Unit 12 - Week 10: First order circuits with time-varying inputs

Assignment 10
The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-11-25, 23:59 IST.

1) In the circuit above, \( v_i(0^-) = 1 \text{ V.} \) \( v_i(t) = 2 \exp(-t/1 \mu\text{s}) \text{ V.} \) The output for \( t > 0 \) is of the following form:

\[
v_o(t) = \frac{v_1 \exp(-t/\tau_1) + v_2 \exp(-t/\tau_2)}{\text{Forced response}}
+ \frac{v_2 \exp(-t/\tau_2)}{\text{Natural response}}
\]

Determine \( v_1, \tau_1, v_2, \tau_2. \)

(The answer must be in volts (V). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 3.9, 4.1

2) Value of \( \tau_1 \)

(The answer must be in microseconds (\( \mu\text{s} \)). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1

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https://onlinecourses.nptel.ac.in/noc20_ee64/unit?unit=21&assessment=226
3) **Value of V₂**

(The answer must be in volts (V). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -3.1,-2.9

4) **Value of τ₂**

(The answer must be in microseconds (μs). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 2

5) In the circuit above, \( v_s (0^-) = -1 \) V. \( v_s (t) = 3 \exp(-t/2 \text{ μs}) \) V. The output for \( t > 0 \) is of the following form:

\[
v_o(t) = (V_1 + V_2 \tau/t) \exp(-t/\tau)
\]

Determine \( V_1 \) and \( V_2 \).

**Value of \( V_1 \)**

(The answer must be in volts (V). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 3.9,4.1

6) **Value of \( V_2 \)**

(The answer must be in volts (V). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -3.1,-2.9
7) In the circuit above, \( i_L(0^-) = 1 \text{ mA} \), \( v_i(t) = 2 \cos(5 \cdot 10^5 t) \text{ V} \). The output for \( t > 0 \) is of the following form:

\[
v_o(t) = V_1 \cos(\omega_0 t + \phi_0) + V_2 \exp(-t/\tau)
\]

Determine \( V_1, V_2, \phi_0, \omega_0 \).

Value of \( V_1 \)

(The answer must be in volts (V). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.3, 1.5

Value of \( V_2 \)

(The answer must be in volts (V). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 0

Value of \( \phi_0 \)

(The answer must be in degrees (°). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -46, -44

Value of \( \omega_0 \)

(The answer must be in kiloradians per second (krad/s). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 500
11) In the circuit above, \( v_s(t) = \sin(10^5 t) \) V. The forced response is \( V_p \cos(10^5 t + \phi) \). Determine \( V_p \) and \( \phi \).

**Value of \( V_p \)**

(The answer must be in **millivolts** (mV). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 789,792

12) **Value of \( \phi \)**

(The answer must be in **degrees** (°). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -110,-107

13) In the circuit above, \( v_s(t) = \cos(10^6 t) \) V. The forced response is \( V_p \cos(10^6 t + \phi) \). Determine \( V_p \) and \( \phi \).

**Value of \( V_p \)**

(The answer must be in **millivolts** (mV). Round off fractional answers to 1 decimal place.)
14) Value of $\phi$

(The answer must be in degrees ($^\circ$). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 199,201

15) Value of $V_p$

(The answer must be in millivolts (mV). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 199,201

16) Value of $\phi$

(The answer must be in degrees ($^\circ$). Round off fractional answers to 1 decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 0