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NPTEL

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Courses » Semiconductor Devices and Circuits

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 1 - How to access the portal

Course outline

How to access the portal

- How to access the home page?
- How to access the course page?
- How to access the MCQ, MSQ and Programming assignments?
- Quiz : Assignment 0
- Assignment 0 solution

Week 1 : Excursion in Quantum Mechanics

Week 2 : Excursion in Solid State Physics

Week 3 : Density of States, Fermi Function and Doping

Week 4 : Recombination-

Assignment 0

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2018-08-01, 23:59 IST.**

1) An ideal capacitor of capacitance C has a dc voltage V across the plates. What is the charge stored in the capacitor? ***1 point***

- $Q = CV^2$
- $Q = CV$
- $Q = C/V$
- $Q = V/C$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$Q = CV$

2) A time-varying sinusoidal voltage is applied across the plates of an ideal capacitor. If the frequency of the sinusoidal voltage decreases, the current through the capacitor _____. ***1 point***

- increases
- decreases
- remains same
- stops to flow

No, the answer is incorrect.
Score: 0

Accepted Answers:

$10^{-6}F$

$10^{-9}F$

$10^{6}F$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$10^{-6}F$

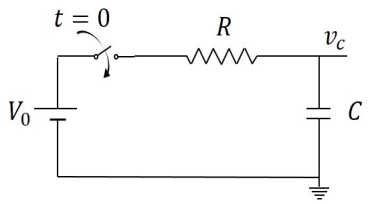
4) Which of the following statement(s) is(are) correct? ***1 point***

- Resistor can store charge.
- Capacitor "blocks" DC and "allows" AC.
- Capacitor "allows" DC and "blocks" AC.
- An ideal capacitor can store charge for an infinite amount of time.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Capacitor "blocks" DC and "allows" AC.
An ideal capacitor can store charge for an infinite amount of time.

5) In an RC series circuit, shown below, the switch is closed at $t = 0$. Assuming the switch is ***1 point*** ideal and the capacitor does not have any initial charge, the variation of the voltage across the capacitor is described by _____.



$v_c(t) = const = 0$

$v_c(t) = const = V_0$

$v_c(t) = V_0(1 - exp(-t/RC))$

$v_c(t) = V_0 exp(-t/RC)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$v_c(t) = V_0(1 - exp(-t/RC))$

6) Classify the following differential equation: ***1 point***

$e^x \frac{dy}{dx} + 5y = x^3 y$

- Linear but not separable
- Separable but not linear
- Neither separable nor linear
- Both separable and linear

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both separable and linear

7) Let us consider the following differential equation: ***1 point***

$\frac{d^2y}{dx^2} = e^y$

How will you express $\left(\frac{dy}{dx}\right)^2$ in terms of the dependent variable y?

- $\left(\frac{dy}{dx}\right)^2 = 2e^y + constant$
- $\left(\frac{dy}{dx}\right)^2 = e^y + constant$
- $\left(\frac{dy}{dx}\right)^2 = e^{2y} + constant$
- $\left(\frac{dy}{dx}\right)^2 = constant$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\left(\frac{dy}{dx}\right)^2 = 2e^y + constant$

8) Let us consider the following differential equation: ***1 point***

$\frac{d^3y}{dx^3} - x\frac{dy}{dx} + (1-x)y = siny$

How many number of boundary conditions required to get a unique solution of the above differential equation?

- 1
- 2
- 3
- 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
3

9) The slope of a function $y = f(x)$ at a point (x, y) is given by ***1 point***

- $y = f(x)$
- $\frac{dy}{dx}$
- $\frac{d^2y}{dx^2}$

$\left(\frac{dy}{dx}\right)^2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{dy}{dx}$

10) Let us consider two points A and B on an arbitrary curve $y = f(x)$. The magnitude of double derivative $\left(\frac{d^2y}{dx^2}\right)$ is higher at point A. The tangent to the curve at both the points are equal. What we can conclude about the radius of curvature at point A and B? ***1 point***

- Radius of curvature at A and B are equal.
- Radius of curvature at A is higher than that at B.
- Radius of curvature at A is lower than that at B.
- Not enough information

No, the answer is incorrect.
Score: 0

Accepted Answers:
Radius of curvature at A is lower than that at B.

Previous Page End