

EN09 101: ENGINEERING MATHEMATICS I

(Common for all branches)

SYLLABUS AND QUESTION BANK FOR MODULE 1I

Infinite Series

Syllabus: Definition of convergence and divergence of infinite series-Ratio test-Comparison test-Raabe's test-Root test-Series of positive and negative terms-Absolute convergence-Test for alternating series-Power series-Interval of convergence-Taylor's and Maclourin's series expansion of functions-Leibnitz' formula for n-th derivative of product of two functions-Its use in Taylor's and Maclourin's series expansions.

Question Bank

1. Define convergent and divergent sequence.(M 2011) (2 marks)
2. Discuss the convergence of the following series: (N 2004) (5 marks)
3. Discuss the convergence of (J 2006) (5 marks)
4. Test the convergence of (J 2007) (5 marks)
5. What is D'Alembert's ratio test? (M 2010) (2 marks)
6. Discuss the convergence of .(A 2012) (5 marks)
7. Examine the convergence or divergence of the series: (J 2007) (5 marks)
8. Test the convergence of the series: (J 2006)(N 2005) (7marks)
9. Discuss the convergence of .(A 2012) (10 marks)
10. Test the series for conditional convergence..(A 2012) (10 marks)
11. Examine the convergence of the series (D 2009) (5 marks)
12. Test the convergence of (D 2006) (5marks)

13. Test the convergence of (J 2006) (5 marks)
14. Test the convergence of the series: .(M 2011) (5 marks)
15. What is Raabe's test? Define.(A 2012) (2 marks)
16. State Raabe's test. Also show that for both ratio test and Raabe's test fail. (J 2006)J(2005) (8 marks)
17. Test the convergence of the series using Raabe's test(J 2007) (8 marks)
18. Test the convergence of the series using Raabe's test: .(M 2011) (10 marks)
19. Discuss the convergence of the series(D 2008) (5 marks)
20. Test the convergence of (J 2007) (8 marks)
21. Examine the convergence or divergence of the series: (D 2009) (J 2004)(7 marks)
22. Test the convergence of the series (N 2005) (8 marks)
23. Test the convergence of the series (J 2006) (8 marks)
24. Test the convergence of the series (D 2006) (8marks)
25. Discuss the convergence of the series (D 2006) (7marks)
26. Discuss the convergence of the series (D 2006) (8marks)
27. Test the convergence of the series where x is any positive number. (J 2006)(J 2005) (8 marks)
28. Show that the series is convergent when $r < 1$ and divergent when $r \leq 1$. (D 2008) (7 marks)

29. Test the convergence of the series (J 2006)(J 2005)(N 2005) (7marks)
30. Test the convergence of (N 2005) (8 marks)
31. Examine the character of the series: (i) .(M 2011) (10 marks)
32. Discuss the convergence of (J 2007) (7 marks)
33. Discuss the convergence of the following series: ..(M 2011) (5 marks)
34. Discuss the convergence of (M 2010) (5 marks)
35. Examine the convergence of the alternating series (J 2007) (7 marks)
36. Test whether the series is convergent or not. (M 2010) (10 marks)
37. State the values of x for which the following series converge: (M 2010) (10 marks)

38. Determine the interval of convergence for the series (D 2006) (7marks)

39. State Leibnitz test for alternating series. (N 2005) (2 marks)

40. Find the n-th derivative of (D 2009) (5 marks)

41. Show that n-th derivative of (J 2007) (7 marks)

42. If (D 2009) (8 marks)

43. Using Maclaurin's series expand $\sin x$. (J 2006) (N 2005)(5 marks)

44. Expand $\log(1+x)$ using Maclaurin's series. (D 2006) (5marks)

45. Using Maclaurin's series expand $\cos x$. (J 2007) (5 marks)

46. Expand using Maclaurin's series. (J 2006) (5 marks)

47. Using Maclaurin's series expand (J 2004) (5 marks)

48. Expand using Maclaurin's series (N 2005) (5 marks)

49. Expand $\tan x$ as infinite series. (J 2004) (5 marks)

50. Expand as far as the term in and show that when x is small(D 2009) (8 marks)
51. Expand up to third degree terms. (D 2008) (7 marks)
52. Show that (D 2009) (8 marks)
53. Find the Taylor's series expansion of .(M 2011) (5 marks)



