

MT224 Differential Equations (Call-II)

Wednesday, Feb 26, 2020

Course Instructors

Arfan Shahzad

Serial No:

Mid Term-I Exam

Total Time: 1 Hour

Total Marks: 25

Signature of Invigilator

Roll No

Section

Signature

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Verify at the start of the exam that you have a total of **five (5)** questions printed on **six (06)** pages including this title page.
2. Attempt all questions on the question-book and in the given order.
3. The exam is closed books, closed notes. Please see that the area in your threshold is free of any material classified as 'useful in the paper' or else there may a charge of cheating.
4. Read the questions carefully for clarity of context and understanding of meaning and make assumptions wherever required, for neither the invigilator will address your queries, nor the teacher/examiner will come to the examination hall for any assistance.
5. Fit in all your answers in the provided space. You may use extra space on the last page if required. If you do so, clearly mark question/part number on that page to avoid confusion.
6. Use only your own stationery and calculator. If you do not have your own calculator, use manual calculations.
7. Use only permanent ink-pens. Only the questions attempted with permanent ink-pens will be considered. Any part of paper done in lead pencil cannot be claimed for checking/rechecking.

	Q-1	Q-2	Q-3	Q-4	Q-5	Total
Total Marks	05	05	05	05	05	25
Marks Obtained						

Vetted By: _____ **Vetter Signature:** _____

University Answer Sheet Required:

No ☐

Yes ☐

Question # 1	05 Points
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Determine the convergence or divergence of the given sequences

a. $a_n = \frac{\ln (n+1)^2}{\sqrt{n}}$

b. $b_n = \frac{5^n + (-1)^n}{5^{n+1} + (-1)^{n+1}}$

Question # 2

05 Points

Find a formula for the nth partial sum of the series and use it to determine if the series converges or diverges. If series converges, find its sum

$$\sum_{n=1}^{\infty} \frac{6}{(2n-1)(2n+1)}$$

Question # 3

05 Points

Apply ratio test to determine the convergence or divergence of the series $\sum_{n=1}^{\infty} (-1)^n \frac{n^2(n+2)!}{n!3^{2n}}$.

Question # 4	05 Points
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Apply integral test to determine the convergence or divergence of the series $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n+1}(\sqrt{n+1}+1)}$.

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Question # 5	05 Points
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Apply alternating series test to determine the convergence or divergence of the series

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{\sqrt{n+1}}{\sqrt{n+1}}.$$