

Maheshtala College
Internal Examination–2021
B.Sc. Mathematics (General)
Paper–DSE-B
(Advanced Calculus)

Time:10AM-11AM

Date 08.07.2021
Full Marks 10

Choose the correct alternative and justify your answer
(1 mark for correct answer and 1 mark for justification).

Answer all questions : [$5 \times 2 = 10$]

1. Find the Laplace transform of the function $f(t) = \sinh at$.

- (a) $\frac{2a}{a^2+s^2}$
- (b) $\frac{a}{s^2-a^2}$
- (c) $\frac{2a}{\sqrt{s^2-a^2}}$
- (d) $\frac{a}{\sqrt{s^2-a^2}}$

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2. Find the inverse laplace transform of $\frac{s-3}{s^2+5s+6}$.

- (a) $6e^{-3t} - 5e^{2t}$
- (b) $6e^{-3t} + 5e^{-2t}$
- (c) $6e^{3t} - 5e^{2t}$
- (d) $6e^{-3t} - 5e^{-2t}$

2

3. Let $\{(-1)^{n-1}\}$ be a real sequence, then which of the following is true.

- (a) convergent
- (b) bounded
- (c) divergent
- (d) None

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4. Let $\{x_n\}$ be a real sequence where $x_n = \{(-1)^n + 1\}$. Find the vale of $\overline{\lim}x_n$ and $\underline{\lim}x_n$.

- (a) 0, 1
- (b) 1, 1
- (c) 2, 0
- (d) 0, 2

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5. The period of $\sin nx$ or $\cos nx$, where n is a positive integer, is —.

- (a) $\frac{\pi}{n}$
- (b) $\frac{2\pi}{n}$
- (c) $\frac{\pi}{2n}$
- (d) $\frac{3\pi}{n}$

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