18MAB102T-Surprise Test 3-June 18

* Required

Answer ALL Questions

Each question carries ONE mark.

1 *

The Laplace transform for a function $f(t)$ where $t > 0$ is defined by

(A) $L[f(t)] = \int_{-\infty}^{\infty} e^{-st} f(t)dt$

(B) $L[f(t)] = \int_{0}^{\infty} e^{-st} f(t)dt$

(C) $L[f(t)] = \int_{a}^{b} e^{-st} f(t)dt$

(D) $L[f(t)] = \int_{0}^{\infty} e^{st} f(t)dt$

- [ ] A
- [x] B
- [ ] C
- [ ] D

2 *

$L[t^3] =$

(A) $\frac{3}{s^3}$ (B) $\frac{6}{s^4}$

(C) $\frac{3}{s^4}$ (D) $\frac{6}{s^3}$

- A
- B
- C
- D

3 *

$L[\,e^{2t}\,t] =$

(A) $\frac{1}{s-2}$ (B) $\frac{1}{(s-2)^2}$

(C) $\frac{2}{(s-2)^3}$ (D) $\frac{1}{s^2}$

- A
- B
- C
- D

4 *

If $L[f(t)] = F(s)$, then by Initial Value Theorem $\lim_{t \to 0} f(t) =$

(A) $\lim_{s \to \infty} sF(s)$ (B) $\lim_{s \to 0} sF(s)$

(C) $\lim_{s \to \infty} F(s)$ (D) $\lim_{s \to 0} F(s)$

- (●) A
- ( ) B
- ( ) C
- ( ) D

5 *

The Laplace transform of a periodic function $f(t)$ with period p is given by

(A) $L[f(t)] = \frac{1}{1-e^{-sp}} \int_0^p e^{-st} f(t)dt$

(B) $L[f(t)] = \frac{1}{1+e^{-sp}} \int_0^p e^{-st} f(t)dt$

(C) $L[f(t)] = \frac{1}{1+e^{-sp}} \int_0^\infty e^{-st} f(t)dt$

(D) $L[f(t)] = \frac{1}{1-e^{-sp}} \int_0^\infty e^{-st} f(t)dt$

- (●) A
- ( ) B
- ( ) C
- ( ) D

6 *

$L^{-1}\left[\frac{1}{s-3}\right] =$

(A) e^{3t}	(B) e^{-3t}
(C) $\cos 3t$	(D) $\sin 3t$

- (●) A
- ( ) B
- ( ) C
- ( ) D

7 *

$L^{-1}\left[\frac{s}{s^2-9}\right] =$

(A) $\cos 3t$	(B) $\sin 3t$
(C) $\cosh 3t$	(D) $\sinh 3t$

- ( ) A
- ( ) B
- (●) C
- ( ) D

8 *

$L^{-1}\left[\frac{1}{(s-1)^2}\right] =$

(A) $t\,e^t$ (B) e^t
(C) e^{-t} (D) $t\,e^{-t}$

- (●) A
- ( ) B
- ( ) C
- ( ) D

9 *

$L^{-1}\left[\frac{s-a}{(s-a)^2+b^2}\right] =$

(A) $e^{at}\cosh bt$ (B) $e^{at}\cos bt$
(C) $\cosh bt$ (D) $\sinh bt$

- ( ) A
- (●) B
- ( ) C
- ( ) D

10 *

By linear property of inverse Laplace Transforms,
$L^{-1}[\,a\,F(s) + \,b\,G(s)] =$

(A) $L^{-1}\,[a\,F(s)\,]$ (B) $a\,L^{-1}[\,F(s)] + \,b\,L^{-1}[\,G(s)]$
(C) $L^{-1}\,[b\,G(s)\,]$ (D) $L^{-1}[\,F(s)] + \,L^{-1}[\,G(s)]$

- [ ] A
- [x] B
- [ ] C
- [ ] D

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