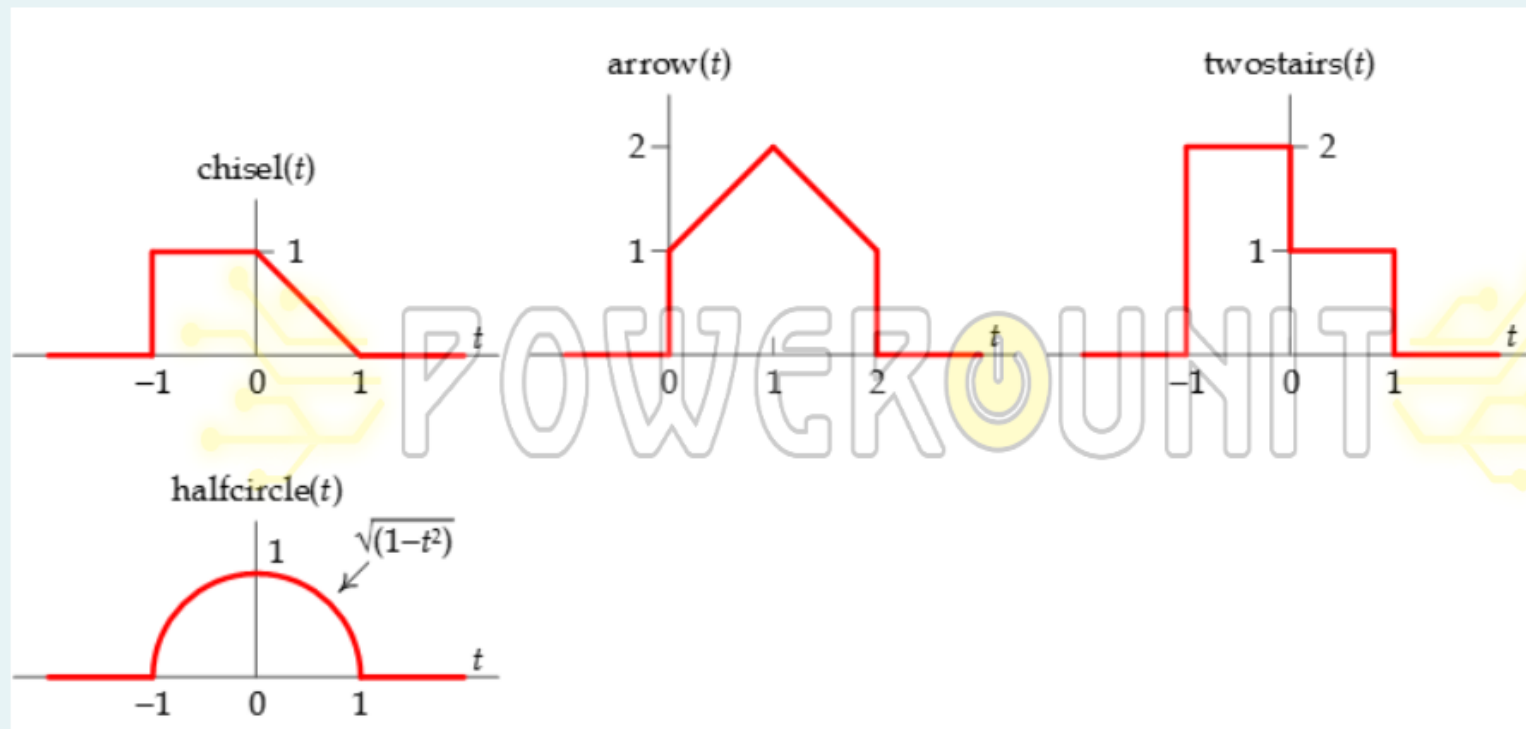The following four signals are used in the exam. Please draw them on a piece of paper to use them later. Notice that you cannot go back to this page after you moved on.

Next page

Question 1

Not yet
answered

Marked out of
2.00

⚑ Flag
question

A signal m(t) is sampled to create the ideally sampled signal x(t). To recover m(t) from x(t) at the receiver, we feed x(t) into:

○ SPF

○ KPF0

○ BSTP

○ Modulator

○ HPF

○ BPF

◉ LPF

○ None of the choices

Clear my choice

Next page

Question 2

Not yet answered

Marked out of 2.00

⚑ Flag question

The system $y[n] = x[3n]$ is:

- ○ Unstable and time-invariant
- ○ Stable and time-invariant
- ○ Stable and time-variant
- ○ None of the choices0
- ○ Unstable and time-variant

Next page

Question 3

Not yet answered

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⚑ Flag question

The total energy in $x(t) = 64.5$ rect $(0.8\ t)$ is:

- ○ 64.5000
- ○ None of the choices
- ○ 5200.3125
- ○ 51.6000
- ● 4160.2500
- ○ 2662.5600
- ○ 6500.3906
- ○ 3328.2000

Clear my choice

Next page

Question 4

Not yet answered

Marked out of 2.00

⚐ Flag question

A practical BPF with maximum gain of 74. The cut-off frequencies are at $\omega 1$ and $\omega 2$ where $H(\omega 1) = H(\omega 2) = ?$

- ○ 18.5000
- ○ 148.0000
- ○ 74.0000
- ○ 104.6518
- ○ None of the choices
- ○ 37.0000
- ○ 52.3259
- ○ 296.0000

Next page

Question 5

Not yet answered

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⚑ Flag question

The power spectral density of 31 cos(274 t) is:

