Unit 12 - week 10

Assignment 10

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

Due on 2019-10-09, 23:59 IST.

Each of the following questions has four options out of which one or more options can be correct. Individual marks are mentioned corresponding to each questions. In case of multiple answers partial marks will be awarded for every correct option chosen provided no incorrect option have been chosen. 0 marks are awarded for questions not attempted.

1) Let $\{W(t),\ t \geq 0\}$ be a Wiener process. Then Cov(W(t) - W(s), W(t) + 2 W(s)) where $0 < s < t$ is given by *2 points*

- $t - s$
- $t + s$
- $t + 5s$
- $t + 9s$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$t - s$

2) Suppose that $\{S(t), t \geq 0\}$, is a geometric Brownian motion with drift parameter $\mu = 0.01$ and volatility parameter $\sigma = 0.2$. If $S(0) = 100$. Then, $E[S(10)]$ is *2 points*

- 134.98
- 135
- 132.12
- 130.01

No, the answer is incorrect.
Score: 0
Accepted Answers:
134.98

3) Let $\{W(t), t \geq 0\}$ be a Brownian motion. Then, $E((W(t) - W(s))^6)$ is equal to *2 points*

- $(t-s)^3$
- $15(t-s)^3$
- $120(t-s)^3$
- 0

No, the answer is incorrect.
Score: 0
Accepted Answers:
$15(t-s)^3$

4) Let $\{W(t), t \geq 0\}$ be a Brownian motion. Then, $E(W(t)|W(1) = x)$ for $1 < t$ is equal to *2 points*

- $x + t$
- x
- $x - t$
- tx

No, the answer is incorrect.
Score: 0
Accepted Answers:
x

5) Let $\{W(t), t \geq 0\}$ be a Brownian motion. Then, $E(W(s)|W(t) = x)$ for $0 < s < t$ is equal to *2 points*

- $\frac{sx}{t}$
- $\frac{st}{x}$
- $\frac{tx}{s}$
- $\frac{x}{st}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{sx}{t}$

6) Let $\{W_t, t \geq 0\}$ be a Brownian motion. Then, the value of $\int_0^T W_t dW_t$ is given by *2 points*

- W_T^2
- $W_T^2 - \frac{1}{2}T$
- $\frac{1}{2}W_T^2 - \frac{1}{2}T$
- $\frac{1}{2}W_T^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{2}W_T^2 - \frac{1}{2}T$

7) Let $\{W_t, t \geq 0\}$ be a Brownian motion and $\{X_t, t \geq 0\}$ and $\{Y_t, t \geq 0\}$ are two stochastic processes satisfying the following SDE's *2 points*

$dX_t = a_x(t)dt + b_x(t)dW_t$
$dY_t = a_y(t)dt + b_y(t)dW_t$
then the SDE for the product X_tY_t is given by

- $dX_tY_t = X_tdY_t + Y_tdX_t$
- $dX_tY_t = X_tdY_t + Y_tdX_t + a_x(t)a_y(t)dt$
- $dX_tY_t = X_tdY_t + Y_tdX_t + b_x(t)b_y(t)dt$
- $dX_tY_t = X_tdY_t + Y_tdX_t + b_x(t)b_y(t)dW_t$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$dX_tY_t = X_tdY_t + Y_tdX_t + b_x(t)b_y(t)dt$

8) Let $\{W_t, t \geq 0\}$ be a Brownian motion. Then, $Var(W_t|W_1 = y)$ for $0 < t < 1$ is equal to *2 points*

- ty
- $t(1-t)$
- t^2y^2
- $t(1-t)t^2y^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$t(1-t)$