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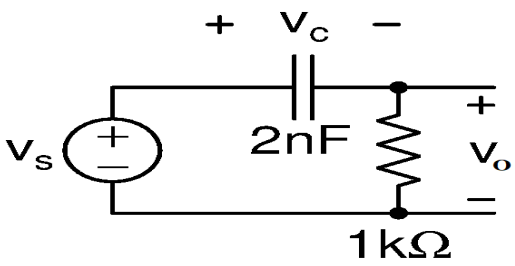
Unit 12 - Week 10 : First order circuits with time-varying inputs

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, $v_c(0^-) = 1$ V. $v_s(t) = 2\exp(-t/1\ \mu s)$ V. The output for $t > 0$ is of the following form:

$$v_o(t) = \underbrace{V_1 \exp(-t/\tau_1)}_{\text{Forced response}} + \underbrace{V_2 \exp(-t/\tau_2)}_{\text{Natural response}}$$

Determine V_1, τ_1, V_2, τ_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

1 point

2) Value of τ_1

(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) 1

1 point

3) 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

1 point

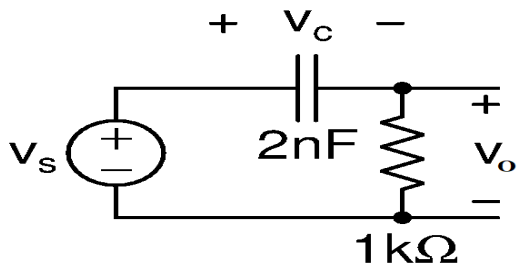
4) Value of τ_2

(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

1 point

5)



In the circuit above, $v_c(0^-) = -1$ V. $v_s(t) = 3\exp(-t/2\,\mu s)$ V. The output for $t > 0$ is of the following form:

$$v_o(t) = (V_1 + V_2\,t/\tau)\exp(-t/\tau)$$

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

1 point

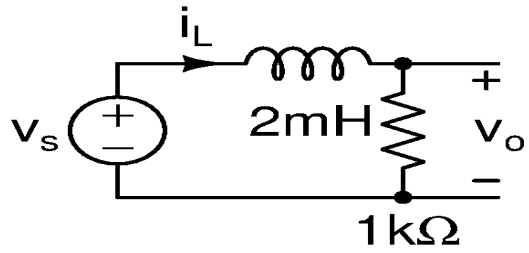
6) Value of V_2

(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

1 point

7)



In the circuit above, $i_L(0^-) = 1$ mA. $v_s(t) = 2\cos(5 \cdot 10^5 t)$ 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, ϕ_0, ω_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

1 point

8) 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

1 point

9) Value of ϕ_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

1 point

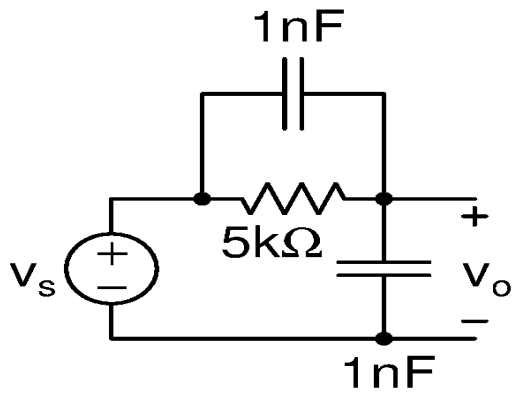
10) Value of ω_0

(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

1 point

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 ϕ.

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

1 point

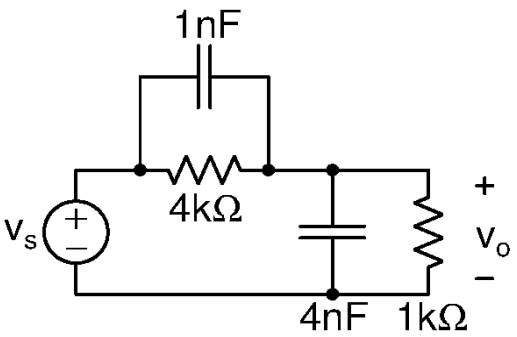
12) Value of ϕ

(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

1 point

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 ϕ.

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

1 point

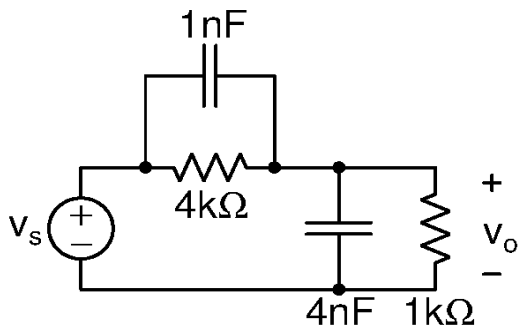
14) Value of ϕ

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

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

1 point

15)



In the circuit above, $v_s(t) = \cos(10^5 t)$ V. The forced response is $V_p \cos(10^5 t + \phi)$. Determine V_p and ϕ.

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

1 point

16) Value of ϕ

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

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

1 point