- ○ $62.0000\, \delta(\omega - 274.0000) + 62.0000\, \delta(\omega + 274.0000)$
- ○ $97.3894\, \delta(\omega - 274.0000) + 97.3894\, \delta(\omega + 274.0000)$
- ○ $31.0000\, \delta(\omega - 274.0000) + 31.0000\, \delta(\omega + 274.0000)$
- ○ $1509.5353\, \delta(\omega - 274.0000) + 1509.5353\, \delta(\omega + 274.0000)$
- ○ $961.0000\, \delta(\omega - 274.0000) + 961.0000\, \delta(\omega + 274.0000)$
- ○ $480.5000\, \delta(\omega - 274.0000) + 480.5000\, \delta(\omega + 274.0000)$
- ○ $31.0000\, \delta(\omega - 548.0000) + 31.0000\, \delta(\omega + 548.0000)$
- ○ None of the choices

Next page

Question **6**

Not yet answered

Marked out of 2.00

⚑ Flag question

The signal $m(t) = 66 \, \text{sinc}(14 \, t)$ bandwidth is:

- ○ 2.2282 Hz
- ○ 7.0000 Hz
- ○ ∞ Hz
- ⦿ 14.0000 Hz
- ○ 28.0000 Hz
- ○ None of the choices
- ○ 175.9292 Hz
- ○ 3.5000 Hz

Clear my choice

Next page

Question **7**

Not yet answered

Marked out of 2.00

⚑ Flag question

The system $y(t) = x^2(t)$ is:

○ None of the choices

○ Linear and non-causal

○ Non-linear and causal

○ Non-linear and non-causal

○ Linear and causal

Next page

Question 8

Not yet answered

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⚑ Flag question

A signal $m(t) = 66\,\text{sinc}(14t)$ is sampled using sampling frequency 224 Hz to create the ideally sampled signal $x(t)$. The value of $X(\omega)$ at $\omega=0$ is:

- ○ 1056.0000
- ○ None of the choices
- ○ 0.2946
- ○ 66.0000
- ○ 132.0000
- ○ 4.7143
- ○ 0.0000
- ○ 2.3571

Next page

Question 9

Not yet answered

Marked out of 2.00

⚑ Flag question

A signal $m(t) = 66 \operatorname{sinc}(14\,t)$ is sampled to create the ideally sampled signal $x(t)$ with 4.46428571 ms between successive samples. The $M(\omega)$ copies inside $X(\omega)$ are ____ apart.

- ○ 14.0000 rad/s
- ○ 112.0000 rad/s
- ○ None of the choices
- ○ 28.0000 rad/s
- ○ 2814.8670 rad/s
- ○ There are no copies of $M(\omega)$
- ○ 703.7168 rad/s
- ○ 1407.4335 rad/s

Next page

Question 10

Not yet answered

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⚑ Flag question

A signal m(t) = 66 sinc(14 t) is sampled to create the ideally sampled signal x(t) with 4.46428571 ms between successive samples. The Fourier transform X(ω) consists of:

○ 2 copies of M(ω)

○ ∞ copies of M(ω)

○ 4.4643 copies of M(ω)

○ Zero copies of M(ω)

○ 71.4286 copies of M(ω)

○ 14.0000 copies of M(ω)

○ One copy of M(ω)

○ None of the choices

Next page

For the signal $x(t) = rep\_8 [88 \; chisel(t / 0.96)]$, the trigonometric Fourier series coefficient b_3 is:

Answer: 0

Next page

Question **12**

Not yet answered

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⚑ Flag question

For the signal $x(t) = rep_8 [88 \, chisel(t / 0.96)]$, the trigonometric Fourier series coefficient b_1 is:

Answer:

Next page

Question 13

Not yet answered

Marked out of 2.00

⚑ Flag question

For the signal $x(t) = 63\ \text{arrow}(\ t\ /\ 5\ )$, the imaginary part of the Fourier transform $\text{Im}[\ X(\omega)\ ]$ at $\omega = 0.08$ rad/s is: [Hint: Use Fourier transform properties]

Answer:

Next page

Question **14**

Not yet answered

Marked out of 2.00

⚑ Flag question

For the signal $x(t) = \text{rep}\_8 \left[88 \, \text{chisel}(t / 0.96) \right]$, the trigonometric Fourier series coefficient a_4 is:

Answer: _____

Next page

Question **15**

Not yet answered

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⚑ Flag question

For the signal $x(t) = \text{rep}_8 [\, 88 \, \text{chisel}(\, t \,/\, 0.96)\,]$, the trigonometric Fourier series coefficient a_1 is:

Answer: [   ]

Next page

Question **16**

Not yet answered

Marked out of 2.00

⚑ Flag question

For the signal x(t) = 63 arrow(t / 5), the magnitude (not phase) spectrum density at ω = 0 rad/s is: [Hint: Use Fourier transform properties]

Answer: arrow(.5

Next page

Question 18

Not yet answered

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⚑ Flag question

For the signal $x(t) = 63$ arrow$(t / 5)$, the real part of the Fourier transform Re$[X(\omega)]$ at $\omega = 0.18$ rad/s is: [Hint: Use Fourier transform properties]

Answer: 1

Next page

Question **19**

Not yet answered

Marked out of 2.00

⚐ Flag question

For the signal $x(t) = rep_8 [88 \, chisel(t / 0.96)]$, the trigonometric Fourier series coefficient a_0 is:

Answer: [   ]

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Question **20**

Not yet answered

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Flag question

For the signal x(t) = 63 arrow(t / 5), the imaginary part of the Fourier transform Im[X(ω)] at ω = 0.18 rad/s is: [Hint: Use Fourier transform properties]

Answer: