geq 0, Z\left[\dfrac{f(k)}{k}\right]=¿$ ……… [B.Tech Nov/Dec 2009]

27. For $k\geq 0, Z[k]=¿$ ……….. [B.Tech Nov/Dec 2009]

28. Solve: $y_{k+1}+\dfrac{1}{2}y_k=\left(\dfrac{1}{2}\right)^k, k\geq 0\ if\ y(0)=0$ [B.Tech Nov/Dec 2009]

29. If $Z(u_n)=U(z)\ then\ Z(a^{-n}u_n)=¿$ ……….. [B.Tech May/June 2009]

30. $Z(n^p)$ =…………,P being positive integer [B.Tech May/June 2009]

31. $Z(n^3)=¿$ ……….. [B.Tech May/June 2009]

32. $Solve: y_{n+2}+6y_{n+1}+9y_n=2^n, with\ y_0=y_1=0\ using\ z-transform.$

[B.Tech S.E. May/June 2009]

33. $Solve: f(n+1)-f(n)=0, f(0)=1$ [B.Tech May/June 2009]

34. $Find: Z\left[2^n\sin\left(\dfrac{n\pi}{2}+\theta\right)\right]$ [B.Tech Nov/Dec 2007]

35. *Solve $y_n - 2y_{n-1} + y_{n-2} = n$*   [B.Tech Nov/Dec 2007]

36. *Find*: $Z\left[\dfrac{\sin(ak)}{k}\right], k \geq 0$

37. *Find*: $Z^{-1}\left[\dfrac{z^2}{\left(z-\dfrac{1}{4}\right)\left(z-\dfrac{1}{5}\right)}\right], |z| > \dfrac{1}{4}$ [B.Tech Nov/Dec

2007]

38. *Find*: $Z^{-1}\left[\dfrac{z^3}{(z-1)\left(z-\dfrac{1}{2}\right)^2}\right]$ [B.Tech

Nov/Dec 2007]

39. Find $Z\left[\left(\dfrac{1}{3}\right)^n \sin\left(\dfrac{n\pi}{2}\right)\right]$ [B.Tech Nov/Dec

2013]

40. Find: $Z\left[\sin^3 n\right]$ [B.Tech Nov/Dec

2013]

41. Find: $Z^{-1}\left[\dfrac{z}{(z-1)(z-3)}\right]$ [B.Tech Nov/Dec

2013]

42. Find: $Z\left[3^n\right], n \geq 1$ [B.Tech Nov/Dec

2013]

43. Find: $Z^{-1}\left[\dfrac{z+1}{z^2 - 2z + 1}\right]$ [B.Tech Nov/Dec

2013]

44. Solve by Z-transform: $f(n) + \dfrac{1}{4}f(n-1) = u(n) + \dfrac{1}{3}u(n-1)$ [B.TechNov/Dec

2013]

45. Find: $\left(\dfrac{1}{4}\right)^{¿n\vee¿}_{¿}$ $Z¿$ [B.Tech

Nov/Dec 2013]

46. Find Z-transform of $3^k, k < 0$ [S.E. May June

2013]

47. Find Z-transform of $\sin 3k, k \geq 0$ [S.E. May June 2013]

48. Solve: $y(k+2)-5y(k+1)+6y(k)=4^k, y(0)=0, y(1)=1$ by Z-transform.

49. Find inverse Z-transform of : $\dfrac{z}{z^2-2z+2}$ [S.E. May June 2013]

50. Find Z-transform of $e^{-3k}\cos 4k$ [S.E. May June 2013]

51. Find Z-transform of $e^{-3k}\sinh(2k+5)$ [S.E.(Old) May June 2013]

52. Find inverse Z-transform of : $\dfrac{z^2}{(z-1)\left(z-\dfrac{1}{2}\right)}$ [S.E.(Old) May June 2013]

53. Solve the equation: $12y_{k+2}-7y_{k+1}+y_k=0, k\geq 0, y(0)=0, y(1)=3$ [S.E. (Old) May June 2013]

54. Find Z-transform of $2^k\cos(3k+2)$ [S.E. Oct Nov 2011]

55. Find inverse Z-transform of : $\dfrac{z^2}{(z^2+1)}$ [S.E. Oct Nov 2011]

56. Solve: $y_{k+2}-5y_{k+1}+6y_k=k, y(0)=0, y(1)=0$ [S.E. Oct Nov 2011]

57. Find inverse Z-transform of : $\dfrac{10z}{(z-1)(z-2)}, |z|>2$ [S.E. Nov/Dec 2012]

58. Find Z-transform of $3^k\cosh ak$ [S.E. Nov/Dec 2012]

59. Solve by Z-transform $y_{k+1}+\dfrac{1}{2}y_k=\left(\dfrac{1}{2}\right)^k, k\geq 0$ if $y(0)=0$ [S.E. Nov/Dec 2012]

60. Find: $Z\left[2^n\sin\left(\dfrac{n\pi}{2}+\theta\right)\right]$ [S.E. May June 2012]

61. Find: $Z^{-1}\left[\dfrac{2z\left(z^2-1\right)}{\left(z^2+1\right)^2}\right]$ [S.E. May June 2012]

62. Solve: $y_n-2y_{n-1}+y_{n-2}=n$ [S.E. May June 2012]

63. Find inverse Z-transform of : $\dfrac{z^3}{\left(z-\dfrac{1}{4}\right)\left(z-1\right)}$ [B.Tech Nov/Dec 2013]

64. Using Z-transform Solve: $u_{k+2}-2u_{k+1}+u_k=2^k, y_0=2, y_1=1$
[B.Tech Nov/Dec 2013]

65. If $Z\left[f\left(n\right)\right]=\bar{f}\left(z\right)$ then $Z\left[\dfrac{f\left(n\right)}{n}\right]=\dot{\iota}$ ……….. [B.Tech Nov/Dec 2013]

66. If $Z\left[f\left(k\right)\right]=\bar{f}\left(z\right)$ then $Z\left[k^n a^k\right]=\dot{\iota}$ ………. [B.Tech Nov/Dec 2013]

67. Find Z-transform of $\sin\left(\dfrac{k\pi}{2}+\alpha\right), k\geq0$ [B.Tech May/June 2013]

68. Find: $Z\left[\dfrac{2^k+3^k}{k}\right], k\geq1$ [B.Tech Nov/Dec 2013]

69. Find inverse Z-transform of : $\dfrac{z^2}{\left(z-\dfrac{1}{2}\right)\left(z-\dfrac{1}{3}\right)}, |z|>\dfrac{1}{2}$ [B.Tech Nov/Dec 2013]

70. Solve: $f\left(n+2\right)+3f\left(n+1\right)+2f\left(n\right)=0$ with $y\left(0\right)=0, f\left(1\right)=1$

71. Find: $Z\left[2^k sinh\alpha k\right]$ [S.E. Nov/Dec 2009]

72. Solve: $u_{n+2}+4u_{n+1}+3u_n=3^n$ with $u_0=0, u_1=1$ [S.E. Nov/Dec 2009]

73. Find: $\dfrac{z^2}{\left(z-\dfrac{1}{4}\right)\left(z-\dfrac{1}{5}\right)}, |z|>\dfrac{1}{4}$ [S.E. May/June 2009]

74.   Find Z[$4^k \sin(2k+3)$¿$, k \geq 0$ [S.E. May/June 2009]

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